

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}	600	V
Gate-Emitter Voltage	V_{GES}	± 20	V
Collector Current	Continuous	I_C	300
	1ms	I_C pulse	600
	Continuous	$-I_C$	300
	1ms	$-I_C$ pulse	600
Max. Power Dissipation	P_C	1200	W
Operating Temperature	T_j	$+150$	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-40 to $+125$	$^{\circ}\text{C}$
Isolation Voltage	AC, 1min.	V_{isol}	2500
Screw Torque	Mounting *1	35	kg $\cdot$ cm
	Terminals *2	45	

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

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0\text{V}$ $V_{CE}=600\text{V}$ $T_j=25^{\circ}\text{C}$ $T_j=125^{\circ}\text{C}$			4.0	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0\text{V}$ $V_{GE}=\pm 20\text{V}$			200	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=20\text{V}$ $I_C=300\text{mA}$	3.0		6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15\text{V}$ $I_C=300\text{A}$		2.7	3.5	V
Input Capacitance	C_{ies}	$V_{GE}=0\text{V}$		28500		pF
Output Capacitance	C_{oes}	$V_{CE}=10\text{V}$		—		
Reverse Transfer Capacitance	C_{res}	$f=1\text{MHz}$		—		
Turn-on Time *3	t_{on}	$V_{CC}=300\text{V}$		0.7	0.8	μs
	t_r	$I_C=300\text{A}$		0.4	0.6	
Turn-off Time *4	t_{off}	$V_{GE}=\pm 15\text{V}$		0.7	1.0	
	t_f	$R_G=6.8\Omega$		0.2	0.35	
Diode Forward On-Voltage	V_F	$I_F=300\text{A}$ $V_{GE}=0\text{V}$			2.5	V
Reverse Recovery Time	t_{rr}	$I_F=300\text{A}$ $-di/dt=900\text{A}/\mu\text{s}$ $V_{GE}=-10\text{V}$			300	ns

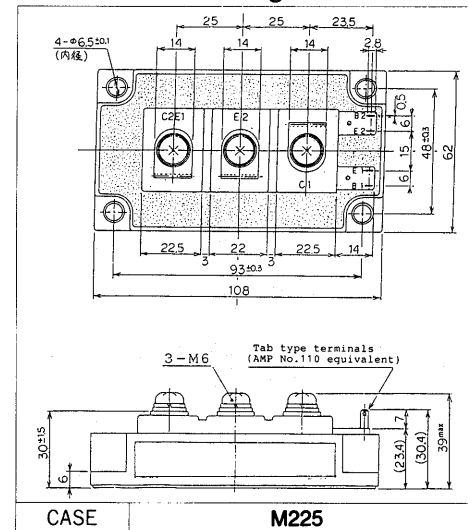
*3 Resistive load

*4 Inductive load

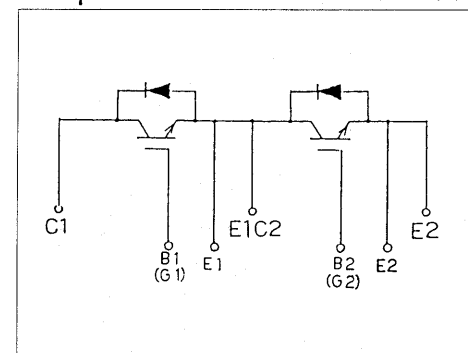
● Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.104	$^{\circ}\text{C}/\text{W}$
	$R_{th(j-c)}$	Diode			0.20	
	$R_{th(c-f)}$	With Thermal compound		0.025		

