

## 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	$V_{GES}$	$\pm 20$	V
Collector Current	Continuous	$I_C$	15
	1ms	$I_{C\ pulse}$	30
	Continuous	$-I_C$	15
	1ms	$-I_{C\ pulse}$	30
Max. Power Dissipation	$P_C$	60	W
Operating Temperature	$T_j$	150	$^{\circ}C$
Storage Temperature	$T_{stg}$	-40 to +125	$^{\circ}C$
Net. Weight		150	g
Isolation Voltage	AC. 1min.	$V_{isol}$	2500
Screw Torque	Mounting *1	35	kg·cm

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

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

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	$I_{CES}$	$V_{GE}=0V$ $V_{CE}=600V$ $T_j=25^{\circ}C$			1.0	mA
Gate-Emitter Leakage Current	$I_{GES}$	$V_{CE}=0V$ $V_{GE}=\pm 20V$			100	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=20V$ $I_C=15mA$	3.0	4.5	6.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V$ $I_C=15A$		2.7	3.5	V
Input Capacitance	$C_{ies}$	$V_{GE}=0V$		1400		pF
Output Capacitance	$C_{oes}$	$V_{CE}=10V$		-		
Reverse Transfer Capacitance	$C_{res}$	$f=1MHz$		-		
Turn-on Time *2	$t_{on}$	$V_{CC}=300V$		0.4	0.8	$\mu s$
	$t_r$	$I_C=15A$		0.3	0.6	
Turn-off Time *3	$t_{off}$	$V_{GE}=\pm 15V$		0.6	1.0	
	$t_f$	$R_G=150\Omega$		0.2	0.35	
Diode Forward On-Voltage	$V_F$	$I_F=15A$ $V_{GE}=0V$			2.5	V
Reverse Recovery Time	$t_{rr}$	$I_F=15A$ $-di/dt=50A/\mu s$ $V_{GE}=-10V$			300	ns

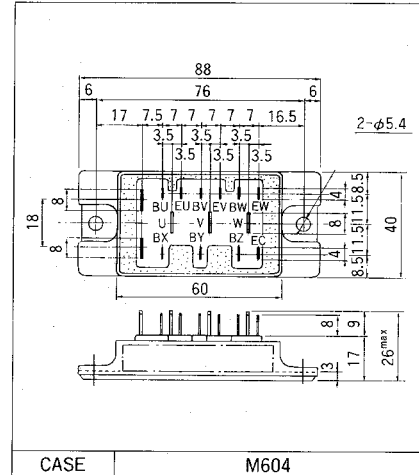
\*2 Resistive load

\*3 Inductive load

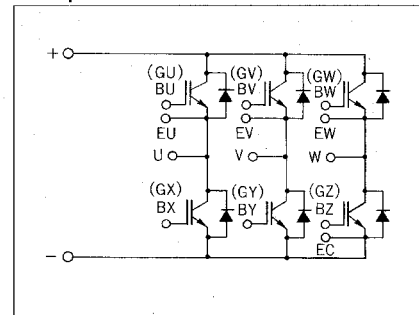
#### ● Thermal Characteristics

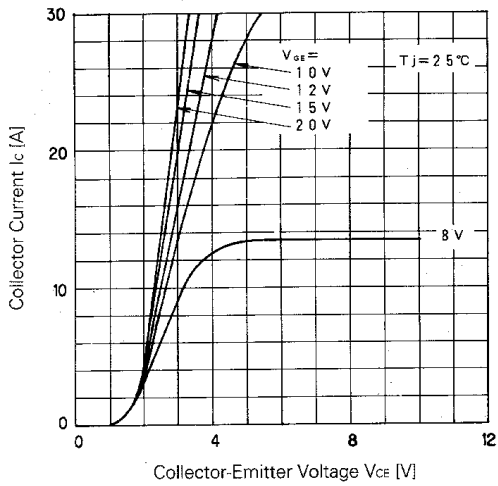
Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			2.08	$^{\circ}C/W$
	$R_{th(j-e)}$	Diode			3.30	
	$R_{th(c-f)}$	With Thermal compound		0.06		

