

TRANSISTOR MODULE

SQD200A40/60



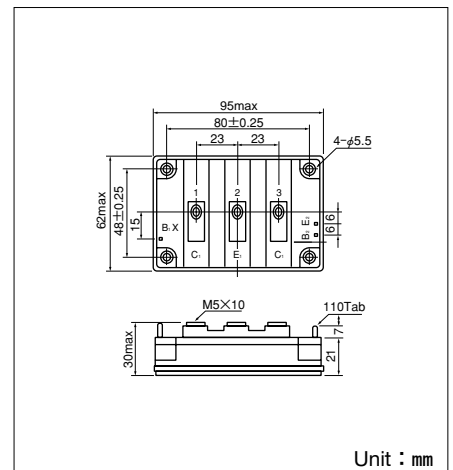
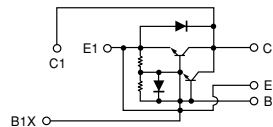
UL;E76102 (M)

SQD200A is a Darlington power transistor module which a high speed, high power Darlington transistor. The transistor has a reverse paralled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction,

- $I_C=200A$, $V_{CEX}=400/600V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base
- V_{EBO} 10V for faster switching speed.

(Applications)

Motor Control (VVVF), AC/DC Servo, UPS, Switching Power Supply, Ultrasonic Application



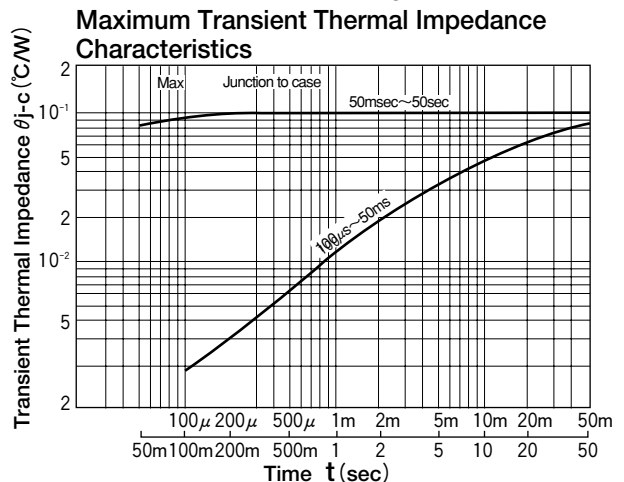
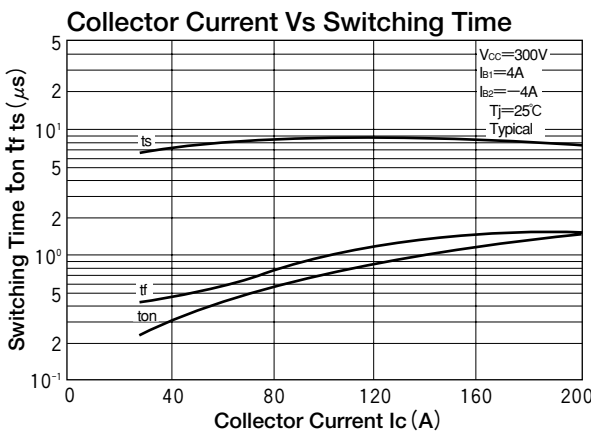
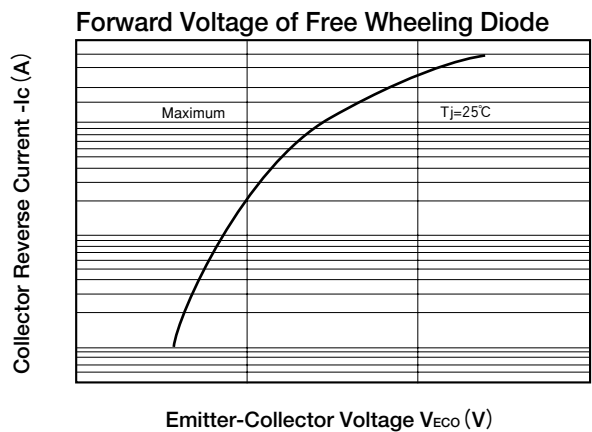
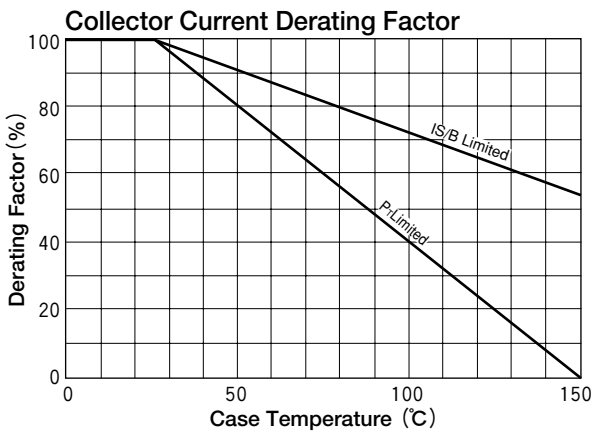
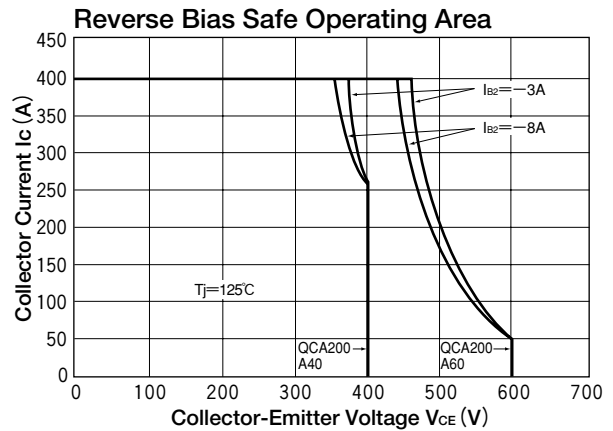
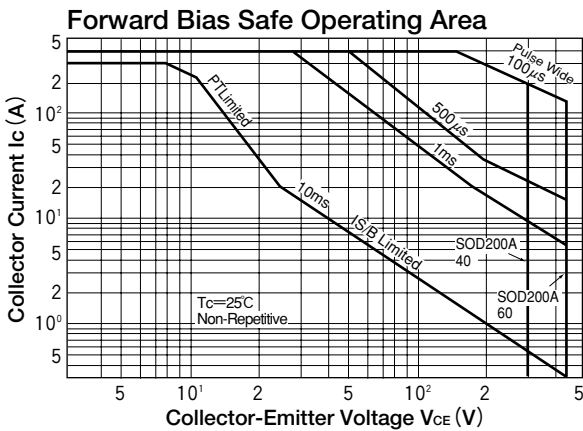
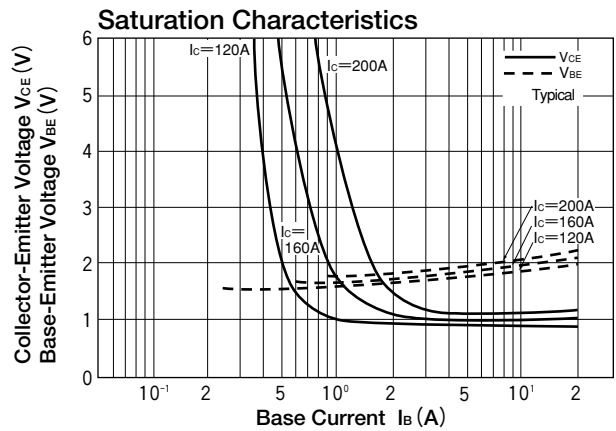
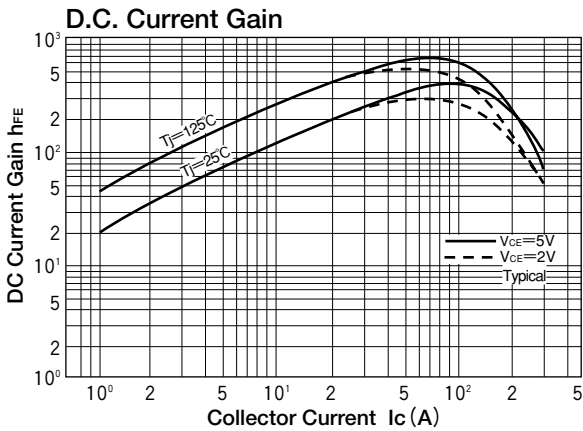
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			SQD200A40	SQD200A60	
V_{CBO}	Collector-Base Voltage		400	600	V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	400	600	V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() =pw \leq 1ms	200 (400)		A
$-I_C$	Reverse Collector Current		200		A
I_B	Base Current		12		A
P_T	Total power dissipation	$T_C=25^\circ C$	1250		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	(M5)	Recommended Value 1.5-2.5 (15-25)		N·m (kgf·cm)
		Terminal (M5)	Recommended Value 1.5-2.5 (15-25)		
	Mass	Typical Value	380		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CBO}$		2.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$		800	mA
$V_{CEO(SUS)}$	Collector Emitter Sustaining Voltage	$I_C=1A$	SQD200A40	300	V
			SQD200A60	450	
$V_{CEX(SUS)}$	Collector Emitter Sustaining Voltage	$I_C=40A, I_{B2}=-8A$	SQD200A40	400	V
			SQD200A60	600	
h_{FE}	DC Current Gain	$I_C=200A, V_{CE}=2V$	75		
		$I_C=200A, V_{CE}=5V$	100		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=200A, I_B=2.7A$		2.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=200A, I_B=2.7A$		2.5	V
t_{on}	Switching Time	$V_{CC}=300V, I_C=200A$ $I_{B1}=4A, I_{B2}=-4A$	On Time		μs
t_s			Storage Time		
t_f			Fall Time		
V_{ECO}	Collector-Emitter Reverse Voltage	$-I_C=200A$		1.4	V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part		0.1	$^\circ C/W$
		Diode part		0.3	



TRANSISTOR MODULE

SQD300A40/60

TOP



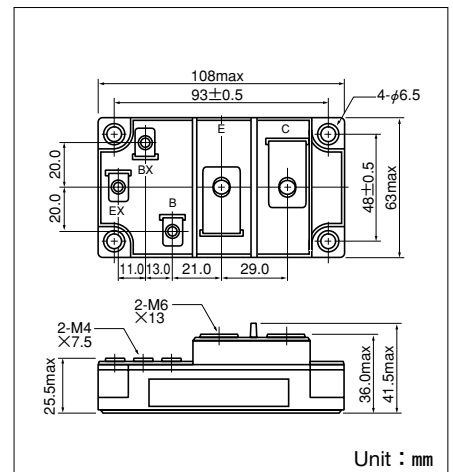
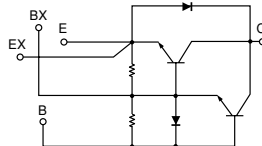
UL;E76102 (M)

SQD300A is a Darlington power transistor module which a high speed, high power Darlington transistor. The transistor has a reverse paralled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction,

- $I_C=300A$, $V_{CEX}=400/600V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base
- V_{EBO} 10V for faster switching speed.

(Applications)

Motor Control (VWVF), AC/DC Servo, UPS, Switching Power Supply, Ultrasonic Application



