

## 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		$V_{CES}$	1200	V
Gate-Emitter Voltage		$V_{GES}$	$\pm 20$	V
Collector Current	Continuous	$I_C$	50	A
	1ms	$I_{C\ pulse}$	100	
	Continuous	$-I_C$	50	
	1ms	$-I_{C\ pulse}$	100	
Max. Power Dissipation		$P_C$	400	W
Operating Temperature		$T_j$	+150	°C
Storage Temperature		$T_{stg}$	-40 to +125	°C
Net. Weight			185	g
Isolation Voltage	AC. 1min.	$V_{isol}$	2500	V
Screw Torque		Mounting *1	35	kg•cm
		Terminals *2	35	

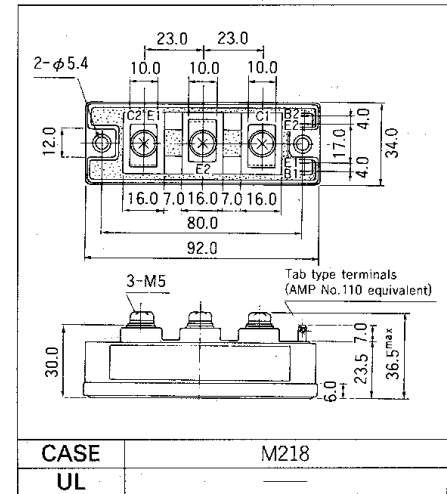
#### ● Electrical Characteristics ( $T_c=25^\circ\text{C}$ )

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{GE}=0V$ $V_{CE}=1200V$ $T_c=25^\circ\text{C}$			1.0	mA
		$V_{GE}=0V$ $V_{CE}=1200V$ $T_c=125^\circ\text{C}$			—	mA
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V$ $V_{GE}=\pm 20V$			100	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=20V$ $I_C=50mA$	3.0		6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V$ $I_C=50A$		2.7	3.5	V
Input Capacitance	$C_{ies}$	$V_{GE}=0V$		9000		pF
Output Capacitance	$C_{oes}$	$V_{CE}=10V$		—		
Reverse Transfer Capacitance	$C_{res}$	$f=1MHz$		—		
Turn-on Time	$t_{on}$	$V_{CC}=600V$		0.5	0.8	$\mu\text{s}$
	$t_r$	$I_C=50A$		0.3	0.6	
Turn-off Time	$t_{off}$	$V_{GE}=\pm 15V$		0.8	1.5	
	$t_f$	$R_G=25\Omega$		0.3	0.5	
Diode Forward On-Voltage	$V_F$	$I_F=50A$ $V_{GE}=0V$			2.5	V
Reverse Recovery Time	$t_{rr}$	$I_F=50A$ $-di/dt=150A/\mu\text{s}$ $V_{GE}=-10V$		200	350	ns

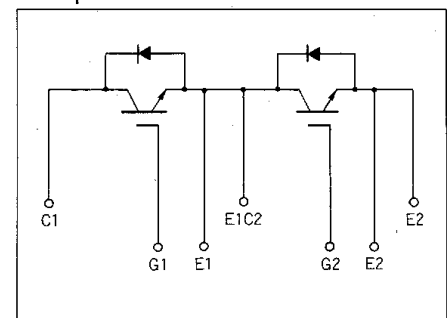
#### ● Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.312	°C/W
	$R_{th(j-c)}$	Diode			0.60	
	$R_{th(c-f)}$	With Thermal compound		0.05		