### ■ Outline Drawings

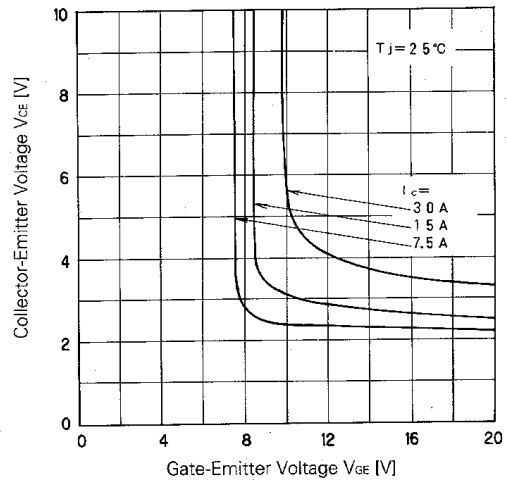


### ■ Equilavelent Circuit Schematic

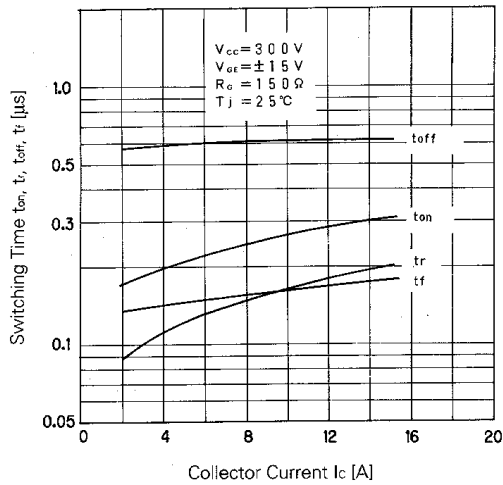




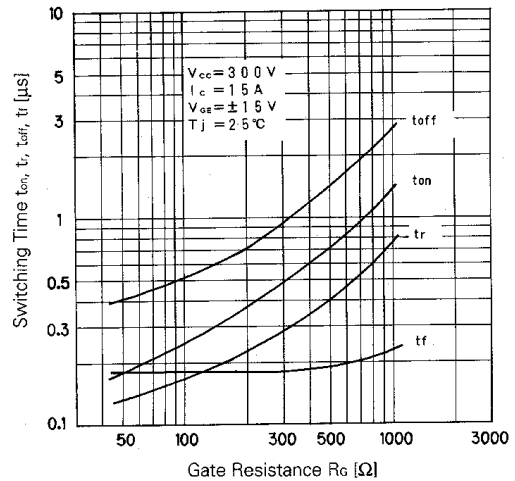
Collector Current vs. Collector-Emitter Voltage



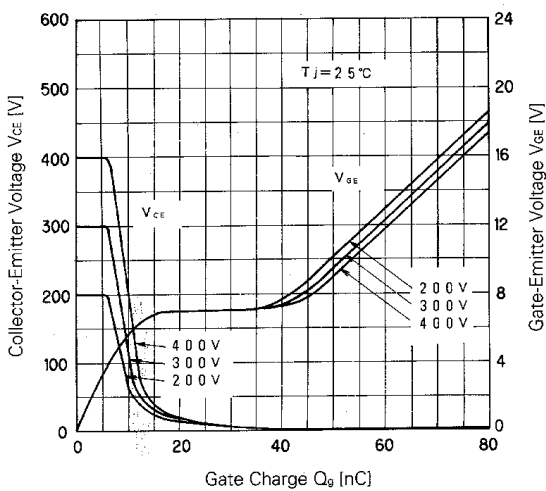
Collector-Emitter Voltage vs. Gate-Emitter Voltage