■ Outline Drawings

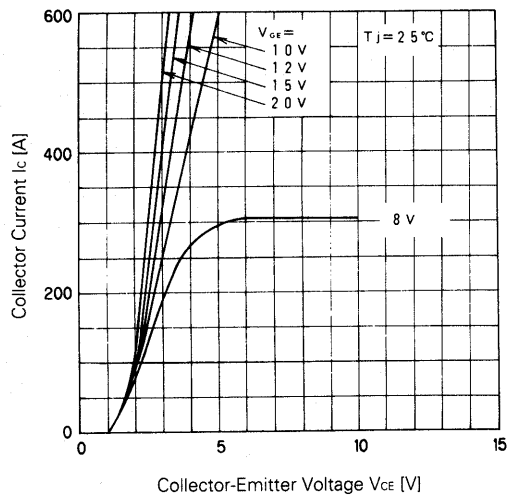


■ Equivalence Circuit Schematic

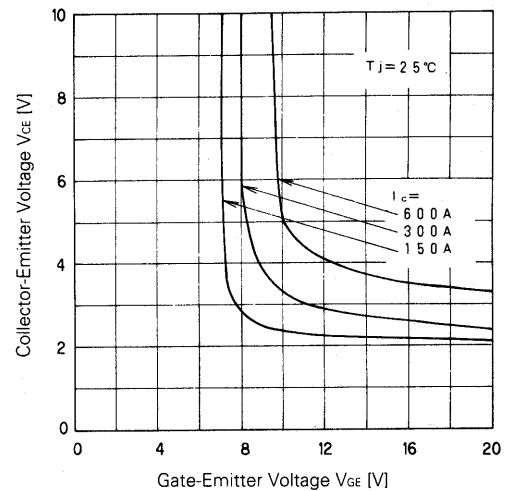


*1 Recommendable Value 25 to 35kg $\cdot$ cm (M5)

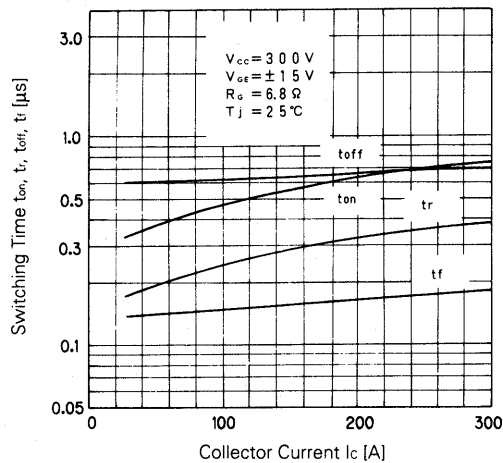
*2 Recommendable Value 35 to 40kg $\cdot$ cm (M4)



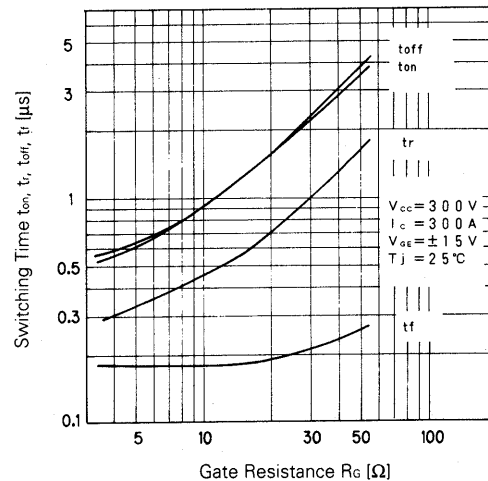
Collector Current vs. Collector-Emitter Voltage



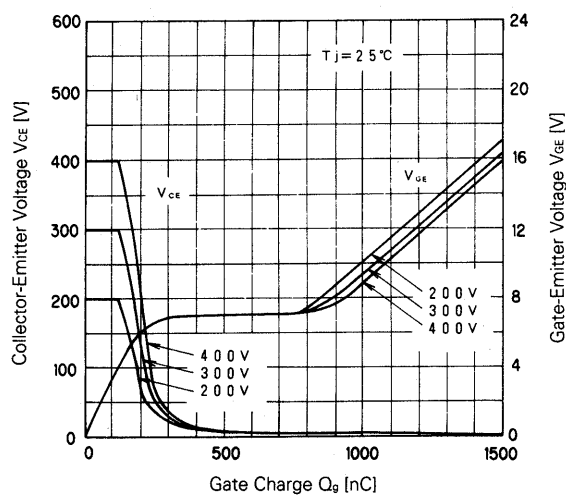
Collector-Emitter Voltage vs. Gate-Emitter Voltage



