

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}	± 20	V
Collector Current	Continuous	I_C	400
	1ms	$I_{C\ pulse}$	800
	Continuous	$-I_C$	400
	1ms	$-I_{C\ pulse}$	800
Max. Power Dissipation	P_C	2600	W
Operating Temperature	T_j	+150	°C
Storage Temperature	T_{stg}	-40 to +125	°C
Isolation Voltage	AC. 1min.	V_{is}	2500
Screw Torque	Mounting *1	3.5	N•m
	Terminals *2	4.5	
	Terminals *3	1.7	

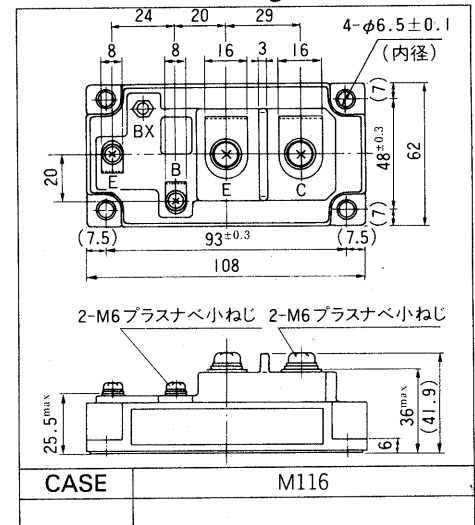
● Electrical Characteristics ($T_c=25^\circ\text{C}$)

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0V\ V_{CE}=1200V\ T_c=25^\circ\text{C}$			4.0	mA
		$V_{GE}=0V\ V_{CE}=1200V\ T_c=125^\circ\text{C}$			—	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V\ V_{GE}=\pm 20V$			400	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=20V\ I_C=400mA$	3.0		6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V\ I_C=400A$			3.5	V
Input Capacitance	C_{ies}	$V_{GE}=0V$		72000		pF
Output Capacitance	C_{oes}	$V_{CE}=10V$		—		
Reverse Transfer Capacitance	C_{res}	$f=1MHz$		—		
Turn-on Time	t_{on}	$V_{CC}=600V$			0.8	μs
	t_r	$I_C=400A$			0.6	
Turn-off Time	t_{off}	$V_{GE}=\pm 15V$			1.5	
	t_f	$R_G=1.8\Omega$			0.5	
Diode Forward On-Voltage	V_F	$I_F=400A\ V_{GE}=0V$			2.5	V
Reverse Recovery Time	t_{rr}	$I_F=400A\ -di/dt=1200A/\mu\text{s}\ V_{GE}=-10V$		200	350	ns

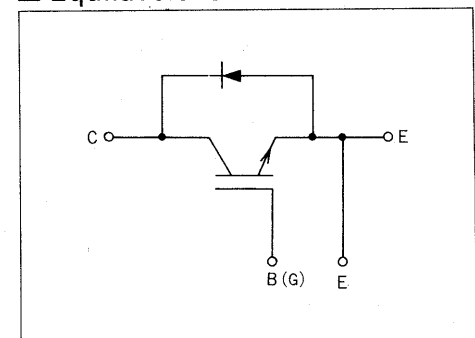
● Thermal Characteristics

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.048	°C/W
	$R_{th(j-c)}$	Diode			0.075	
	$R_{th(c-f)}$	With Thermal compound		0.0125		

■ Outline Drawings



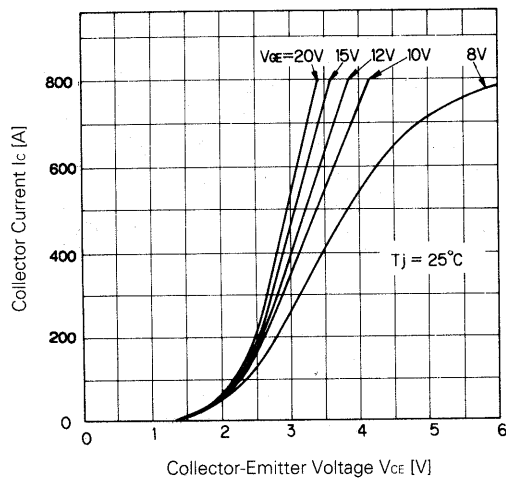
■ Equilavelent Circuit Schematic



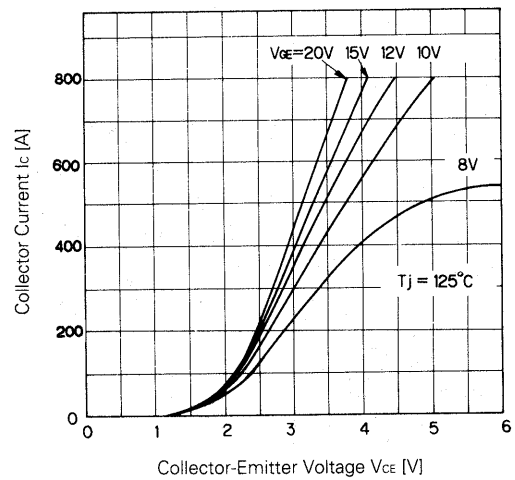
*1 Recommendable Value 2.5 ~ 3.5 N•m (M5) or (M6)