Unit : mm

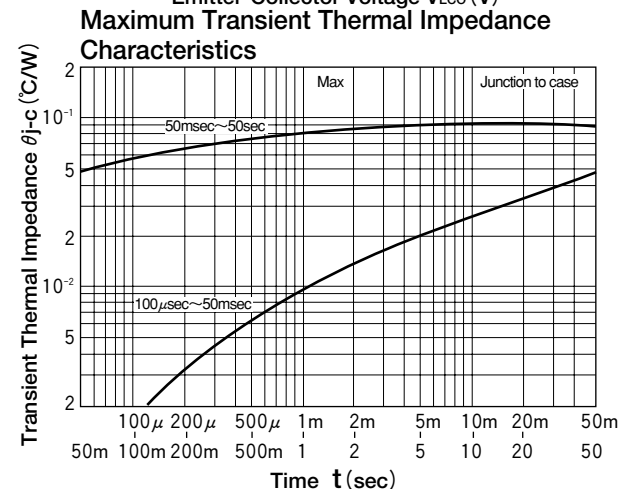
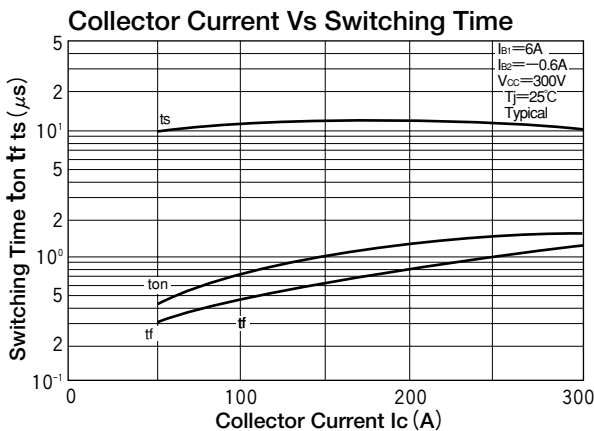
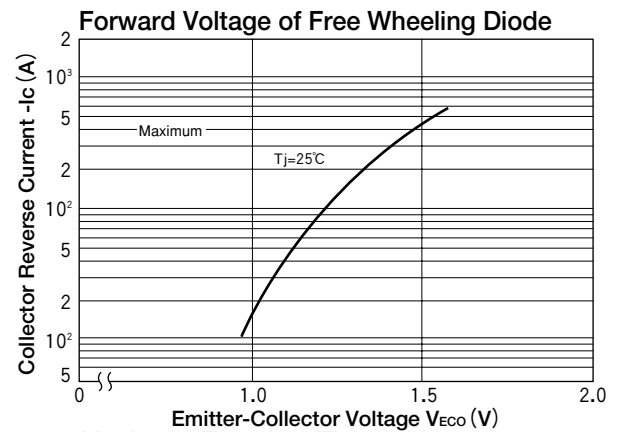
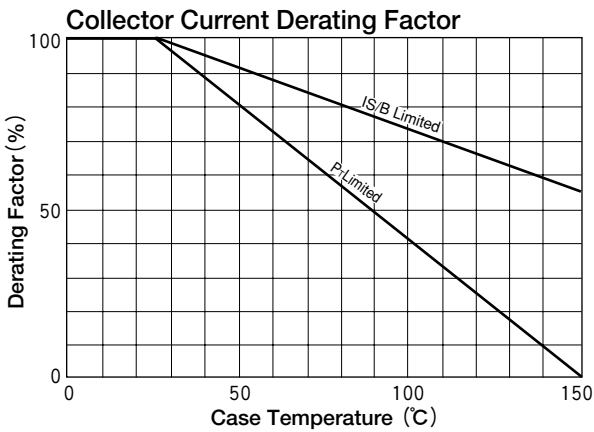
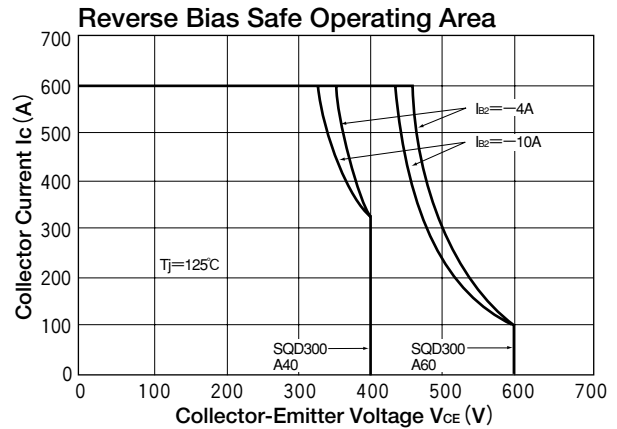
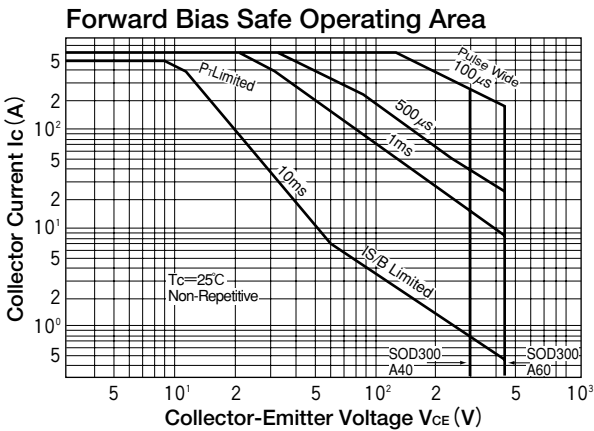
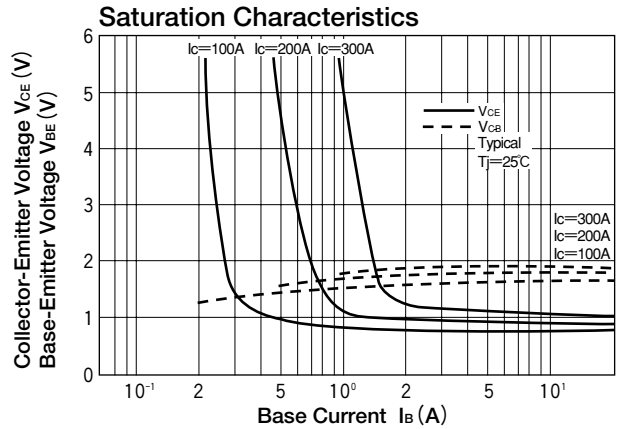
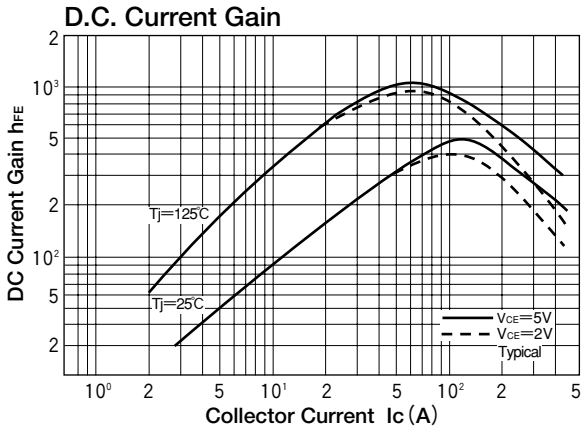
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			SQD300A40	SQD300A60	
V_{CBO}	Collector-Base Voltage		400	600	V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	400	600	V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() =pw≤1ms	300 (600)		A
$-I_C$	Reverse Collector Current		300		A
I_B	Base Current		18		A
P_T	Total power dissipation	$T_C=25^\circ C$	1380		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	Mounting (M6)	Recommended Value 2.5-3.9 (25-40)		N·m (kgf·cm)
		Terminal (M6)	Recommended Value 2.5-3.9 (25-40)		
		Terminal (M4)	Recommended Value 1.0-1.4 (10-14)		
	Mass	Typical Value	460		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CBO}$		3.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$		1000	mA
$V_{CEO(SUS)}$	Collector Emitter Sustaning Voltage	SQD300A40 SQD300A60	$I_C=1A$	300	V
$V_{CEX(SUS)}$		SQD300A40 SQD300A60	$I_C=60A, I_{B2}=-10A$	400 600	V
h_{FE}	DC Current Gain	$I_C=300A, V_{CE}=2V$		75	
		$I_C=300A, V_{CE}=5V$		100	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300A, I_B=4.0A$		2.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=300A, I_B=4.0A$		2.5	V
t_{on}	Switching Time	On Time		2.0	μs
t_s		Storage Time	$V_{CC}=300V, I_C=300A$ $I_{B1}=6A, I_{B2}=-6A$	12.0	
t_f		Fall Time		3.0	
V_{ECO}	Collector-Emitter Reverse Voltage	$-I_C=300A$		1.4	V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part		0.09	$^\circ C/W$
		Diode part		0.3	



TRANSISTOR MODULE

SQD300AA100

TOP



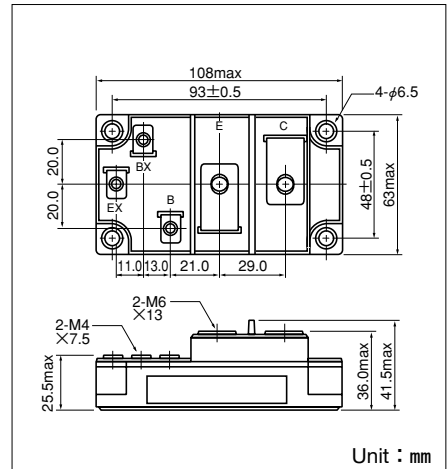
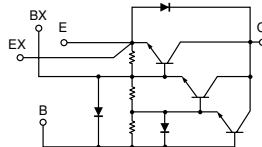
UL;E76102 (M)

SQD300AA100 is a Darlington power transistor module with a high speed, high power Darlington transistor. The transistor has a reverse paralled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction.

- $I_C=300A$, $V_{CEX}=1000V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base

(Applications)

Motor Control (VVVF), AC/DC Servo, UPS, Switching Power Supply, Ultrasonic Application



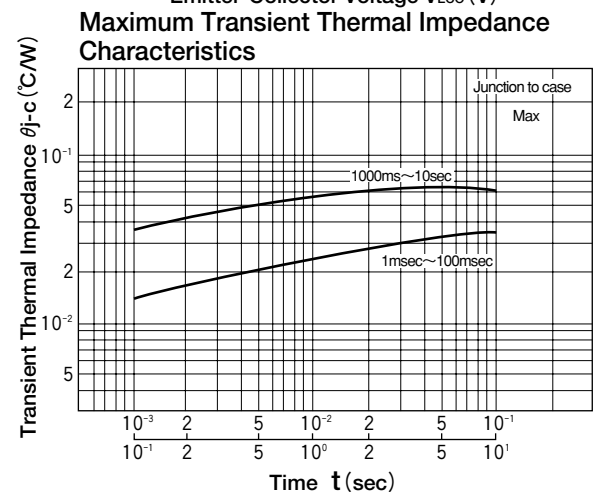
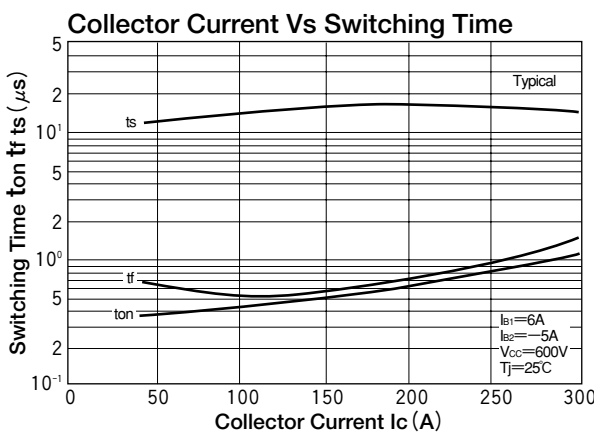
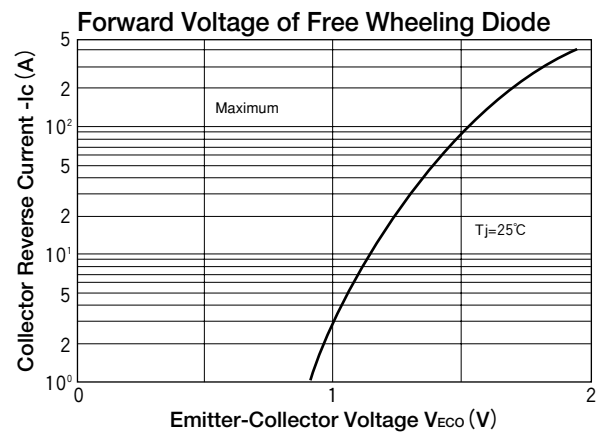
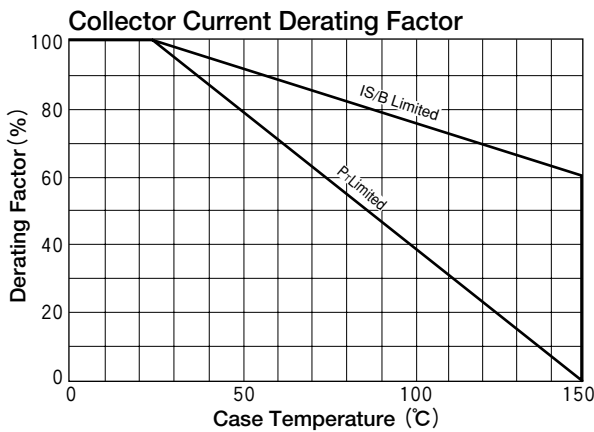
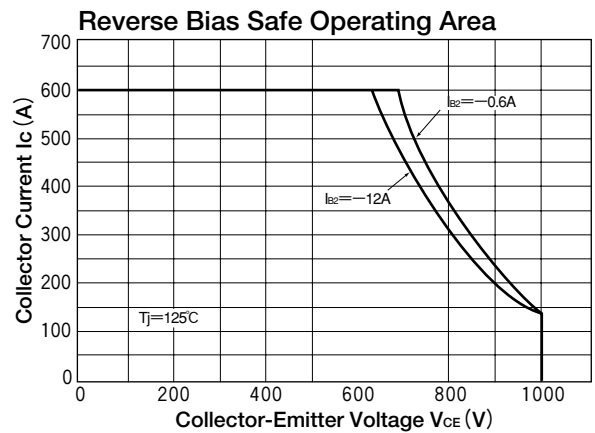
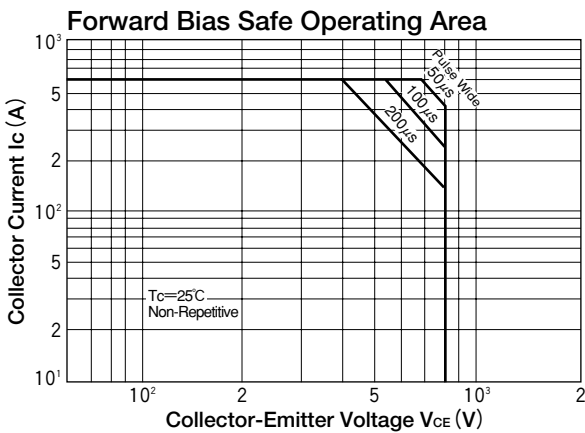
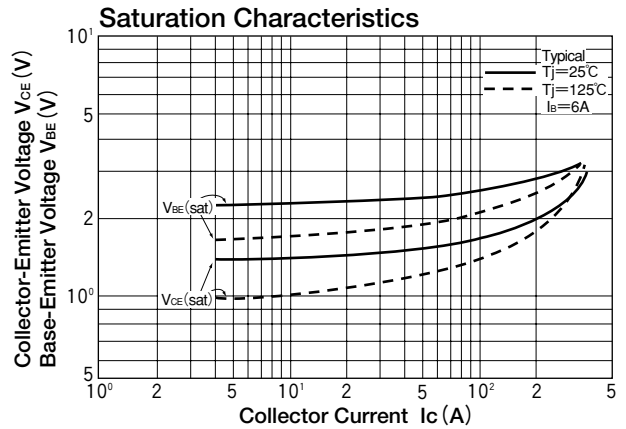
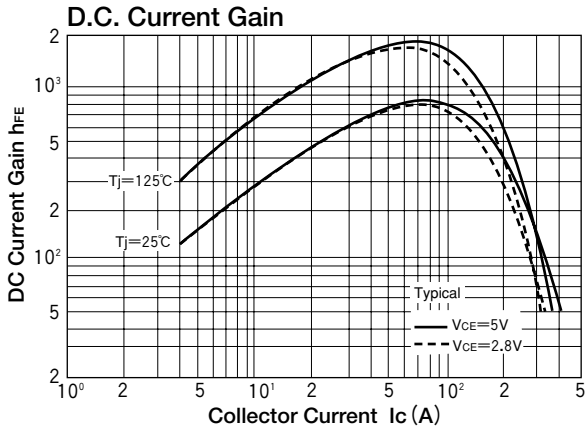
Maximum Ratings

