

# TRANSISTOR MODULE (Hi-β)

## SQD400BA60

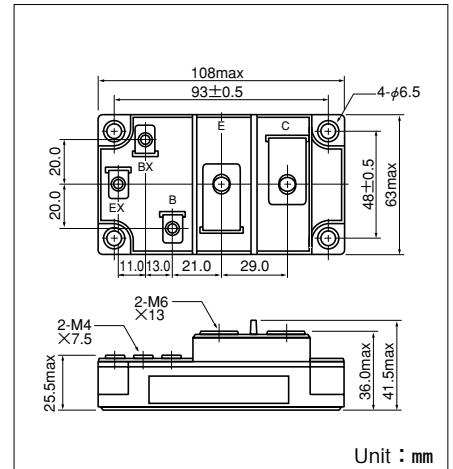
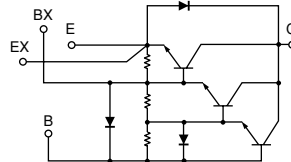
UL:E76102(M)

**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,

- $I_C=400A$ ,  $V_{CEX}=600V$
- 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 (VVVF), AC/DC Servo,  
UPS, Switching  
Power Supply, Ultrasonic Application



### Maximum Ratings

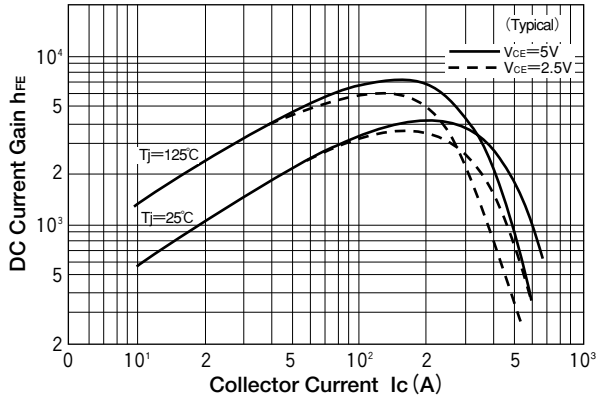
( $T_j=25^{\circ}C$  unless otherwise specified)

Symbol	Item		Conditions	Ratings	Unit
				<b>SQD400BA60</b>	
$V_{CBO}$	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

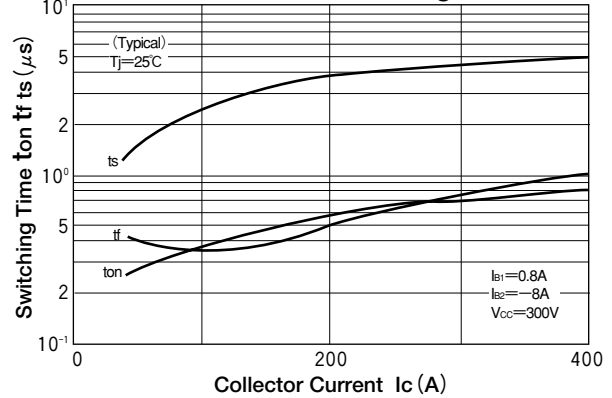
### Electrical Characteristics

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	$V_{CC}=300V, I_C=400A$ $I_{B1}=0.8A, I_{B2}=-8A$			2.0	$\mu s$
$t_s$		Storage Time				8.0	
$t_f$		Fall Time				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	