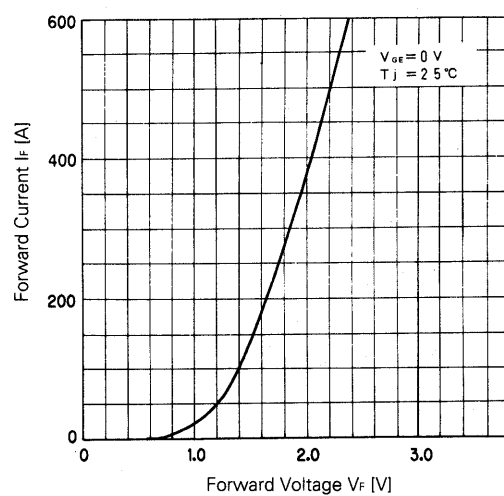
Switching Time



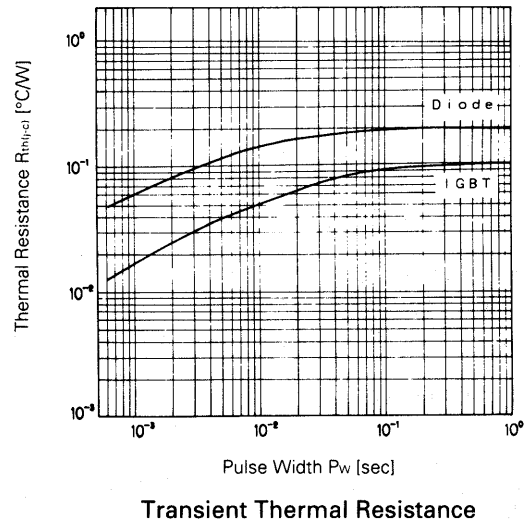
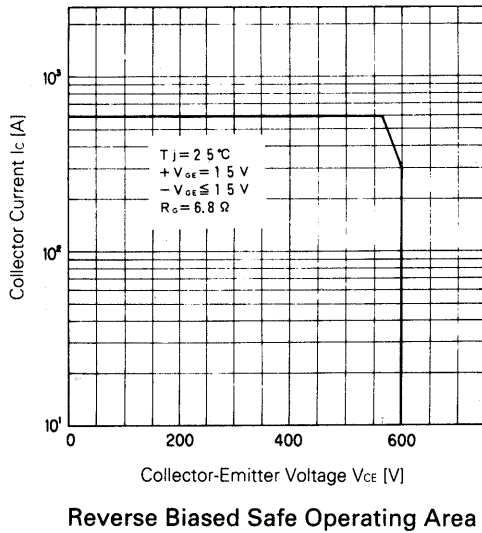
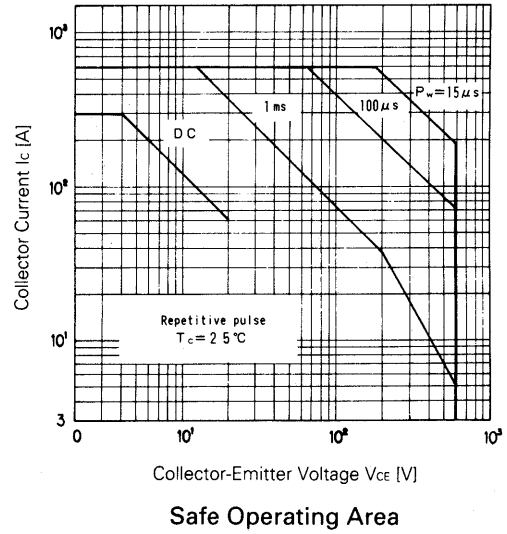
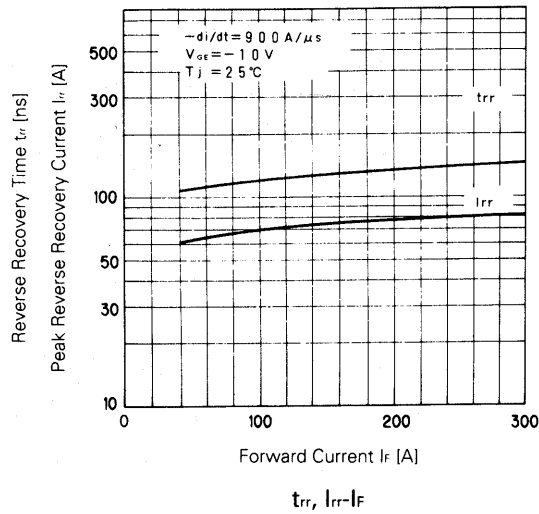
Switching Time-Gate Resistance



Dynamic Input Characteristic



Forward Voltage of Free Wheel Diode



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