($T_j=25^{\circ}C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			SQD300AA100		
V_{CBO}	Collector-Base Voltage		1000		V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	1000		V
V_{EBO}	Emitter-Base Voltage		7		V
I_C	Collector Current		300		A
$-I_C$	Reverse Collector Current		300		A
I_B	Base Current		16		A
P_T	Total power dissipation	$T_C=25^{\circ}C$	2000		W
T_j	Junction Temperature		-40 to +150		$^{\circ}C$
T_{stg}	Storage Temperature		-40 to +125		$^{\circ}C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	Mounting (M6)	Recommended Value 2.5-3.9 (25-40)	4.7 (48)	N·m (kgf·cm)
		Terminal (M6)	Recommended Value 2.5-3.9 (25-40)	4.7 (48)	
		Terminal (M4)	Recommended Value 1.0-1.4 (10-14)	1.5 (15)	
	Mass	Typical Value	520		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=1000V$		2.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=7V$		800	mA
$V_{CEX(SUS)}$	Collector Emitter Sustaning Voltage	$I_C=60A$, $I_{B2}=-12A$	1000		V
h_{FE}	DC Current Gain	$I_C=300A$, $V_{CE}=2.8V$	75		
		$I_C=300A$, $V_{CE}=5V$	100		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300A$, $I_B=6A$		2.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=300A$, $I_B=6A$		3.5	V
t_{on}	Switching Time	On Time		3.0	μs
t_s		Storage Time	$V_{CC}=600V$, $I_C=300A$ $I_{B1}=6A$, $I_{B2}=-6A$	15.0	
t_f		Fall Time		3.0	
V_{ECO}	Collector-Emitter Reverse Voltage	$I_C=-300A$		1.8	V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part		0.063	$^{\circ}C/W$
		Diode part		0.3	



TRANSISTOR MODULE

SQD300AA120

TOP



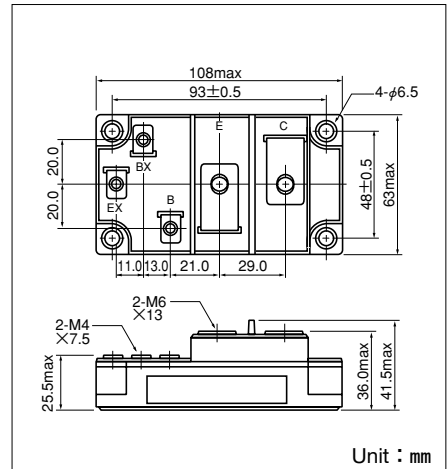
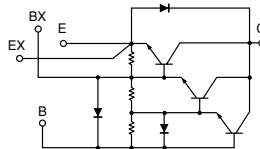
UL;E76102 (M)

SQD300AA120 is a Darlington power transistor module with a high speed, high power Darlington transistor. The transistor has a reverse paralled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction.

- $I_C=300A$, $V_{CEX}=1200V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base

(Applications)

Motor Control (VVVF), AC/DC Servo, UPS, Switching Power Supply, Ultrasonic Application



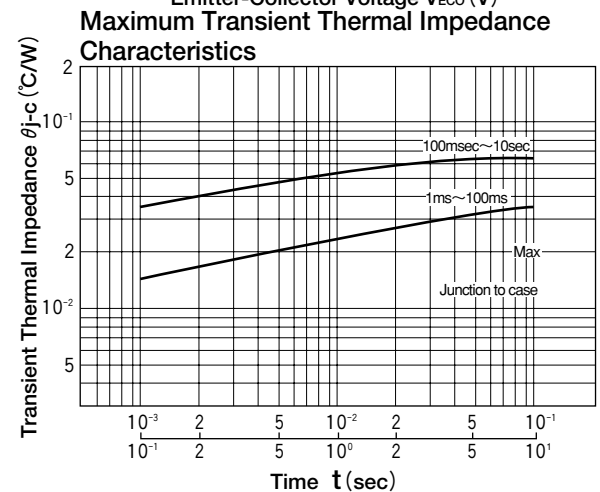
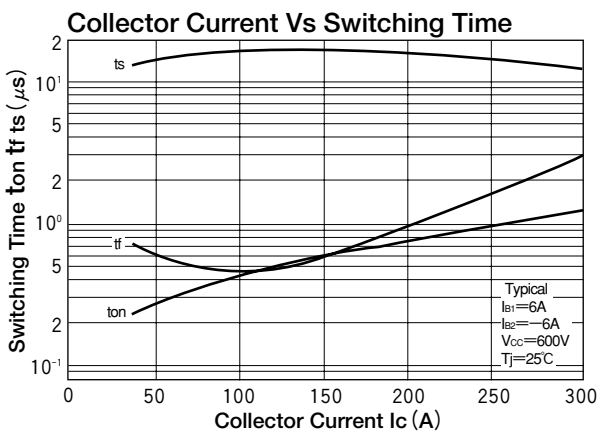
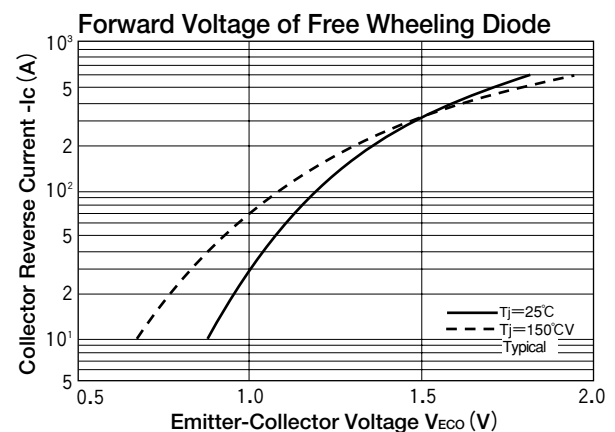
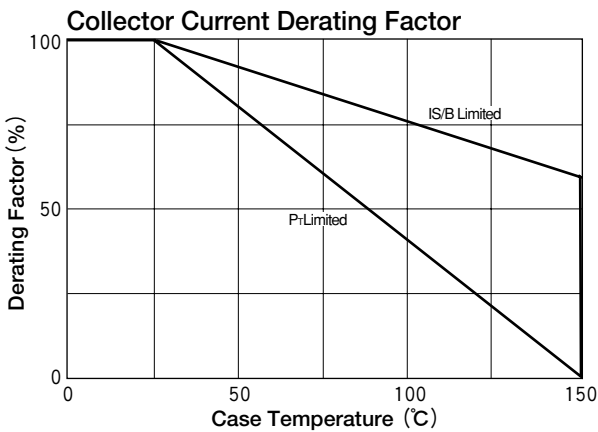
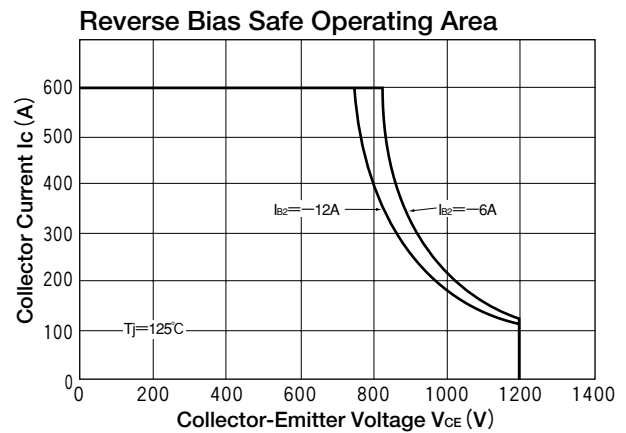
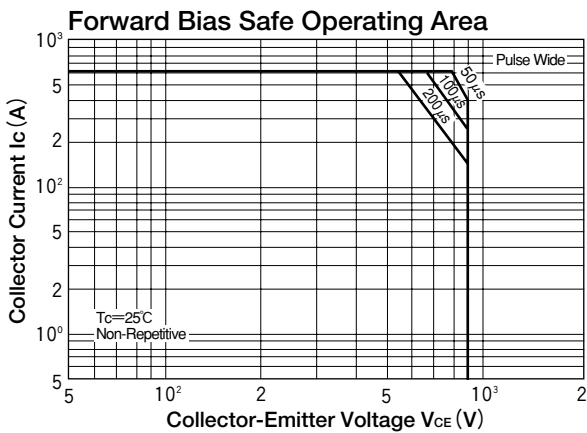
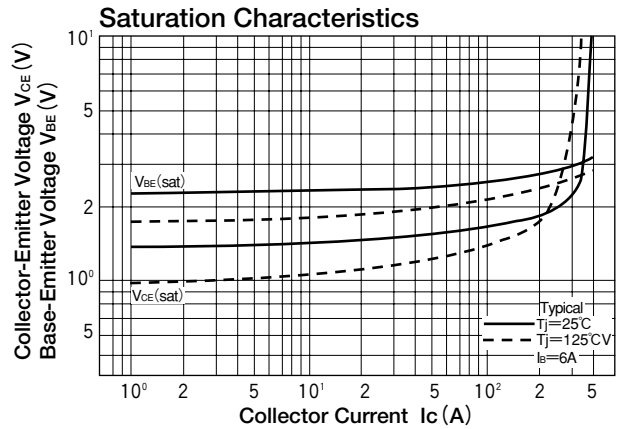
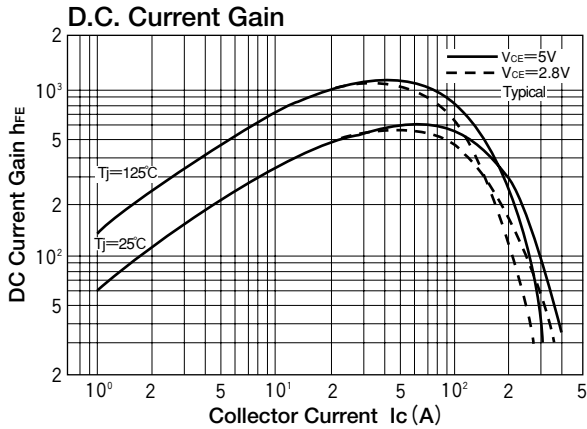
Maximum Ratings

($T_j=25^{\circ}C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			SQD300AA120		
V_{CBO}	Collector-Base Voltage		1200		V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	1200		V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current		300		A
$-I_C$	Reverse Collector Current		300		A
I_B	Base Current		16		A
P_T	Total power dissipation	$T_C=25^{\circ}C$	2000		W
T_j	Junction Temperature		-40 to +150		$^{\circ}C$
T_{stg}	Storage Temperature		-40 to +125		$^{\circ}C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	(M6)	Recommended Value 2.5-3.9 (25-40)	4.7 (48)	N·m (kgf·cm)
		Terminal (M6)	Recommended Value 2.5-3.9 (25-40)	4.7 (48)	
		Terminal (M4)	Recommended Value 1.0-1.4 (10-14)	1.5 (15)	
	Mass	Typical Value	470		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=1200V$		4.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=10V$		1200	mA
$V_{CEX(SUS)}$	Collector Emitter Sustaning Voltage	$I_C=60A$, $I_{B2}=-12A$	1200		V
h_{FE}	DC Current Gain	$I_C=300A$, $V_{CE}=5V$	75		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300A$, $I_B=6A$		3.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=300A$, $I_B=6A$		3.5	V
t_{on}	Switching Time	On Time		3.0	μs
t_s		Storage Time	$V_{CC}=600V$, $I_C=300A$ $I_{B1}=6A$, $I_{B2}=-6A$	15.0	
t_f		Fall Time		3.0	
V_{ECO}	Collector-Emitter Reverse Voltage	$I_C=-300A$		1.8	V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part		0.063	$^{\circ}C/W$
		Dioe part		0.3	



TRANSISTOR MODULE

SQD400AA100



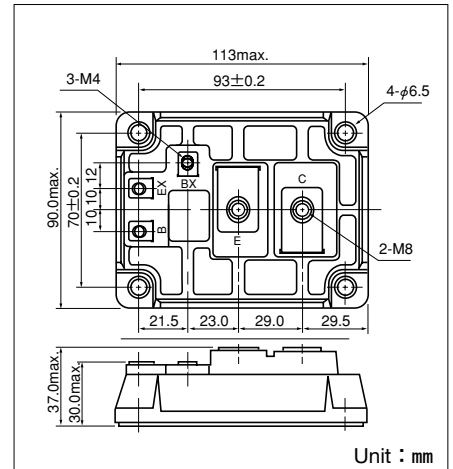
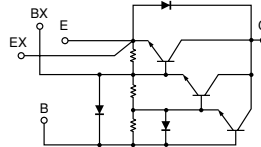
UL;E76102 (M)

SQD400AA100 is a Darlington power transistor module with a high speed, high power Darlington transistor. The transistor has a reverse paralleled fast recovery diode. The mounting base of the module is electrically isolated from Semiconductor elements for simple heatsink construction.

