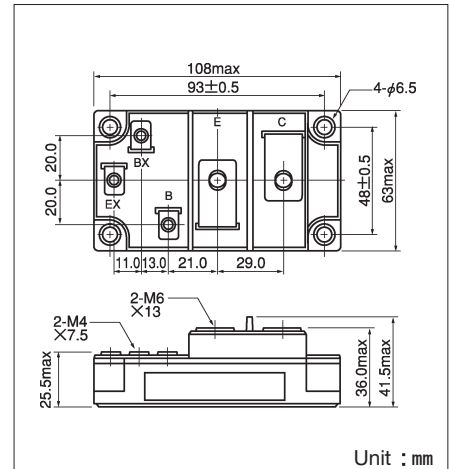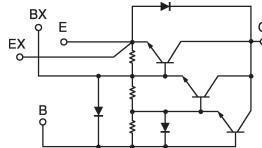# TRANSISTOR MODULE (Hi-β)

SQD300BA60

UL；E76102（M）

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

● Ic＝300A, VCEX＝600V
● Low saturation voltage for higher efficiency.
● ULITRA HIGH DC current gain hFE. hFE≧750
● Isolated mounting base
● VEBO 10V for faster switching speed.

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

Unit：mm

■Maximum Ratings

(Tj＝25℃)

Symbol	Item		Conditions	Ratings SQD300BA60	Unit
VCBO	Collector-Base Voltage			600	V
VCEX	Collector-Emitter Voltage		VBE＝－2V	600	V
VEBO	Emitter-Base Voltage			10	V
Ic	Collector Current		（ ）＝pw≦1ms	300 （600）	A
－Ic	Reverse Collector Current			300	A
IB	Base Current			18	A
PT	Total power dissipation		Tc＝25℃	1380	W
Tj	Junction Temperature			－40～＋150	℃
Tstg	Storage Temperature			－40～＋125	℃
VISO	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

(Tj＝25℃)

Symbol	Item		Conditions	Ratings Min.	Ratings Typ.	Ratings Max.	Unit
ICBO	Collector Cut-off Current		VCB＝VCBO			4.0	mA
IEBO	Emitter Cut-off Current		VEB＝VEBO			1200	mA
VCEO (SUS)	Collector Emitter Sustaning Voltage		Ic＝1A	450			V
VCEX (SUS)			Ic＝60A, IB2＝－10A	600			
hFE	DC Current Gain		Ic＝300A, VCE＝2.5V	750			
VCE (sat)	Collector-Emitter Saturation Voltage		Ic＝300A, IB＝400mA			2.5	V
VBE (sat)	Base-Emitter Saturation Voltage		Ic＝300A, IB＝400mA			3.0	V
ton	Switching Time	On Time	Vcc＝300V, Ic＝300A IB1＝0.6A, IB2＝－6A			2.0	μs
ts		Storage Time				8.0	
tf		Fall Time				2.0	
VECO	Collector-Emitter Reverse Voltage		Ic＝－300A			1.8	V
trr	Reverse Recovery time		Vcc＝300V, Ic＝－300A, －di/dt＝300A/μs, VBE＝－5V		200		ns
Rth (j-c)	Thermal Impedance (junction to case)	Transistor part				0.09	℃/W
		Diode part				0.3	

SanRex

D.C. Current Gain

Vertical axis: DC Current Gain h_{FE} (from 5 to 10^4 to 2)
Horizontal axis: Collector Current Ic (A) (10^1 to 10^3)

Typical
V_{CE}=5V
V_{CE}=2.5V

T_j=125℃
T_j=25℃

Collector Current Vs Switching Time

Vertical axis: Switching Time ton tf ts (μs) (10^{-1} to 10^1)
Horizontal axis: Collector Current Ic (A) (0 to 300)

Typical
T_j=25℃

ts
tf
ton

I_{B_1}=0.6A
I_{B_2}=-6.0A
V_{CC}=300V

Forward Bias Safe Operating Area

Vertical axis: Collector Current Ic (A) (5 to 10^2)
Horizontal axis: Collector-Emitter Voltage V_{CE} (V) (5 to 10^3)

Pulse Wide
100μs
500μs
1ms

Non-Repetitive
T_C=25℃

Reverse Bias Safe Operating Area

Vertical axis: Collector Current Ic (A) (0 to 600)
Horizontal axis: Collector-Emitter Voltage V_{CE} (V) (0 to 700)

I_{B_2}=-3.5A
I_{B_2}-10A

T_j=125℃

Collector Current Derating Factor

Vertical axis: Derating Factor (%) (0 to 100)
Horizontal axis: Case Temperature (℃) (0 to 150)

IS/B Limited
P_T Limited

Forward Voltage of Free Wheeling Diode

Vertical axis: Collector Reverse Current -Ic (A) (10^0 to 10^3)
Horizontal axis: Emitter-Collector Voltage V_{ECO} (V) (0 to 3.0)

Typical
T_j=25℃

Reverse Recovery Characteristics

Left vertical axis: Reverse Recovery Charge Qrr (μC) / Reverse Recovery Current Irr (A) (5 to 5)
Right vertical axis: Reverse Recovery Time trr (μC) (5 to 5)
Horizontal axis: Reverse Collector Current -Ic (A) (0 to 600)

Irr
Qrr
trr

di_f/dt=-300A/μs
Typical
V_{BE}=-5V
T_j=25℃

Maximum Transient Thermal Impedance Characteristics

Vertical axis: Transient Thermal Impedance θj-c (℃/W)
Horizontal axis: Time t (sec)

Max
Junction to Case

50msec~50sec
200μsec~50msec