### ■ Outline Drawings

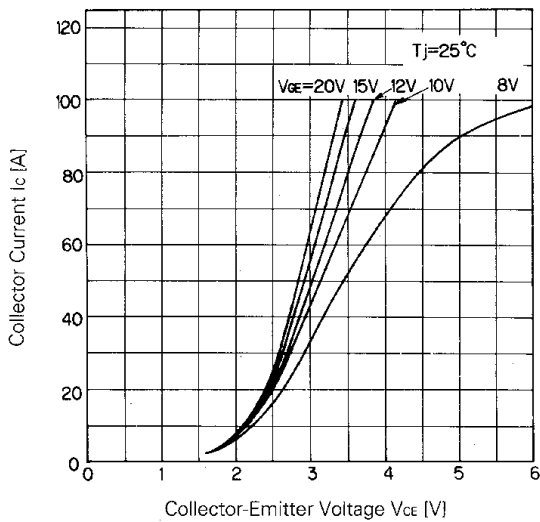


### ■ Equilavent Circuit Schematic

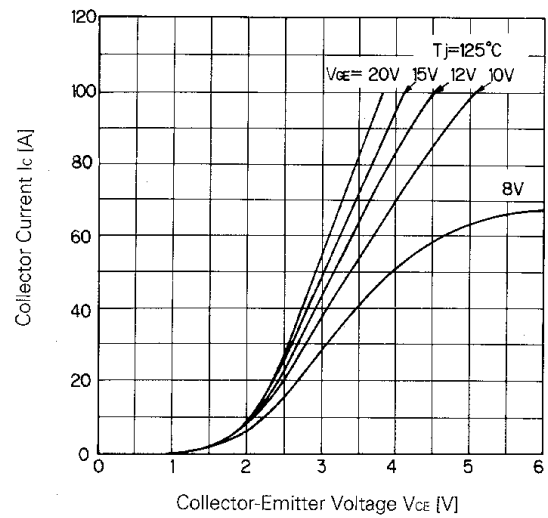


\*1 Recommendable Value 25 to 35kg•cm (M5)

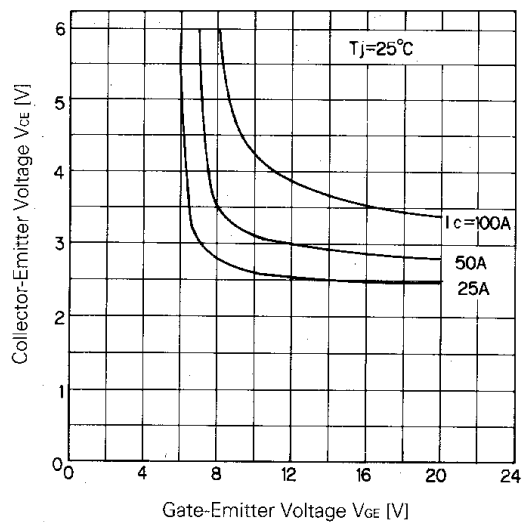
\*2 Recommendable Value 25 to 35kg•cm (M5)



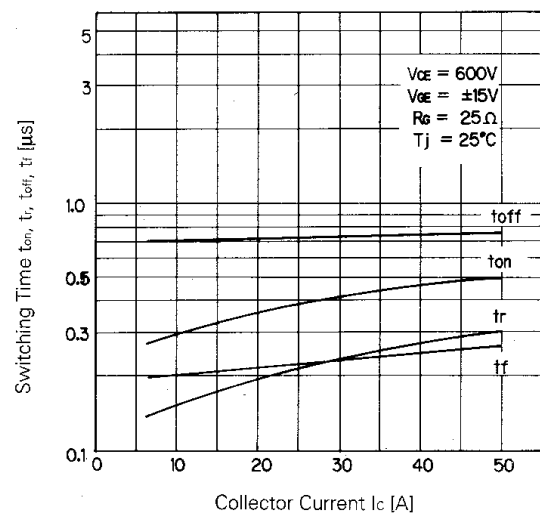
Collector Current vs. Collector-Emitter Voltage