- $I_C=400A$, $V_{CEX}=1000V$
- Low saturation voltage High DC current gain
- Isolated monuting base

(Applications)

Motor Control (VVF), AC/DC Servo, UPS, Switching Power Supply, Ultrasonic Application



Unit : mm

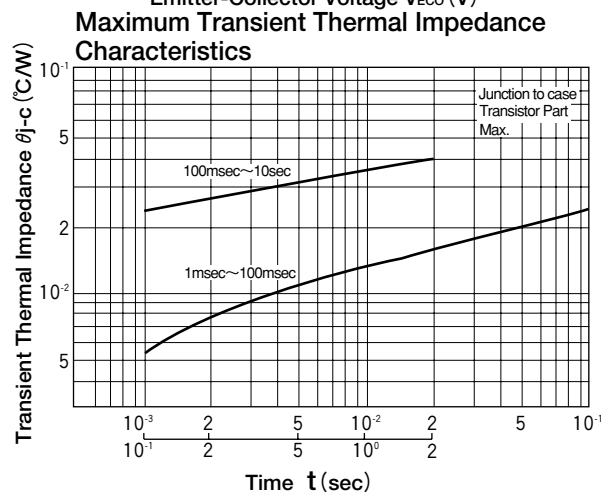
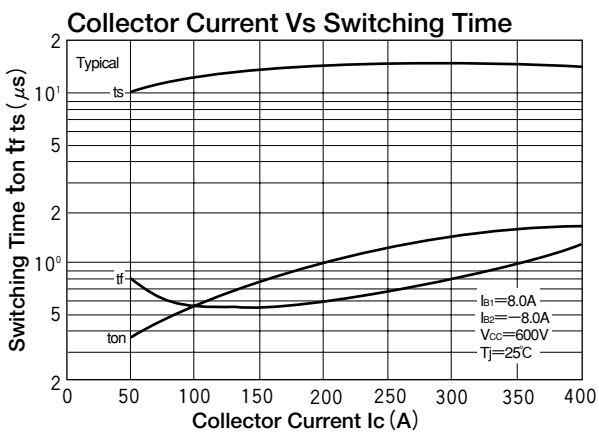
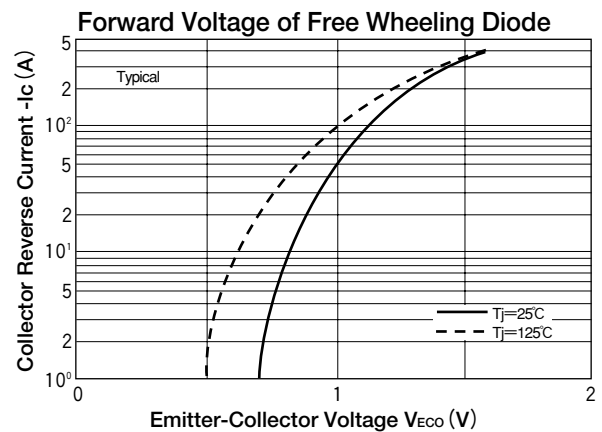
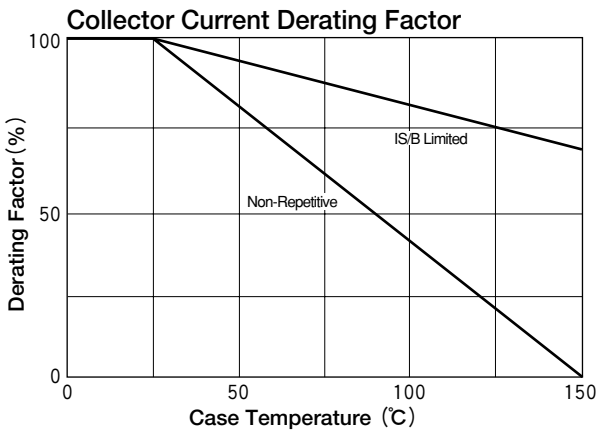
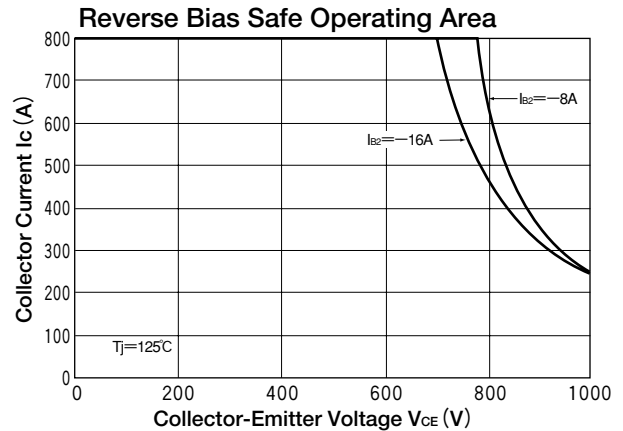
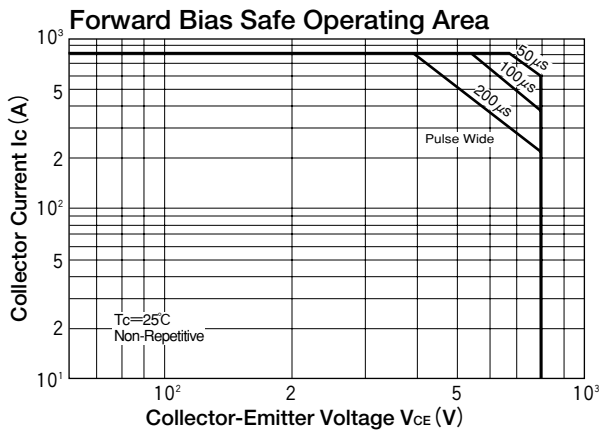
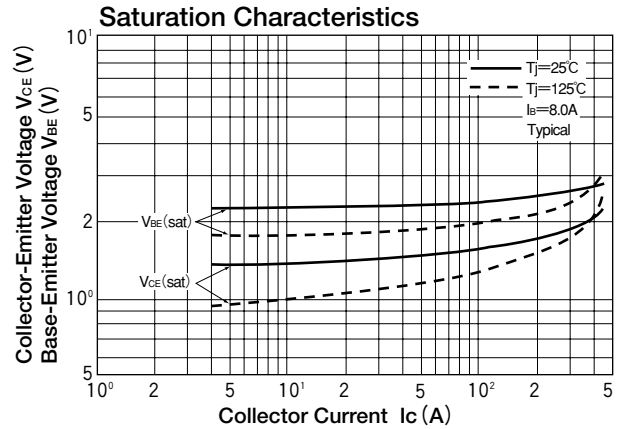
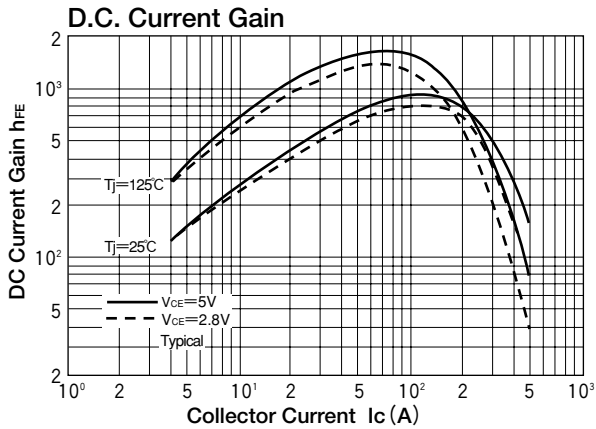
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit	
			SQD400AA100			
V_{CBO}	Collector-Base Voltage		1000		V	
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	1200		V	
$V_{CEX(SUS)}$	Collector-Emitter Sustaning Voltage	$I_C=-80A, I_B=-18A$	1000		V	
V_{EBO}	Emitterr-Base Voltage		10		V	
I_C	Collector Current		400		A	
$-I_C$	Reverse Collector Current		400		A	
I_B	Base Current		20		A	
P_T	Total power dissipation	$T_C=25^\circ C$	3120		W	
T_j	Junction Temperature		-40 to +150		$^\circ C$	
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$	
V_{iso}	Isolation Voltage	A.C. 1minute	2500		V	
	Mounting Torque	Mouting (M6)	Recommended Value	2.5-3.9 (25-40)	4.7 (48)	N·m (kgf·cm)
		Terminal (M8)	Recommended Value	8.8-10 (90-105)	11 (115)	
		Terminal (M4)	Recommended Value	1.0-1.4 (10-14)	1.5 (15)	
	Mass	Typical Value	670		g	

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=1000V$		3.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=10V$		1000	mA
h_{FE}	DC Current Gain	$I_C=300A, V_{CE}=2.8V$	75		
		$I_C=400A, V_{CE}=5V$	100		
$V_{CE(sat)}$	Collector-Emitter Sturation Voltage	$I_C=400A, I_B=8A$	2.5		V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=400A, I_B=8A$	3.5		V
t_{on}	Switching Time	$V_{CC}=600V, I_C=400A$ $I_{B1}=8A, I_{B2}=-8A$	3.0		μs
t_s			16.0		
t_f			3.0		
V_{ECO}	$I_C=-400A$	Collector-Emitter Reverse Voltage	1.8		V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part	0.04		$^\circ C/W$
		Diode part	0.16		



TRANSISTOR MODULE

SQD400AA120



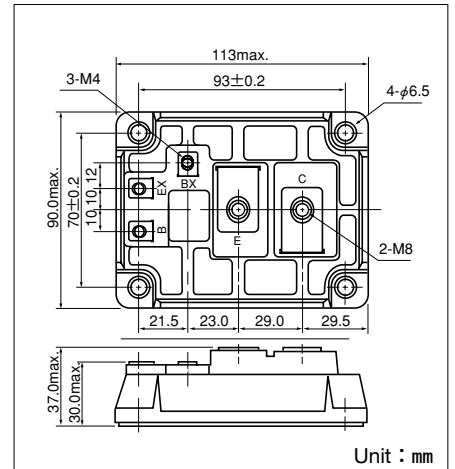
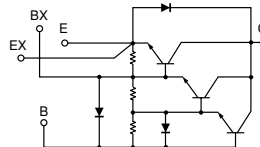
UL;E76102 (M)

SQD400AA120 is a Darlington power transistor module with a high speed, high power Darlington transistor. The transistor has a reverse paralleled fast recovery diode. The mounting base of the module is electrically isolated from Semiconductor elements for simple heatsink construction.

- $I_C=400A$, $V_{CEX}=1200V$
- Low saturation voltage for higher efficiency
- High DC current gain.
- Isolated monuting base

(Applications)

Motor Control (VVVF), AC/DC Servo, UPS,
Switching Power Supply, Ultrasonic Application



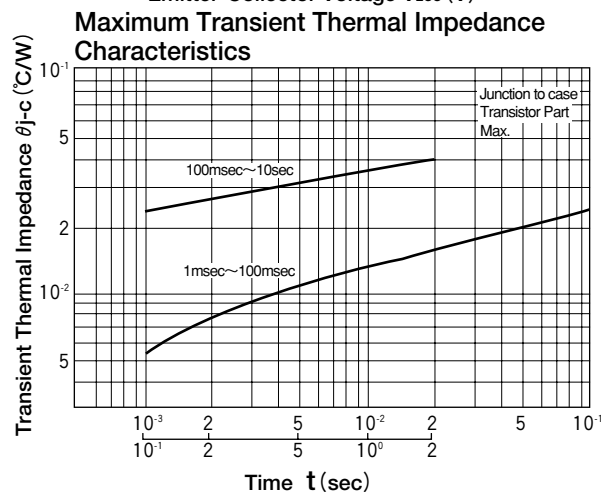
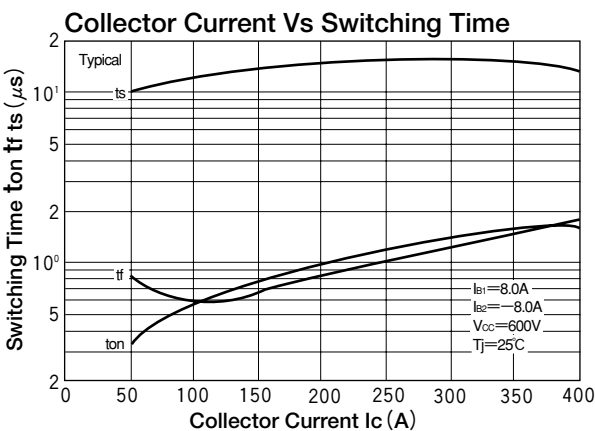
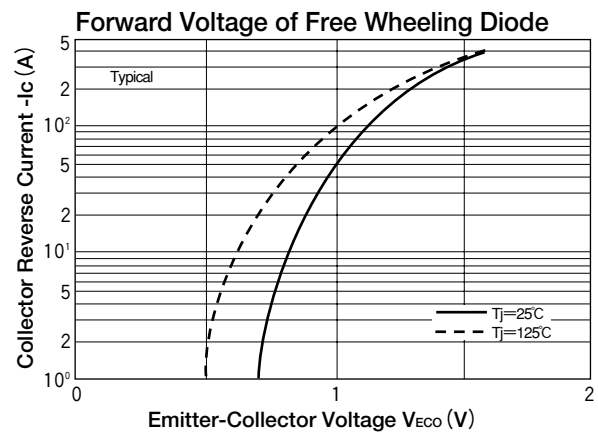
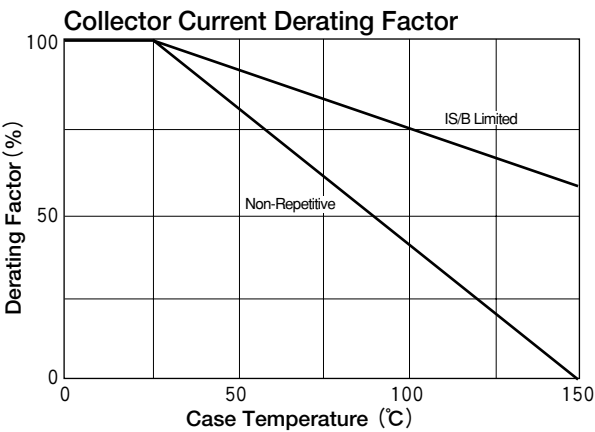
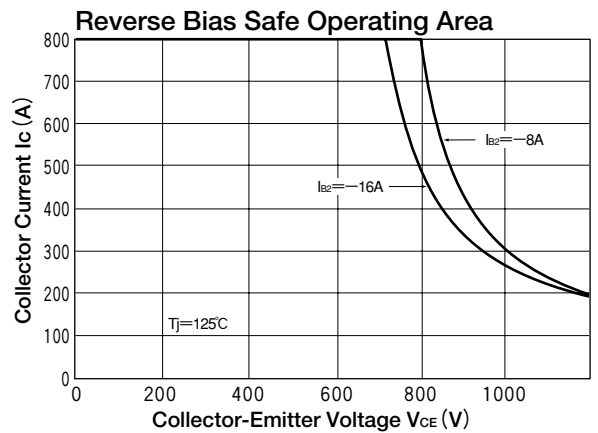
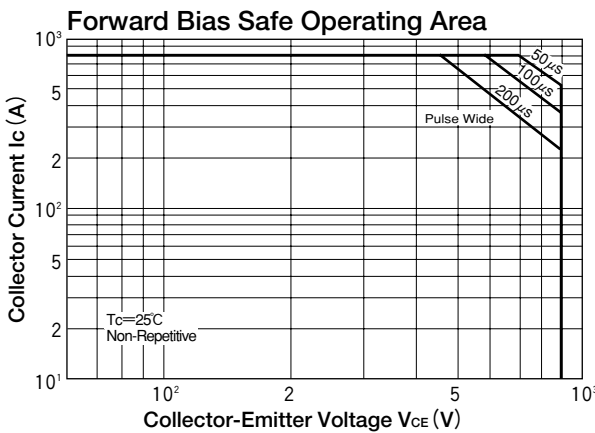
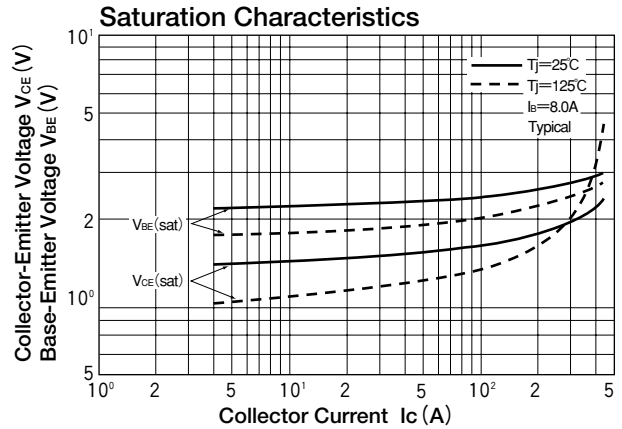
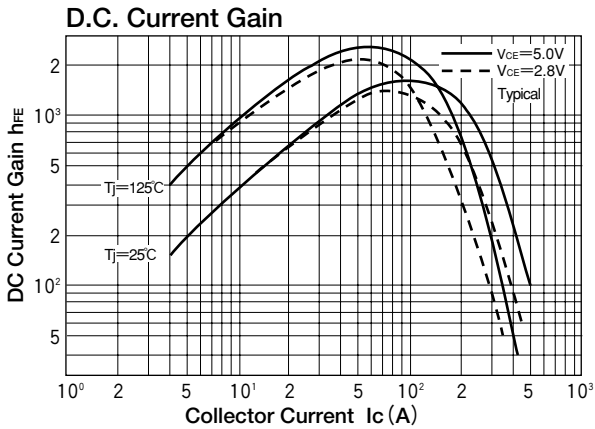
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			SQD400AA120		
V_{CBO}	Collector-Base Voltage		1200		V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	1200		V
$V_{CEX(SUS)}$	Collector-Emitter Sustaining Voltage	$I_C=80A, I_{B2}=-18A$	1200		V
V_{EBO}	Emitterr-Base Voltage		10		V
I_C	Collector Current		400		A
$-I_C$	Reverse Collector Current		400		A
I_B	Base Current		20		A
P_T	Total power dissipation	$T_C=25^\circ C$	3120		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{iso}	Isolation Voltage	A.C. 1minute	2500		V
	Mounting Torque	Mouting (M6)	Recommended Value 2.5-3.9 (25-40)	4.7 (48)	N·m (kgf·cm)
		Terminal (M8)	Recommended Value 8.8-10 (90-105)	11 (115)	
		Terminal (M4)	Recommended Value 1.0-1.4 (10-14)	1.5 (15)	
	Mass	Typical Value	670		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max	
I_{CBO}	Collector Cut-off Current	$V_{CB}=1200V$		5.00	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=10V$		1000	mA
h_{FE}	DC Current Gain	$I_C=400A, V_{CE}=2.8V$	75		
		$I_C=400A, V_{CE}=5V$	100		
$V_{CE(sat)}$	Collector-Emitter Sturation Voltage	$I_C=400A, I_B=8A$	3.0		V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=400A, I_B=8A$	3.5		V
t_{on}	Switching Time	On Time	3.0		μs
t_s		Storage Time	17.0		
t_f		Fall Time	3.0		
V_{ECO}	Collector-Emitter Reverse Voltage	$I_C=-400A$	1.8		V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part	0.04		$^\circ C/W$
		Diode part	0.16		