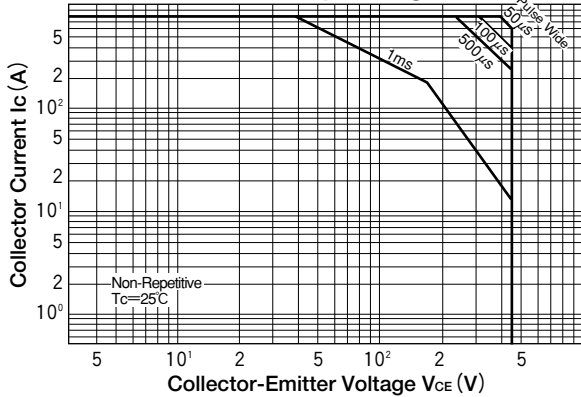
## D.C. Current Gain



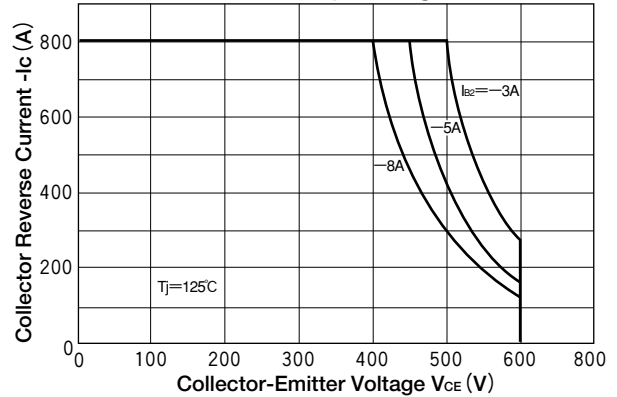
## Collector Current Vs Switching Time



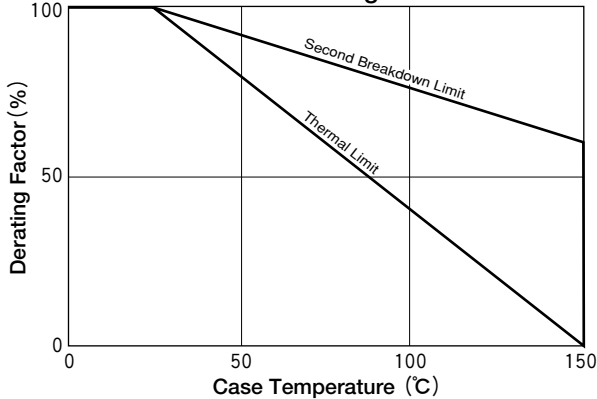
## Forward Bias Safe Operating Area



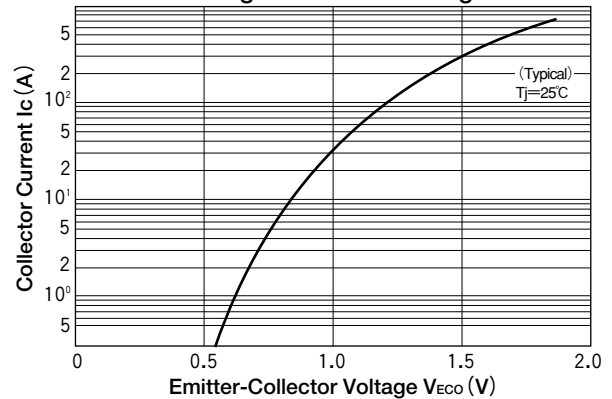
## Reverse Bias Safe Operating Area



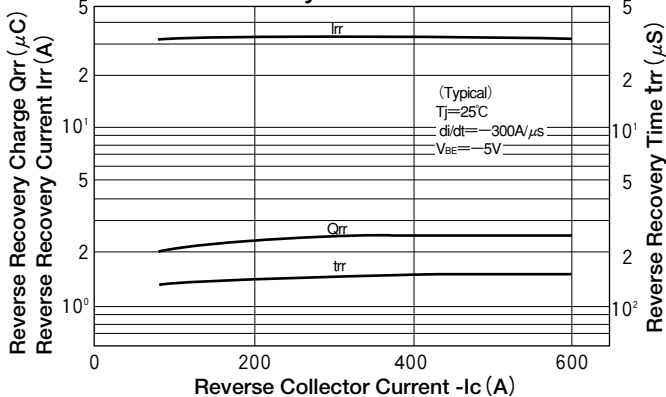
## Collector Current Derating Factor



## Forward Voltage of Free Wheeling Diode



## Reverse Recovery Characteristics



## Transient Thermal Impedance