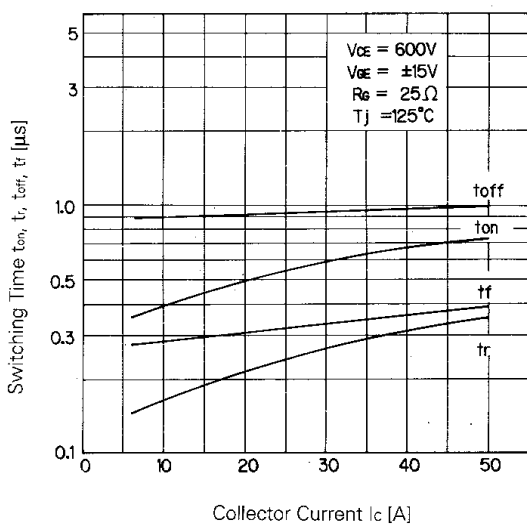
Collector Current vs. Collector-Emitter Voltage



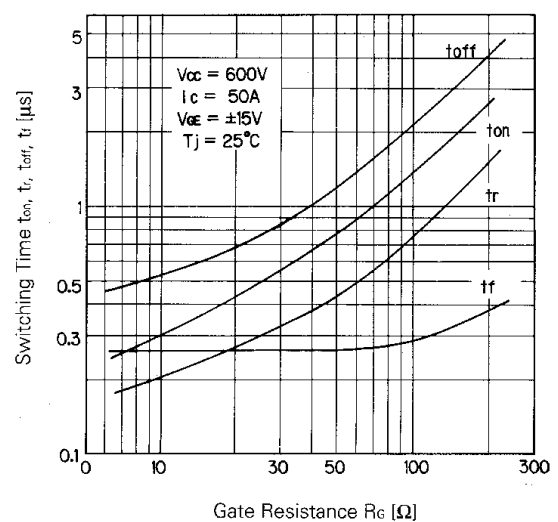
Collector-Emitter Voltage vs. Gate-Emitter Voltage