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

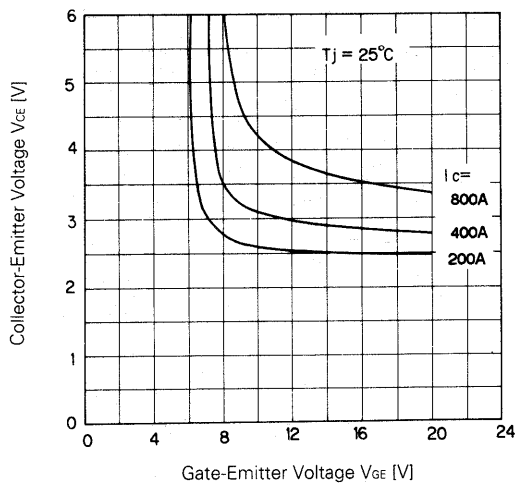
*3 Recommendable Value 1.3 ~ 1.7 N•m (M4)



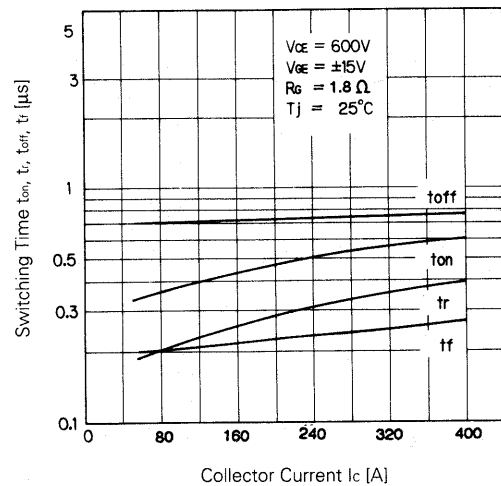
Collector Current vs. Collector-Emitter Voltage



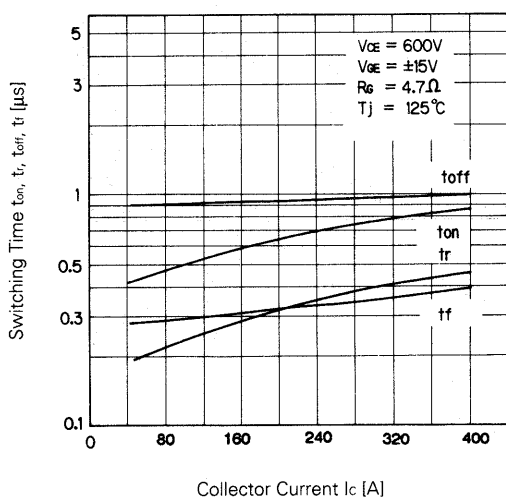
Collector Current vs. Collector-Emitter Voltage



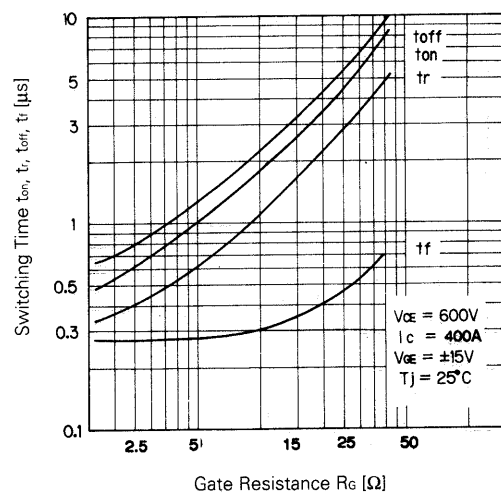
Collector-Emitter Voltage vs. Gate-Emitter Voltage