TRANSISTOR MODULE (Hi-β)

SQD300BA60



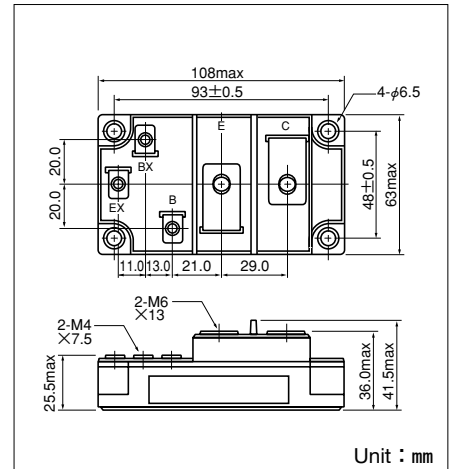
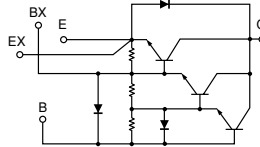
UL;E76102 (M)

SQD300BA60 is a Darlington power transistor module with a **ULTRA HIGH** h_{FE} , high speed, high power Darlington transistor. The transistor has a reverse paralleled fast recovery diode (t_{rr} : 200ns). The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction,

- $I_C=300A$, $V_{CEX}=600V$
- Low saturation voltage for higher efficiency.
- ULTRA HIGH DC current gain h_{FE} . $h_{FE} \geq 750$
- Isolated mounting base
- V_{EBO} 10V for faster switching speed.

(Applications)

Motor Control (VWVF), AC/DC Servo, UPS, Switching Power Supply, Ultrasonic Application



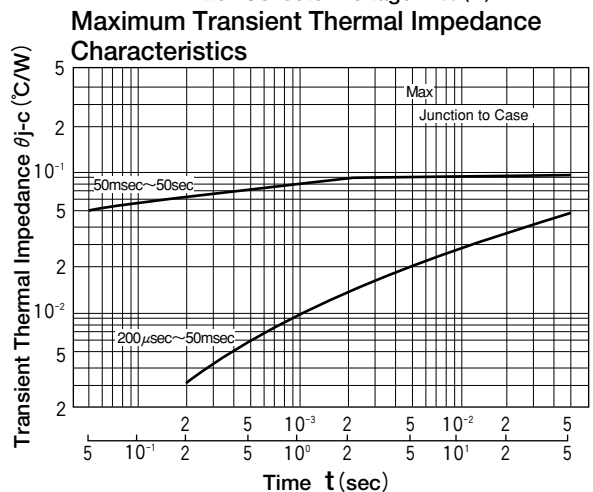
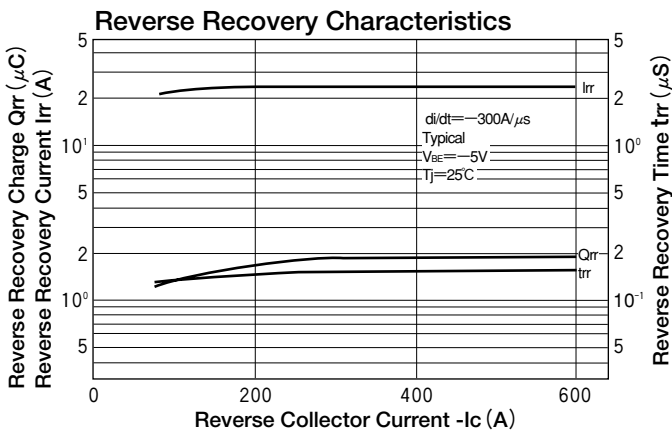
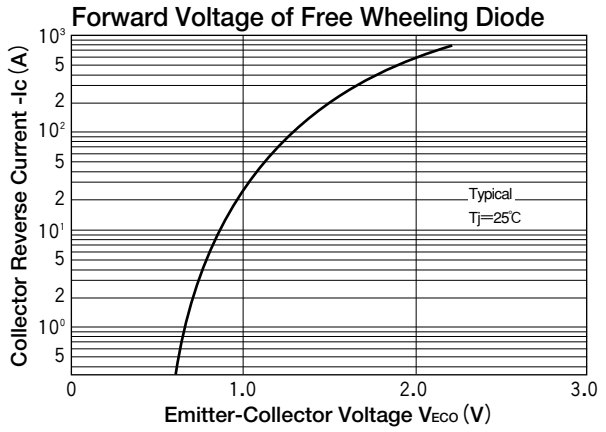
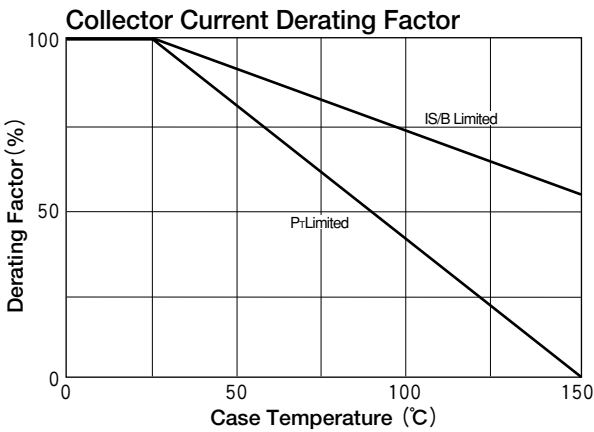
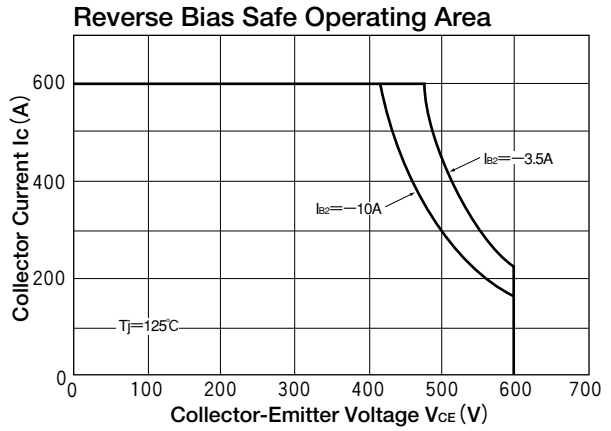
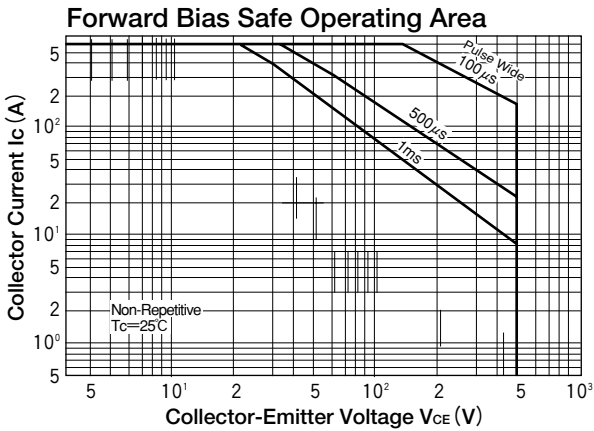
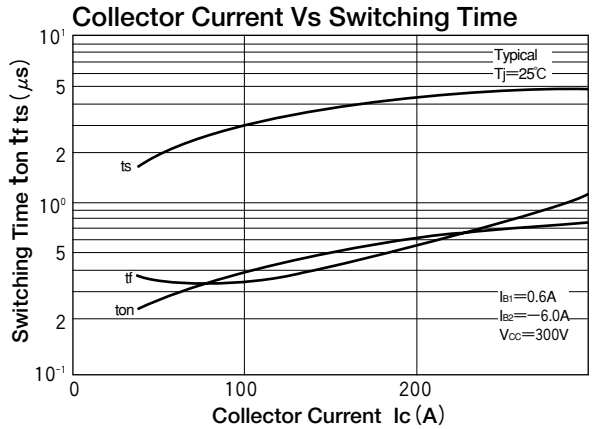
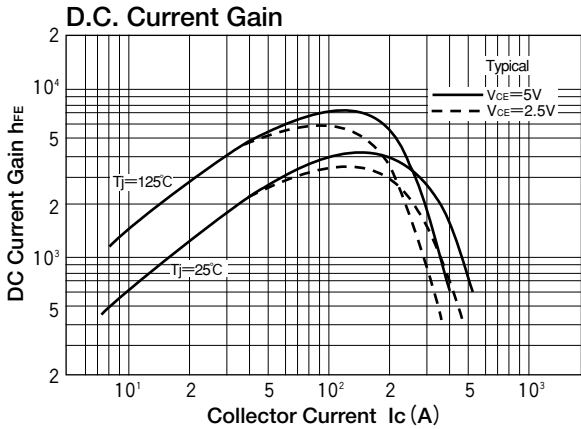
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			SQD300BA60		
V_{CBO}	Collector-Base Voltage		600		V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	600		V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() = $p_w \leq 1ms$	300 (600)		A
$-I_C$	Reverse Collector Current		300		A
I_B	Base Current		18		A
P_T	Total power dissipation	$T_C=25^\circ C$	1380		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	(M6)	Recommended Value 2.5-3.9 (25-40)	4.7 (48)	N·m (kgf·cm)
		Terminal (M6)	Recommended Value 2.5-3.9 (25-40)	4.7 (48)	
		Terminal (M4)	Recommended Value 1.0-1.4 (10-14)	1.5 (15)	
	Mass	Typical Value	460		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings			Unit
			Min.	Typ.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CBO}$			4.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$			1200	mA
$V_{CEO(SUS)}$	Collector Emitter Sustaining Voltage	$I_C=1A$	450			V
$V_{CEX(SUS)}$		$I_C=60A, I_{B2}=-10A$	600			
h_{FE}	DC Current Gain	$I_C=300A, V_{CE}=2.5V$	750			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=300A, I_B=400mA$			2.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=300A, I_B=400mA$			3.0	V
t_{on}	Switching Time	On Time			2.0	μs
t_s		Storage Time	$V_{CC}=300V, I_C=300A$		8.0	
t_f		Fall Time	$I_{B1}=0.6A, I_{B2}=-6A$		2.0	
V_{ECO}	Collector-Emitter Reverse Voltage	$I_C=-300A$			1.8	V
t_{rr}	Reverse Recovery time	$V_{CC}=300V, I_C=-300A, -di/dt=300A/\mu s, V_{BE}=-5V$		200		ns
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part			0.09	$^\circ C/W$
		Diode part			0.3	



TRANSISTOR MODULE (Hi-β)

SQD400BA60



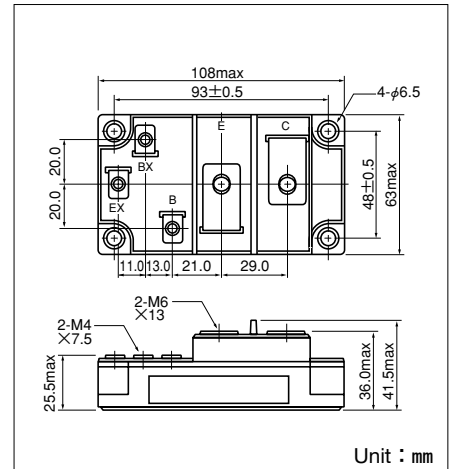
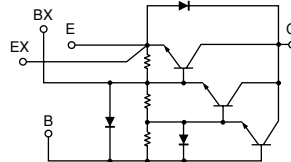
UL;E76102 (M)

SQD400BA60 is a Darlington power transistor module with a **ULTRA HIGH** h_{FE} , high speed, high power Darlington transistor. The transistor has a reverse paralleled fast recovery diode (t_{rr} : 200ns). The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction,

- $I_C=400A$, $V_{CE}=600V$
- Low saturation voltage for higher efficiency.
- ULTRA HIGH DC current gain h_{FE} . $h_{FE} \geq 750$
- Isolated mounting base
- V_{EBO} 10V for faster switching speed.