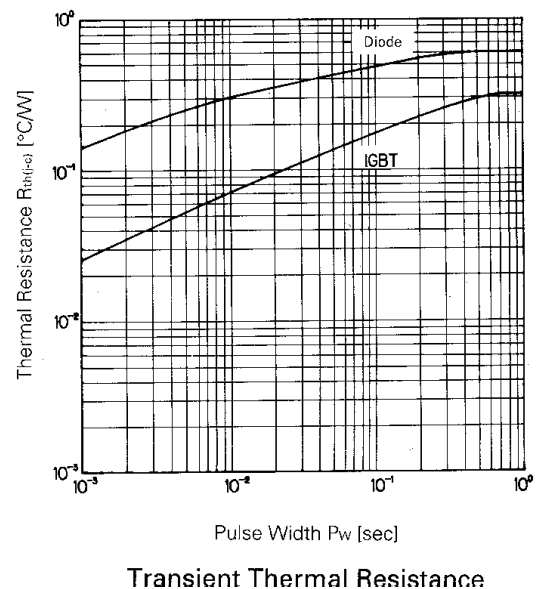
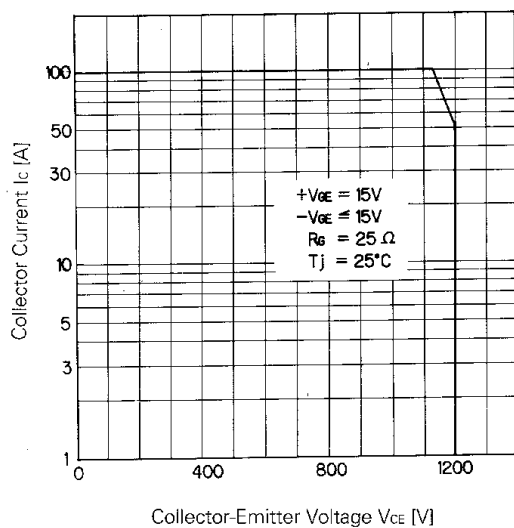
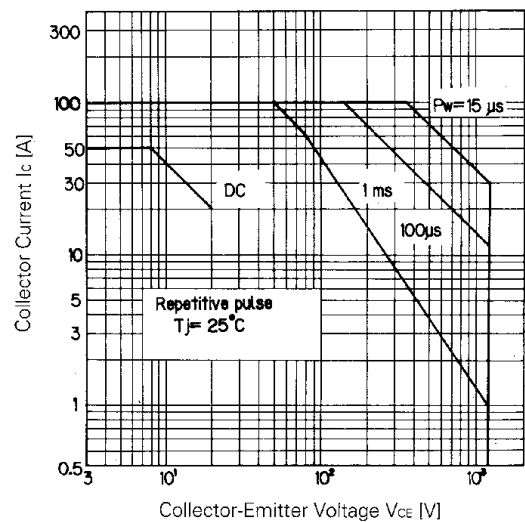
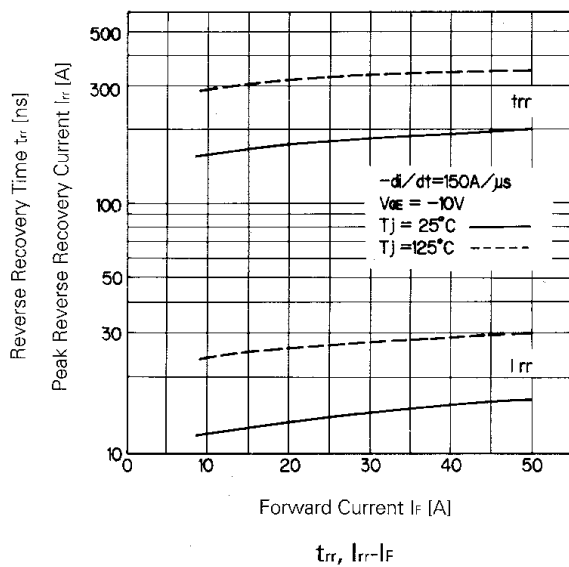
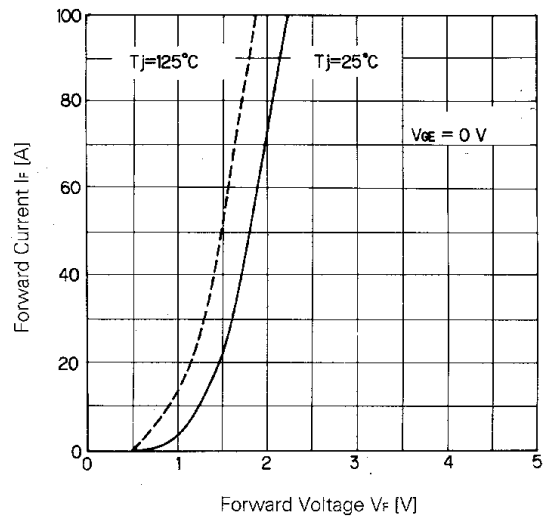
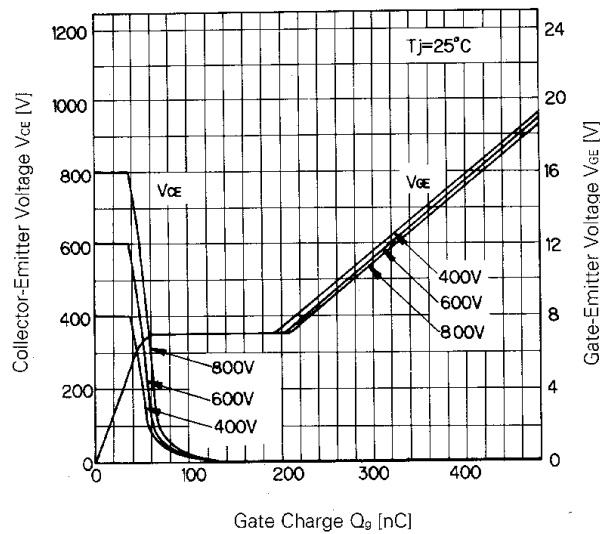
Switching Time



Switching Time



Switching Time-Gate Resistance



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