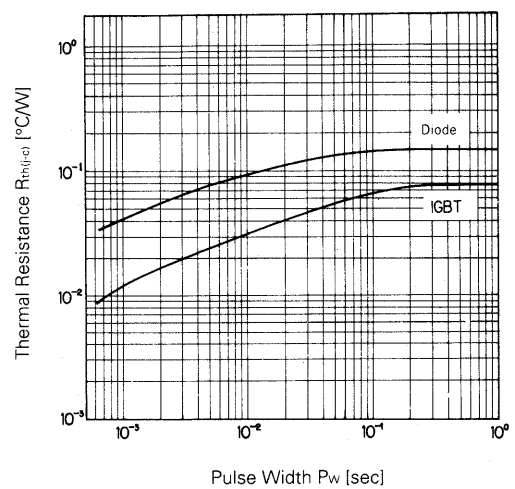
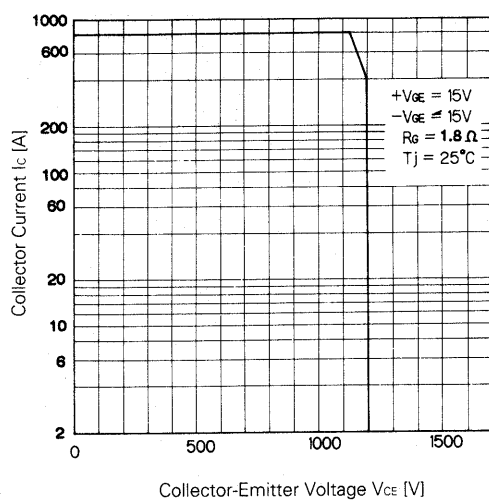
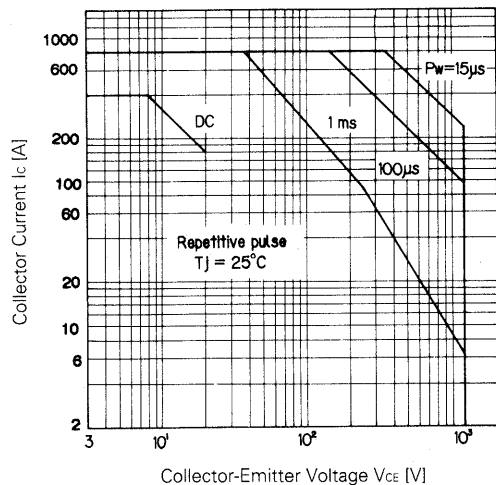
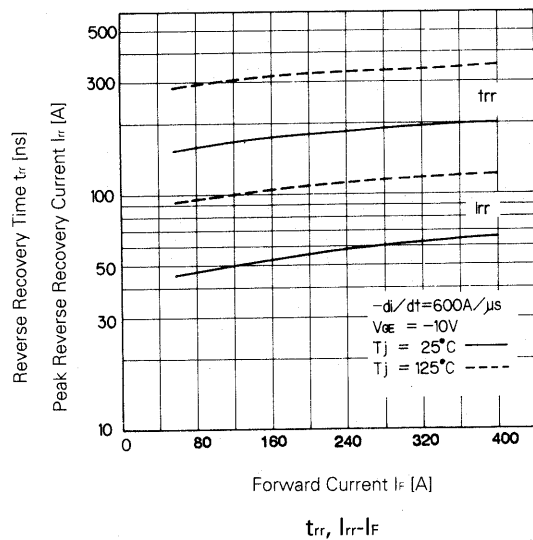
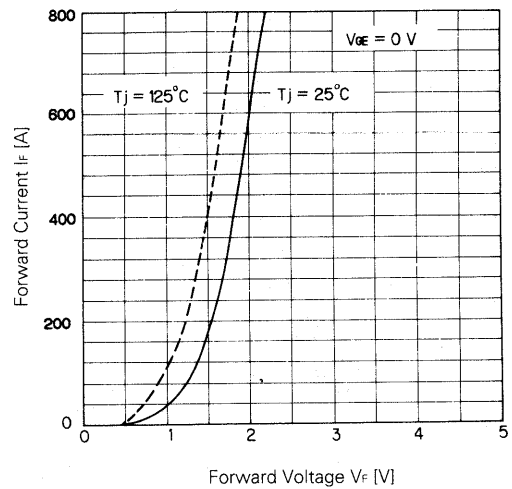
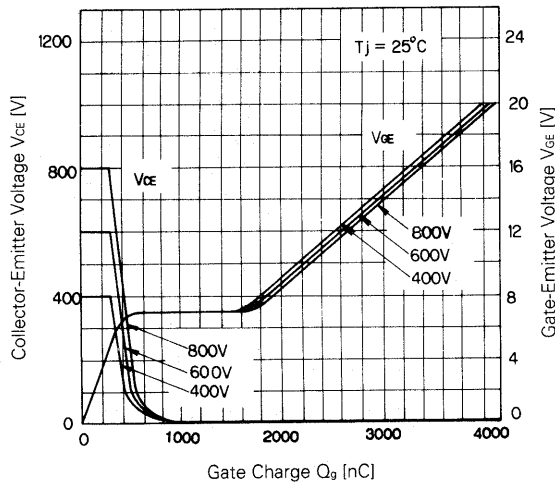
Switching Time



Switching Time



Switching Time-Gate Resistance



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