(Applications)

Motor Control (VWVF), AC/DC Servo,
UPS, Switching
Power Supply, Ultrasonic Application



Maximum Ratings

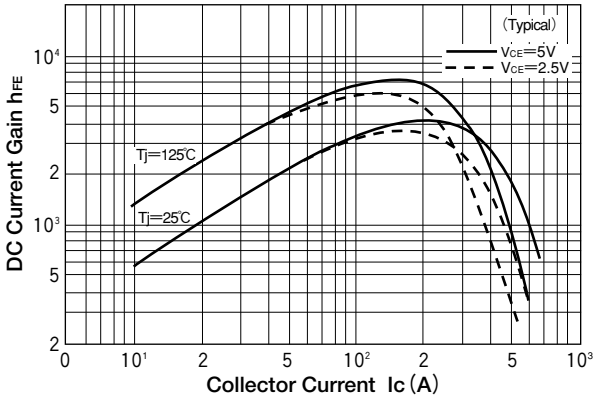
($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			SQD400BA60		
V_{CBO}	Collector-Base Voltage		600		V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	600		V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() = $p_w \leq 1ms$	400 (800)		A
$-I_C$	Reverse Collector Current		400		A
I_B	Base Current		24		A
P_T	Total power dissipation	$T_C=25^\circ C$	1500		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	Mounting (M6)	Recommended Value 43kgf·cm	4.7 (48)	N·m (kgf·cm)
		Terminal (M6)	Recommended Value 43kgf·cm	4.7 (48)	
		Terminal (M4)	Recommended Value 12.5kgf·cm	1.5 (15)	
	Mass	Typical Value	460		g

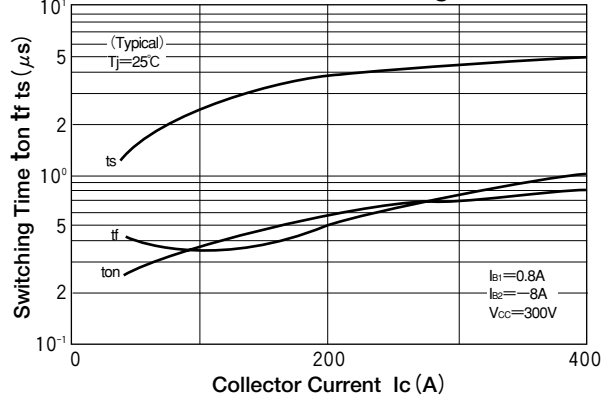
Electrical Characteristics

Symbol	Item	Conditions	Ratings			Unit
			Min.	Typ.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CBO}$			4.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$			1600	mA
$V_{CEO(SUS)}$	Collector Emitter Sustaining Voltage	$I_C=1A$	450			V
$V_{CEX(SUS)}$		$I_C=80A, I_{B2}=-8A$	600			
h_{FE}	DC Current Gain	$I_C=400A, V_{CE}=2.5V$	750			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=400A, I_B=530mA$			2.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=400A, I_B=530mA$			3.0	V
t_{on}	Switching Time	On Time			2.0	μs
t_s		Storage Time	$V_{CC}=300V, I_C=400A$		8.0	
t_f		Fall Time	$I_{B1}=0.8A, I_{B2}=-8A$		2.0	
V_{ECO}	Collector-Emitter Reverse Voltage	$-I_C=400A$			1.8	V
t_{rr}	Reverse Recovery time	$V_{CC}=300V, I_C=-400A, -di/dt=300A/\mu s, V_{BE}=-5V$		200		ns
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part			0.083	$^\circ C/W$
		Diode part			0.25	

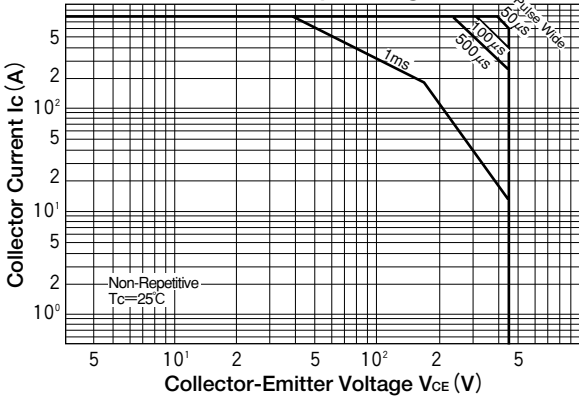
D.C. Current Gain



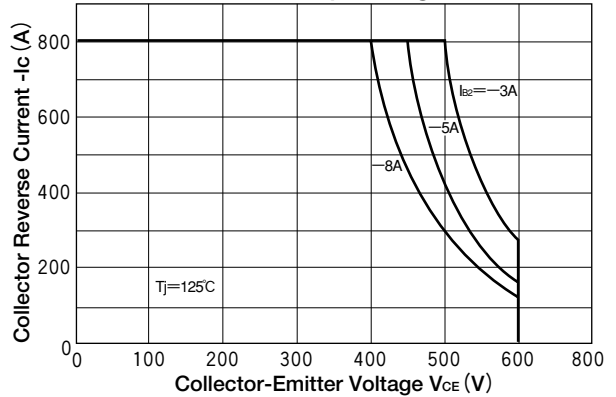
Collector Current Vs Switching Time



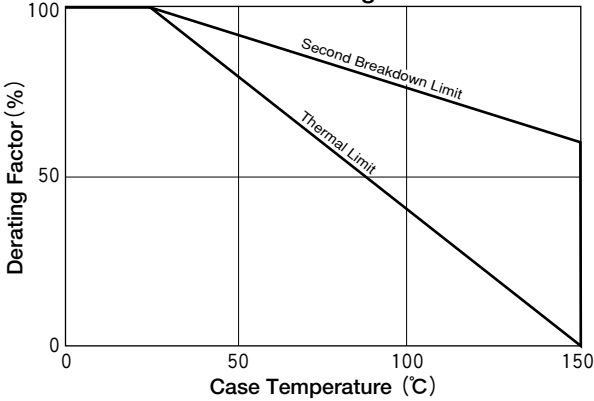
Forward Bias Safe Operating Area



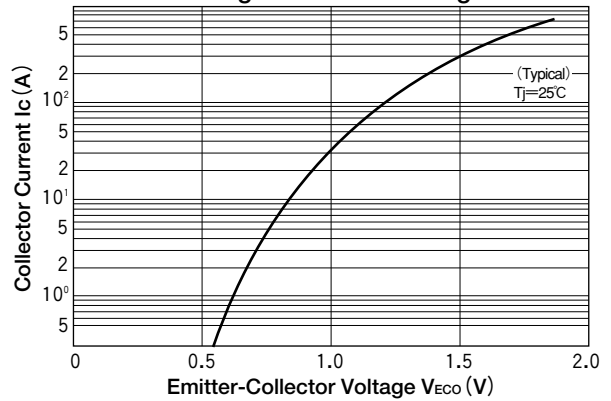
Reverse Bias Safe Operating Area



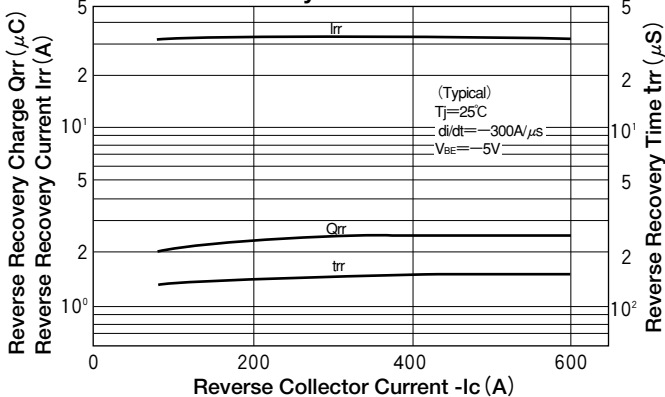
Collector Current Derating Factor



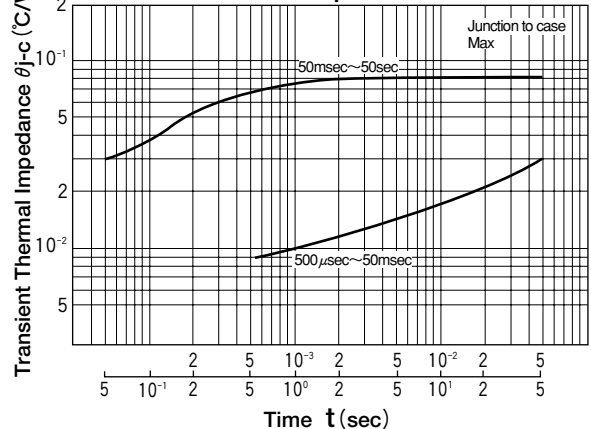
Forward Voltage of Free Wheeling Diode



Reverse Recovery Characteristics



Transient Thermal Impedance



TRANSISTOR MODULE (THREE PHASES BRIDGE TYPE)

QF15AA40/60

TOP

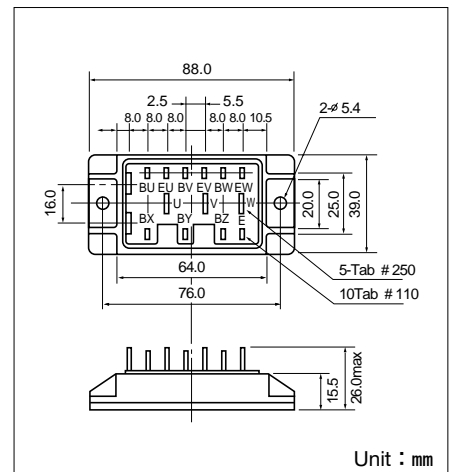
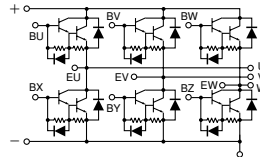


QF15AA is six pack Darlington power transistor module which has six transistors connected in three phase bridge configuration. Each transistor has a reverse paralleled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction.

- $I_C=15A$, $V_{CEX}=400/600V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base
- $V_{EBO} 10V$ for faster switching speed.

(Applications)