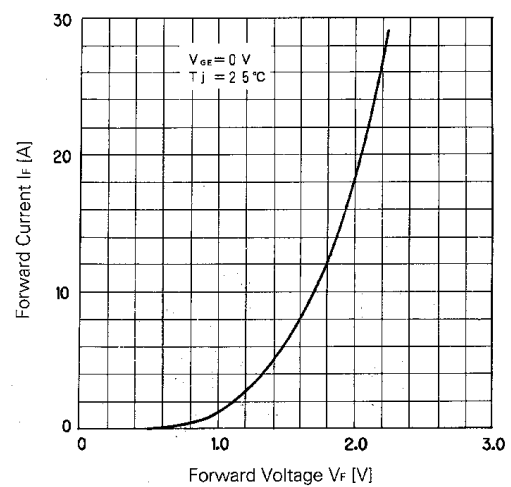
Switching Time



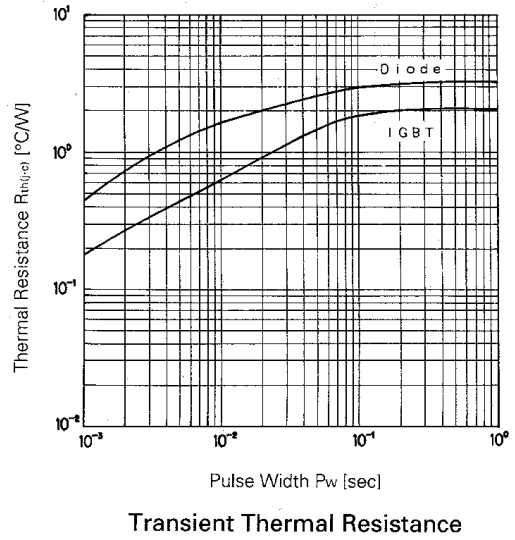
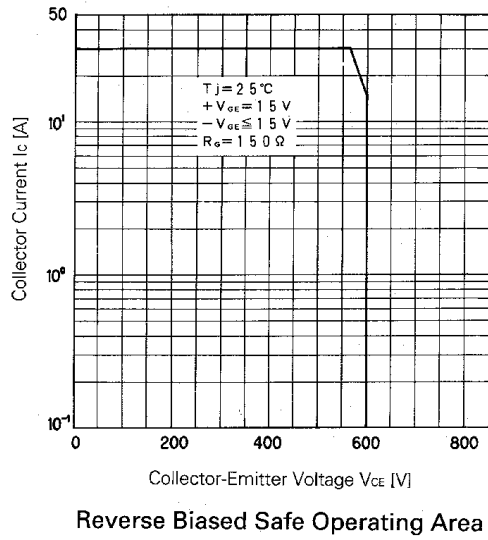
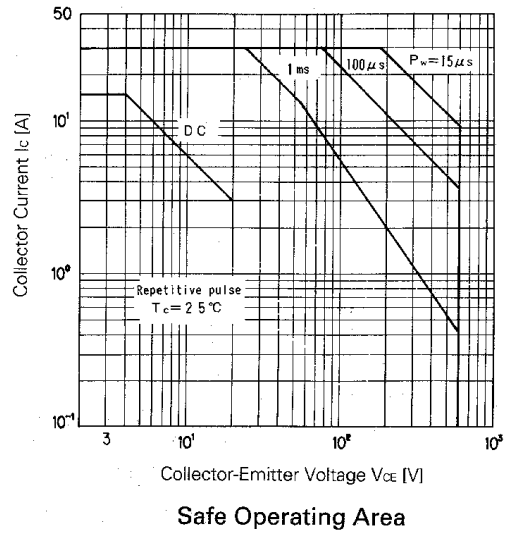
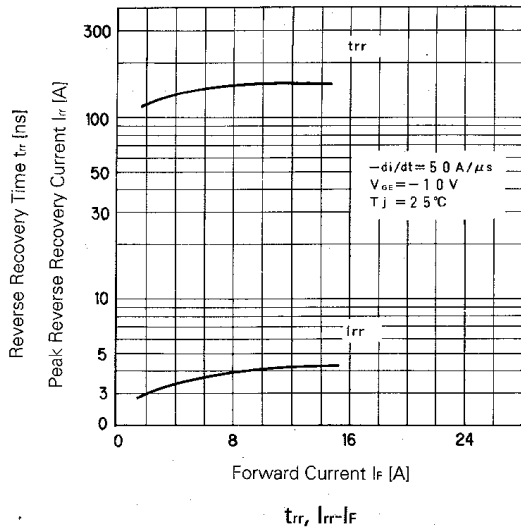
Switching Time-Gate Resistance



Dynamic Input Characteristic



Forward Voltage of Free Wheel Diode



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