

## IGBT MODULE ( L series)

### ■ Features

- High Speed Switching
- Low Saturation Voltage
- Voltage Drive

### ■ Applications

- Inverter for Motor Drive
- AC and DC Servo Drive Amplifier
- Uninterruptible Power Supply
- Industrial Machines, such as Welding Machines

### ■ Maximum Ratings and Characteristics

#### ● Absolute Maximum Ratings

Items	Symbols	Ratings	Units
Collector-Emitter Voltage	V <sub>CEs</sub>	1200	V
Gate-Emitter Voltage	V <sub>GES</sub>	±20	V
Collector Current	Continuous	I <sub>C</sub>	400
	1ms	I <sub>C pulse</sub>	800
	Continuous	-I <sub>C</sub>	400
	1ms	-I <sub>C pulse</sub>	800
Max. Power Dissipation	P <sub>C</sub>	2600	W
Operating Temperature	T <sub>j</sub>	+150	°C
Storage Temperature	T <sub>stg</sub>	-40 to +125	°C
Isolation Voltage	AC. 1min.	V <sub>is</sub>	2500
Screw Torque	Mounting *1	3.5	N•m
	Terminals *2	4.5	
	Terminals *3	1.7	

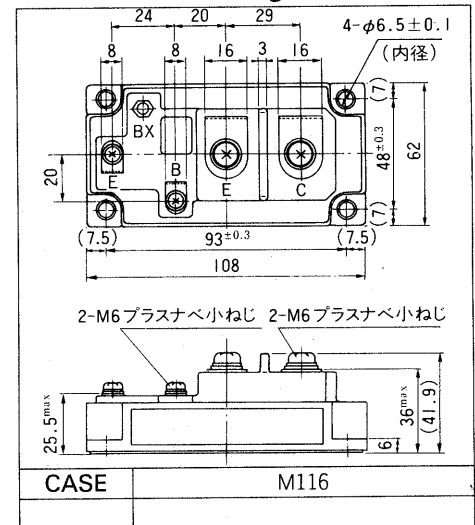
#### ● Electrical Characteristics (T<sub>c</sub>=25°C)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I <sub>CEs</sub>	V <sub>GE</sub> =0V V <sub>CE</sub> =1200V T <sub>c</sub> =25°C			4.0	mA
		V <sub>GE</sub> =0V V <sub>CE</sub> =1200V T <sub>c</sub> =125°C			-	mA
Gate-Emitter Leakage Current	I <sub>GES</sub>	V <sub>CE</sub> =0V V <sub>GE</sub> =±20V			400	nA
Gate-Emitter Threshold Voltage	V <sub>GE(th)</sub>	V <sub>CE</sub> =20V I <sub>C</sub> =400mA	3.0		6.0	V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	V <sub>GE</sub> =15V I <sub>C</sub> =400A			3.5	V
Input Capacitance	C <sub>ies</sub>	V <sub>GE</sub> =0V		72000		pF
Output Capacitance	C <sub>oes</sub>	V <sub>CE</sub> =10V		-		
Reverse Transfer Capacitance	C <sub>res</sub>	f=1MHz		-		
Turn-on Time	t <sub>on</sub>	V <sub>CC</sub> =600V			0.8	μs
	t <sub>r</sub>	I <sub>C</sub> =400A			0.6	
Turn-off Time	t <sub>off</sub>	V <sub>GE</sub> =±15V			1.5	
	t <sub>f</sub>	R <sub>G</sub> =1.8Ω			0.5	
Diode Forward On-Voltage	V <sub>F</sub>	I <sub>F</sub> =400A V <sub>GE</sub> =0V			2.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =400A -di/dt=1200A/μs V <sub>GE</sub> =-10V		200	350	ns

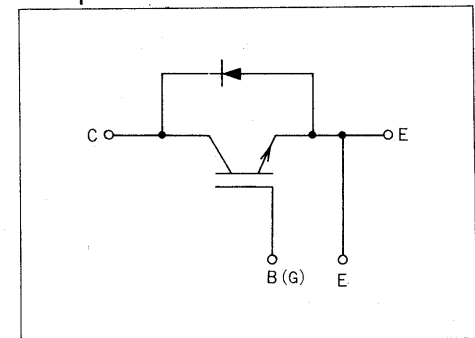
#### ● Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	R <sub>th(j-c)</sub>	IGBT			0.048	°C/W
	R <sub>th(j-e)</sub>	Diode			0.075	
	R <sub>th(c-f)</sub>	With Thermal compound		0.0125		