Motor Control (VWF), AC Servo, UPS



Unit : mm

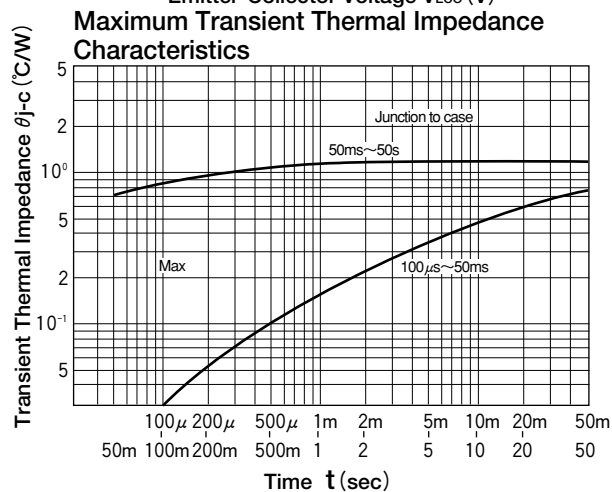
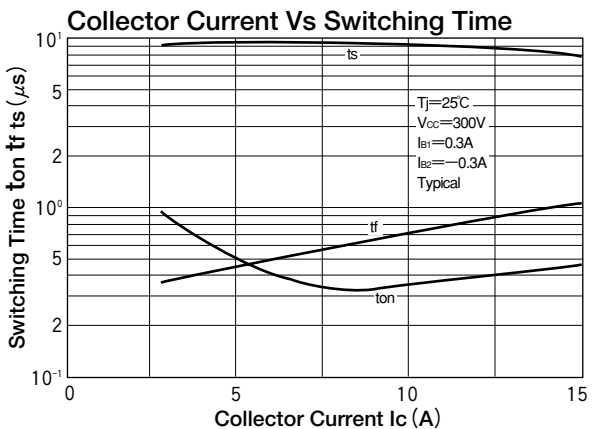
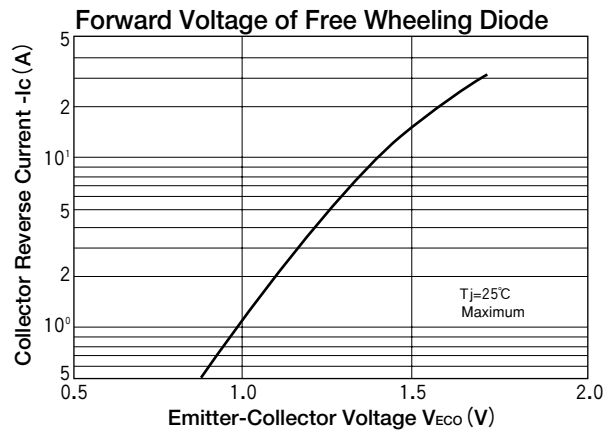
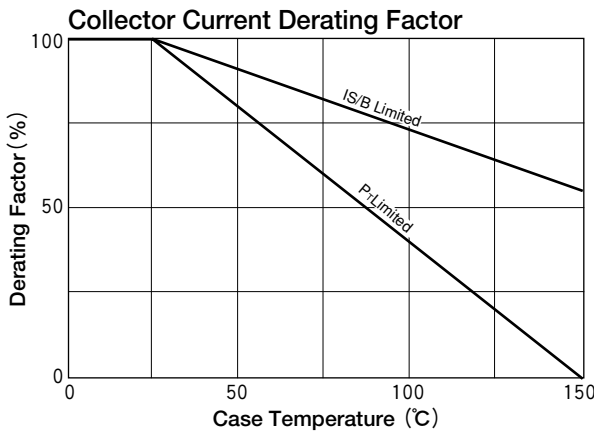
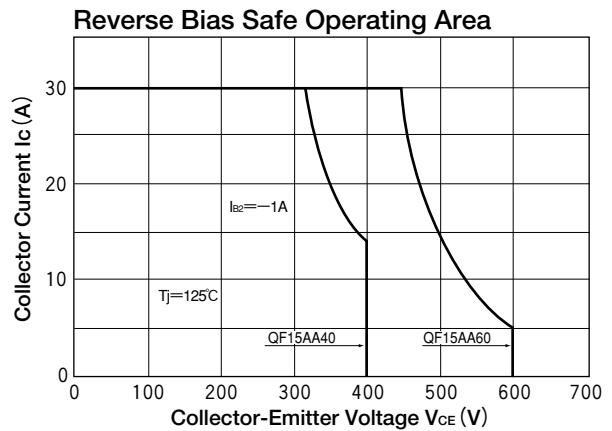
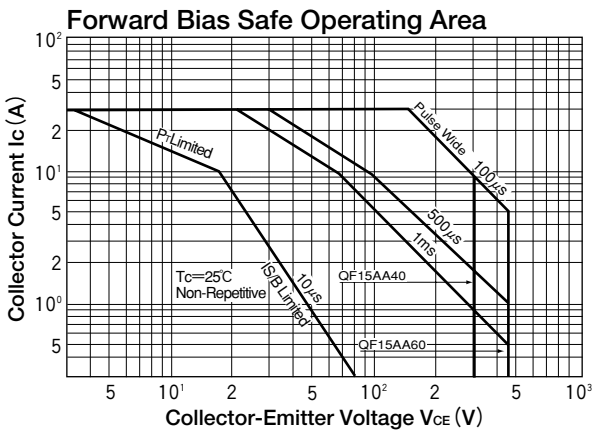
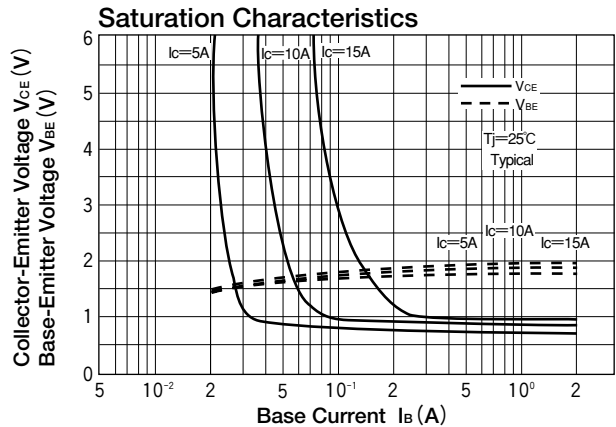
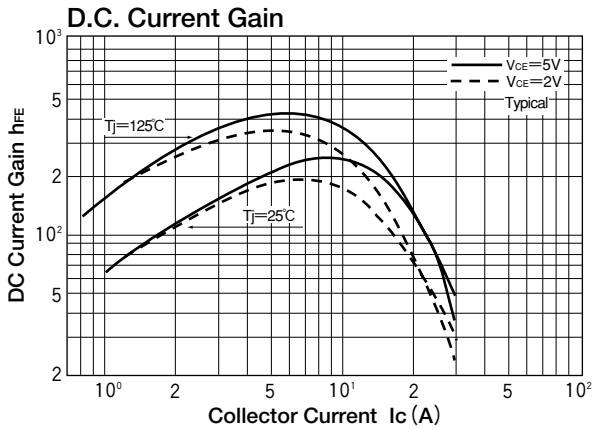
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			QF15AA40	QF15AA60	
V_{CBO}	Collector-Base Voltage		400	600	V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	400	600	V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() = $p_w \leq 1ms$	15 (30)		A
$-I_C$	Reverse Collector Current		15		A
I_B	Base Current		1		A
P_T	Total power dissipation	$T_C=25^\circ C$	100		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque (M5)	Recommended Value 1.5-2.5 (15-25)	2.7 (28)		N·m (kgf·cm)
	Mass	Typical Value	95		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit	
			Min.	Max.		
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CBO}$		1.0	mA	
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$		100	mA	
$V_{CEO(SUS)}$	Collector Emitter Sustaining Voltage	$I_C=1A$	300		V	
$V_{CEX(SUS)}$			450			
		$I_C=3A, I_{B2}=-1A$	400		V	
			600			
h_{FE}	DC Current Gain	$I_C=15A, V_{CE}=2V$	75			
		$I_C=15A, V_{CE}=5V$	100			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=15A, I_B=0.2A$		2.0	V	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=15A, I_B=0.2A$		2.5	V	
t_{on}	Switching Time	$V_{CC}=300V, I_C=15A$ $I_{B1}=0.4A, I_{B2}=-0.4A$		1.0	μs	
t_s			Storage Time			12.0
t_f			Fall Time			2.0
V_{ECO}	Collector-Emitter Reverse Voltage	$-I_C=15A$		1.5	V	
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part		1.2	$^\circ C/W$	
		Diode part		2.5		



TRANSISTOR MODULE (THREE PHASES BRIDGE TYPE)

QF20AA40/60

TOP

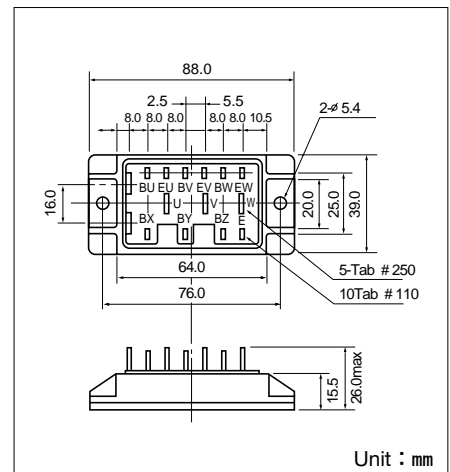
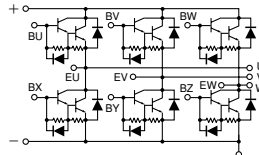


QF20AA is six pack Darlington power transistor module which has six transistors connected in three phase bridge configuration. Each transistor has a reverse paralleled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction.

- $I_C=20A$, $V_{CEX}=400/600V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base
- $V_{EBO} 10V$ for faster switching speed.

(Applications)

Motor Control (VWF), AC Servo, UPS



Unit : mm

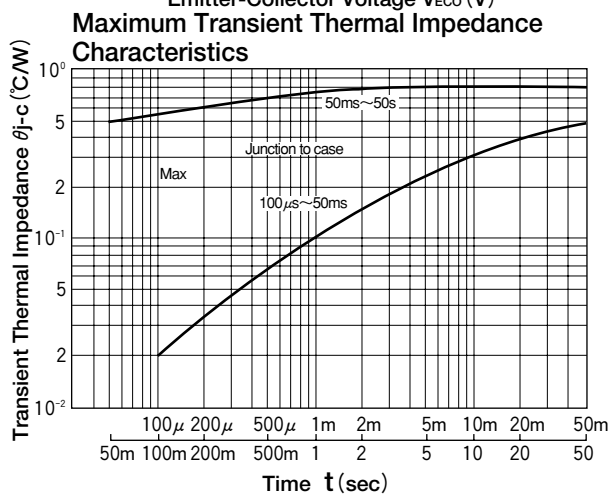
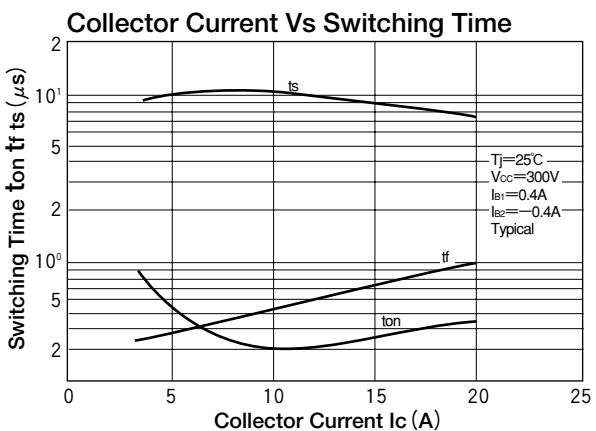
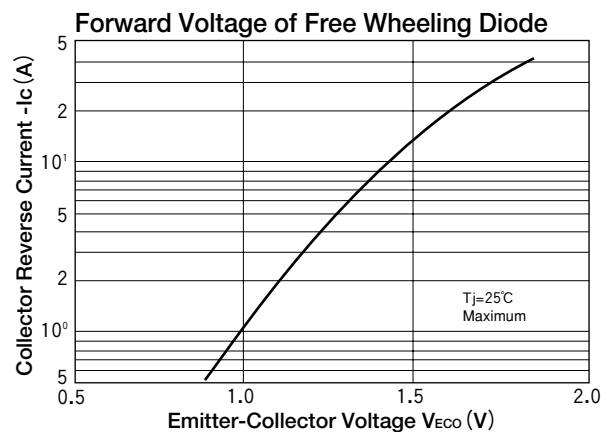
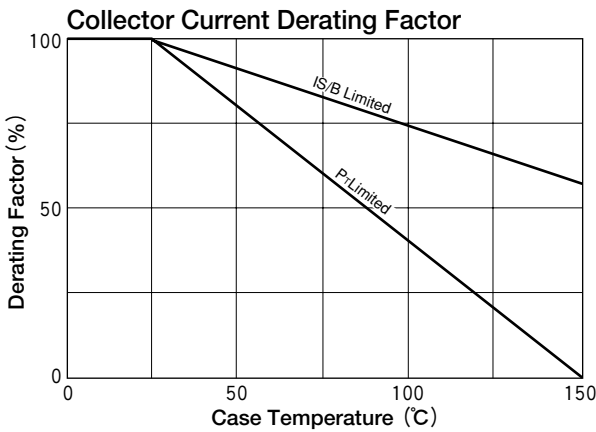
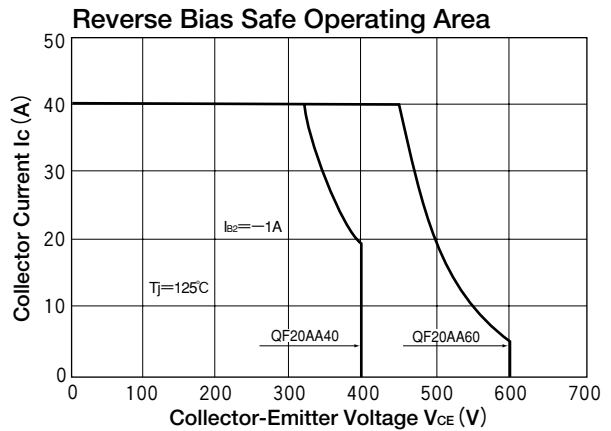
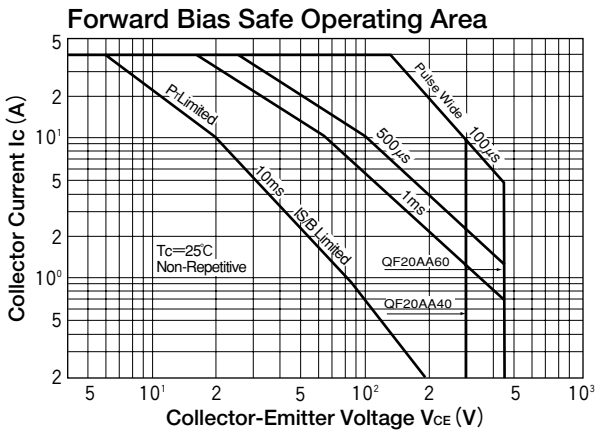
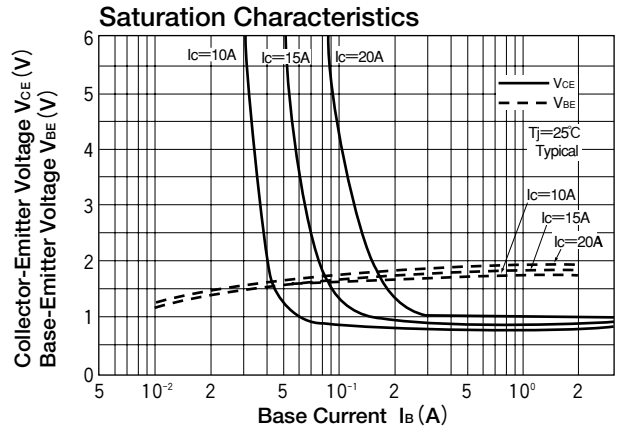
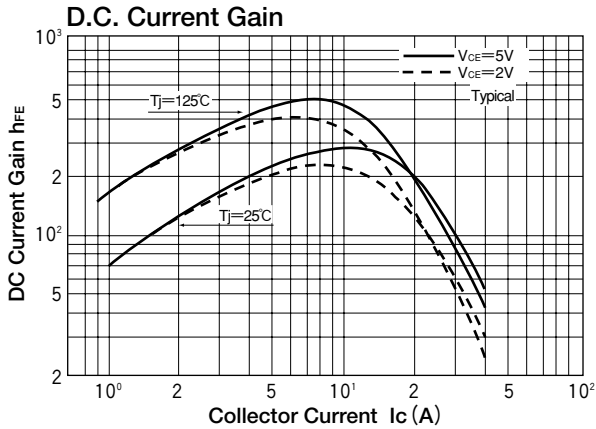
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			QF20AA40	QF20AA60	
V_{CB0}	Collector-Base Voltage		400	600	V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	400	600	V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() = $p_w \leq 1ms$	20 (40)		A
$-I_C$	Reverse Collector Current		20		A
I_B	Base Current		2		A
P_T	Total power dissipation	$T_C=25^\circ C$	160		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{iso}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque (M5)	Recommended Value 1.5-2.5 (15-25)	2.7 (28)		N·m (kgf·cm)
	Mass	Typical Value	95		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CB0}$		1.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$		200	mA
$V_{CE0(SUS)}$	Collector Emitter Sustaining Voltage	QF20AA40	300		V
		QF20AA60			
$V_{CEX(SUS)}$	Collector Emitter Sustaining Voltage	QF20AA40	400		V
		QF20AA60			
h_{FE}	DC Current Gain	$I_C=20A, V_{CE}=2V$	75		
		$I_C=20A, V_{CE}=5V$	100		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=20A, I_B=0.27A$	2.0		V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=20A, I_B=0.27A$	2.5		V
t_{on}	Switching Time	On Time	1.0		μs
t_s		Storage Time	12.0		
t_f		Fall Time	2.0		
V_{ECO}	Collector-Emitter Reverse Voltage	$-I_C=20A$	1.6		V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part	0.8		$^\circ C/W$
		Diode part	2.2		



TRANSISTOR MODULE (THREE PHASES BRIDGE TYPE)

QF30AA40/60

TOP

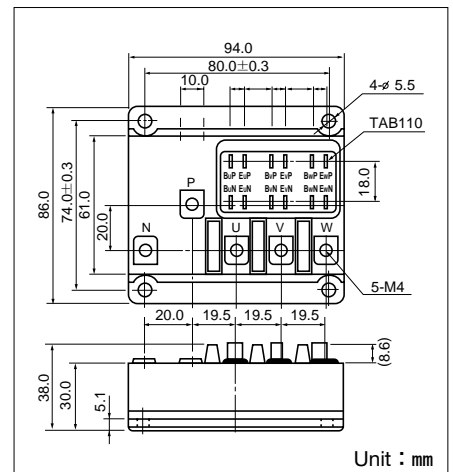
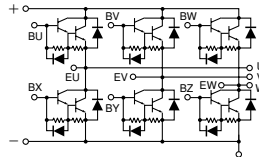


QF30AA is six pack Darlington power transistor module which has six transistors connected in three phase bridge configuration. Each transistor has a reverse paralleled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction.