### ■ Outline Drawings



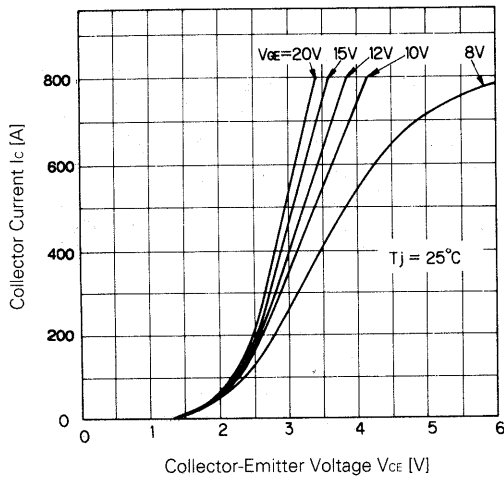
### ■ Equilevelent Circuit Schematic



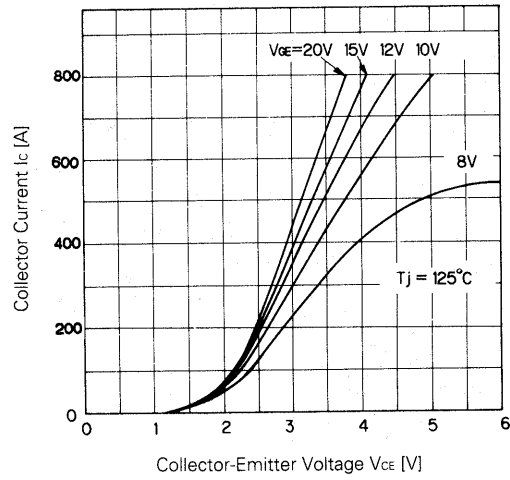
\*1 Recommendable Value 2.5 ~ 3.5 N•m (M5) or (M6)

\*2 Recommendable Value 3.5 ~ 4.5 N•m (M6)

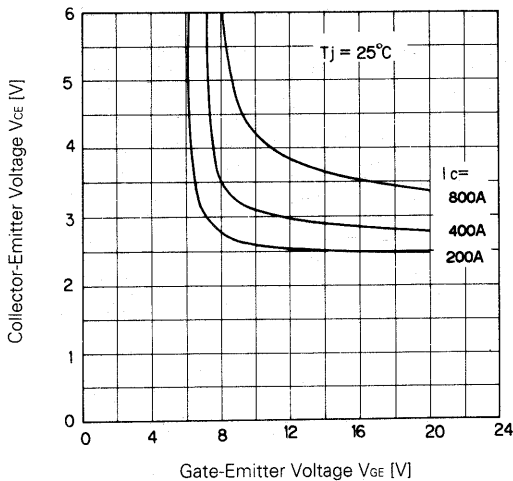
\*3 Recommendable Value 1.3 ~ 1.7 N•m (M4)



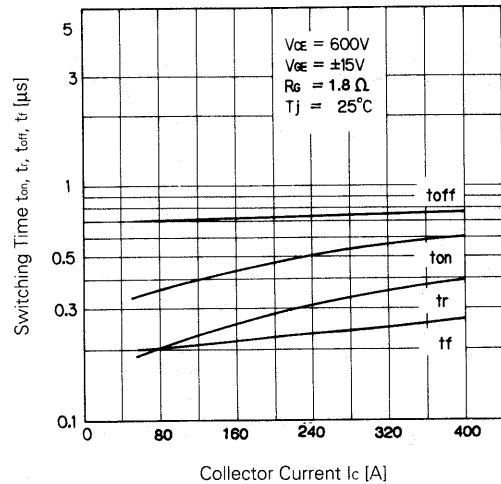
Collector Current vs. Collector-Emittor Voltage



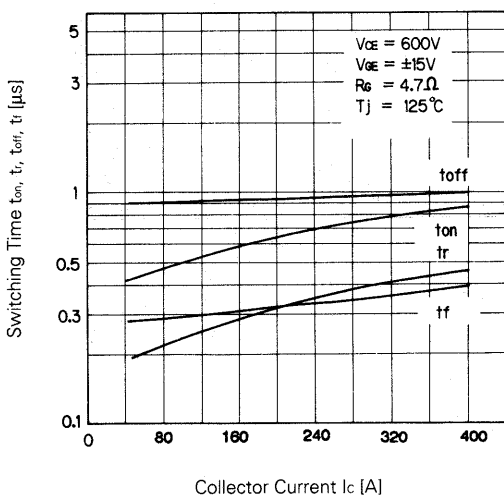
Collector Current vs. Collector-Emittor Voltage



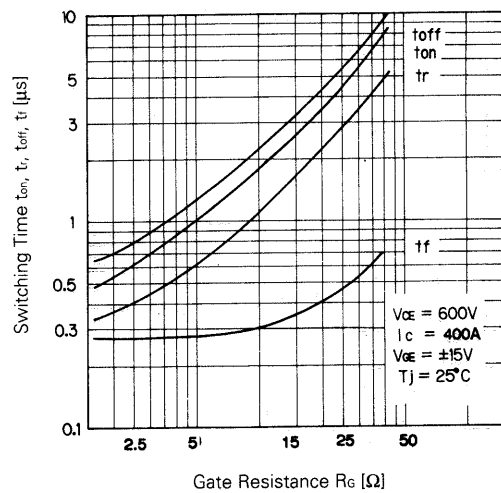
Collector-Emittor Voltage vs. Gate-Emittor Voltage



Switching Time



Switching Time



Switching Time-Gate Resistance