- $I_C=30A$, $V_{CEX}=400/600V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base
- $V_{EBO} 10V$ for faster switching speed.

(Applications)

Motor Control (VWF), AC Servo, UPS



Unit : mm

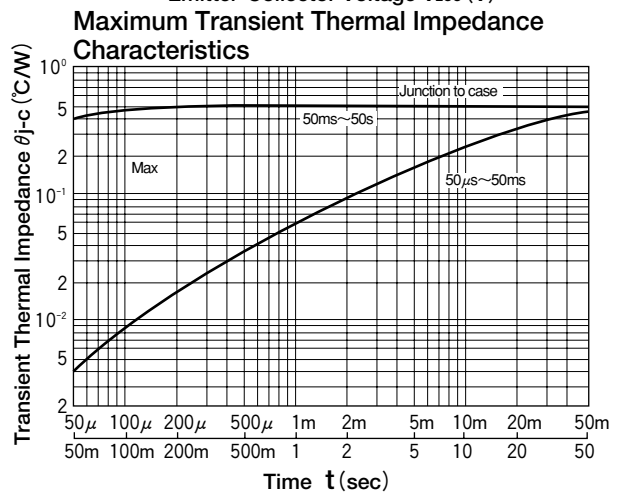
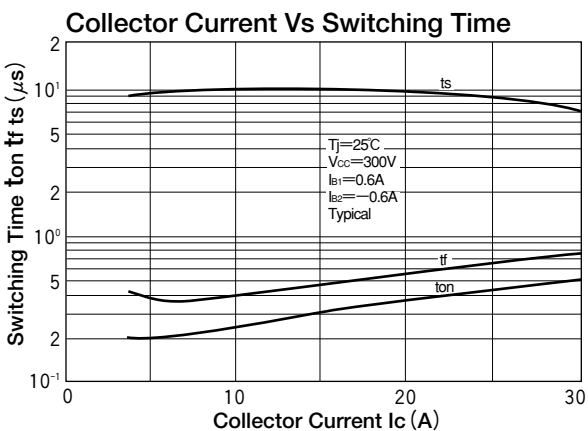
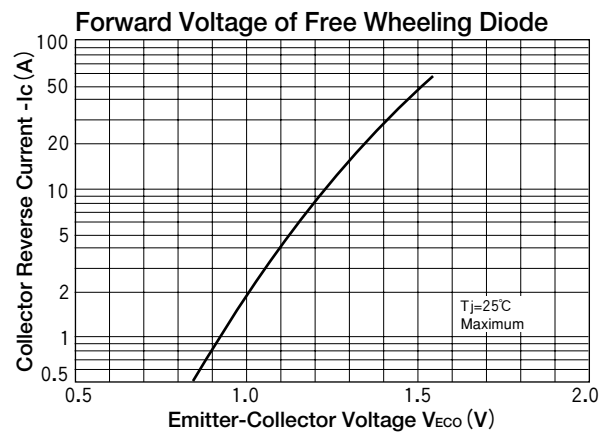
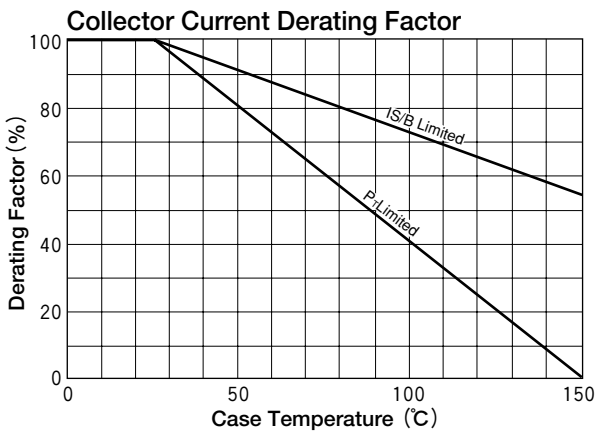
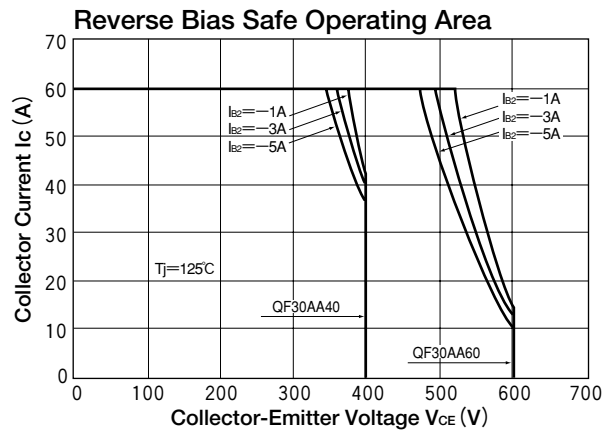
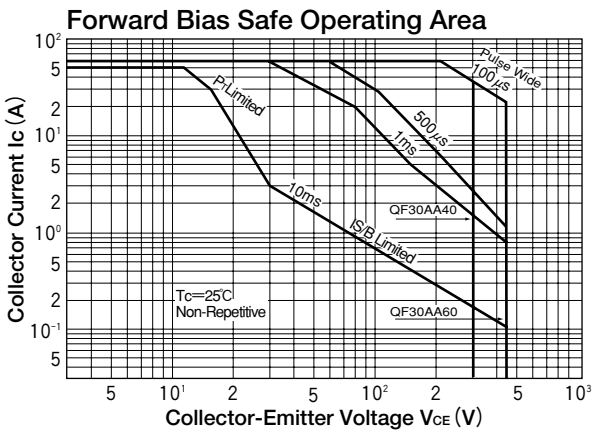
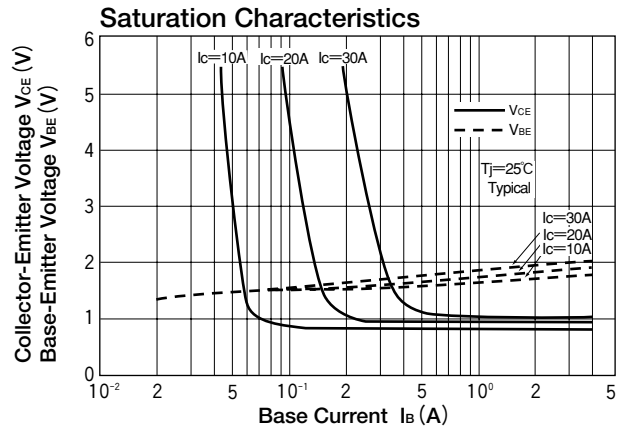
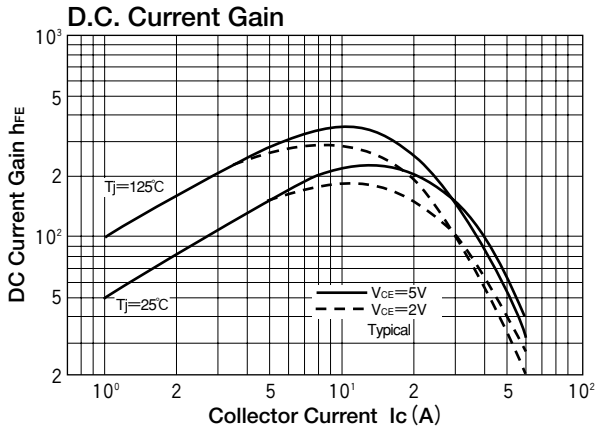
Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			QF30AA40	QF30AA60	
V_{CBO}	Collector-Base Voltage		400	600	V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	400	600	V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() = $p_w \leq 1ms$	30 (60)		A
$-I_C$	Reverse Collector Current		30		A
I_B	Base Current		2		A
P_T	Total power dissipation	$T_C=25^\circ C$	250		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	Mounting (M6)	Recommended Value 1.5-2.5 (15-25)		N·m (kgf·cm)
		Terminal (M4)	Recommended Value 1.0-1.4 (10-14)		
	Mass	Typical Value	400		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CBO}$		1.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$		300	mA
$V_{CEO(SUS)}$	Collector Emitter Sustaining Voltage	QF30AA40	300		V
		QF30AA60	450		
$V_{CEX(SUS)}$	Collector Emitter Sustaining Voltage	QF30AA40	400		V
		QF30AA60	600		
h_{FE}	DC Current Gain	$I_C=30A$, $V_{CE}=2V$	75		
		$I_C=30A$, $V_{CE}=5V$	100		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=30A$, $I_B=0.4A$		2.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=30A$, $I_B=0.4A$		2.5	V
t_{on}	Switching Time	On Time		1.0	μs
t_s		Storage Time	$V_{CC}=300V$, $I_C=30A$ $I_{B1}=0.6A$, $I_{B2}=-0.6A$	12.0	
t_f		Fall Time		2.0	
V_{ECO}	Collector-Emitter Reverse Voltage	$-I_C=30A$		1.4	V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part		0.5	$^\circ C/W$
		Diode part		1.6	



TRANSISTOR MODULE (THREE PHASES BRIDGE TYPE)

QF50AA40/60

TOP

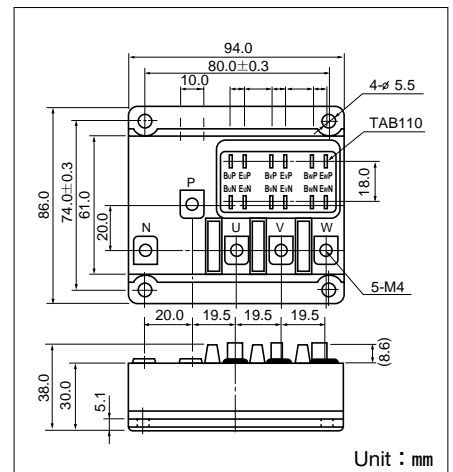
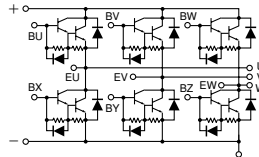


QF50AA is six pack Darlington power transistor module which has six transistors connected in three phase bridge configuration. Each transistor has a reverse paralleled fast recovery diode. The mounting base of the module is electrically isolated from semiconductor elements for simple heatsink construction.

- $I_C=50A$, $V_{CEX}=400/600V$
- Low saturation voltage for higher efficiency.
- High DC current gain h_{FE}
- Isolated mounting base
- V_{EBO} 10V for faster switching speed.

(Applications)

- Motor Control (VWF), AC Servo, UPS



Unit : mm

Maximum Ratings

($T_j=25^\circ C$ unless otherwise specified)

Symbol	Item	Conditions	Ratings		Unit
			QF50AA40	QF50AA60	
V_{CBO}	Collector-Base Voltage		400	600	V
V_{CEX}	Collector-Emitter Voltage	$V_{BE}=-2V$	400	600	V
V_{EBO}	Emitter-Base Voltage		10		V
I_C	Collector Current	() = $p_w \leq 1ms$	50 (100)		A
$-I_C$	Reverse Collector Current		50		A
I_B	Base Current		3		A
P_T	Total power dissipation	$T_C=25^\circ C$	300		W
T_j	Junction Temperature		-40 to +150		$^\circ C$
T_{stg}	Storage Temperature		-40 to +125		$^\circ C$
V_{ISO}	Isolation Voltage	A.C.1minute	2500		V
	Mounting Torque	Mounting (M6)	Recommended Value 1.5-2.5 (15-25)		N·m kgf·cm
		Terminal (M4)	Recommended Value 1.0-1.4 (10-14)		
	Mass	Typical Value	400		g

Electrical Characteristics

Symbol	Item	Conditions	Ratings		Unit
			Min.	Max.	
I_{CBO}	Collector Cut-off Current	$V_{CB}=V_{CBO}$		1.0	mA
I_{EBO}	Emitter Cut-off Current	$V_{EB}=V_{EBO}$		300	mA
$V_{CEO(SUS)}$	Collector Emitter Sustaining Voltage	QF50AA40 QF50AA60	$I_C=1A$	300 450	V
		QF50AA40 QF50AA60	$I_C=10A, I_{B2}=-5A$	400 600	V
h_{FE}	DC Current Gain	$I_C=50A, V_{CE}=2V$ $I_C=50A, V_{CE}=5V$	75 100		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=50A, I_B=0.67A$		2.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=50A, I_B=0.67A$		2.5	V
t_{on}	Switching Time	On Time		1.0	μs
t_s		Storage Time	$V_{CC}=300V, I_C=50A$ $I_{B1}=1A, I_{B2}=-1A$	12.0	
t_f		Fall Time		2.0	
V_{ECO}	Collector-Emitter Reverse Voltage	$-I_C=50A$		1.4	V
$R_{th(j-c)}$	Thermal Impedance (junction to case)	Transistor part		0.4	$^\circ C/W$
		Diode part		1.3	

