

IGBT MODULE (P-Series)

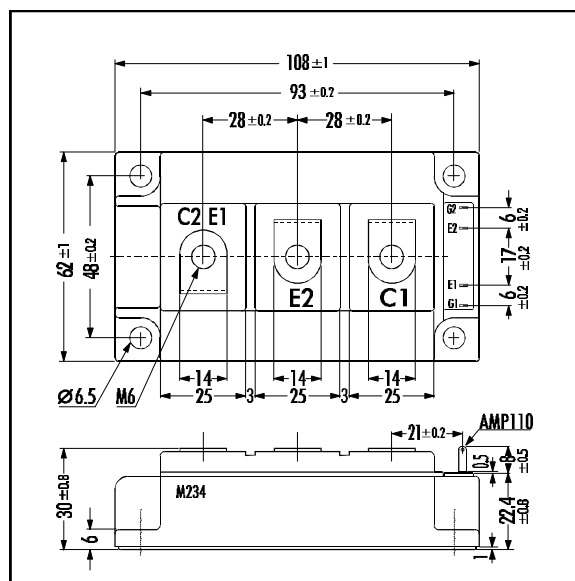
■ Features

- *Square SC SOA at $10 \times I_C$*
- *Simplified Parallel Connection*
- *Narrow Distribution of Characteristics*
- *High Short Circuit Withstand-Capability*

■ Applications

- *High Power Switching*
- *A.C. Motor Controls*
- *D.C. Motor Controls*
- *Uninterruptible Power Supply*

■ Outline Drawing



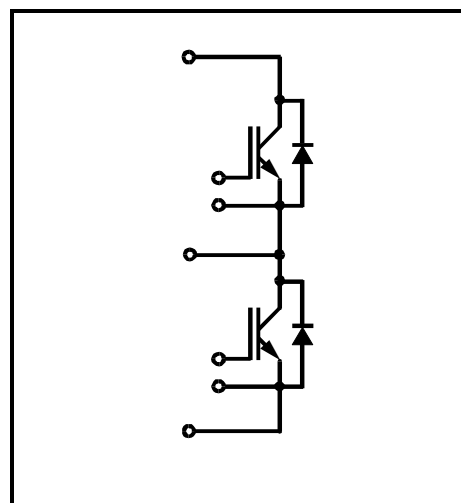
■ Maximum Ratings and Characteristics

• **Absolute Maximum Ratings** ($T_c=25^{\circ}\text{C}$)

Items		Symbols	Ratings	Units
Collector-Emitter Voltage		V_{CES}	1400	V
Gate -Emitter Voltage		V_{GES}	± 20	V
Collector Current	Continuous $T_C=25^{\circ}C$	I_C	200	A
	Continuous $T_C=80^{\circ}C$		150	
	1ms $T_C=25^{\circ}C$	I_C PULSE	400	
	1ms $T_C=80^{\circ}C$		300	
		$-I_C$	150	
	1ms	$-I_C$ PULSE	300	
Max. Power Dissipation		P_C	1100	W
Operating Temperature		T_j	+150	$^{\circ}C$
Storage Temperature		T_{stg}	-40 ~ +125	$^{\circ}C$
Isolation Voltage	A.C. 1min.	V_{is}	2500	V
Screw Torque		Mounting *1	3.5	Nm
		Terminals *2	3.5	

Note: *1:Recommendable Value: 2.5 – 3.5 Nm (M5)

■ Equivalent Circuit

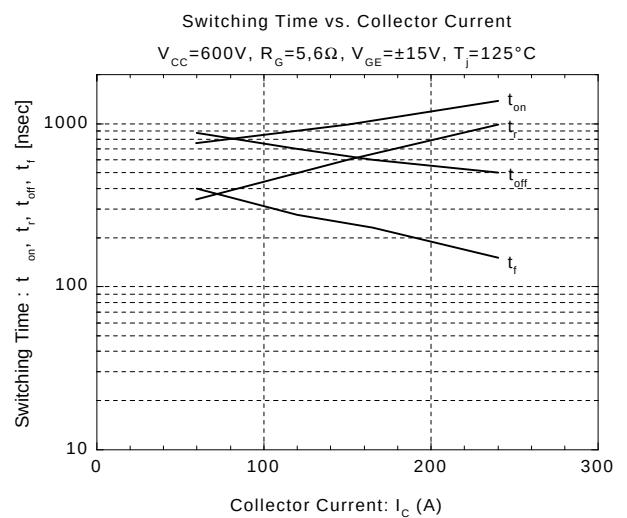
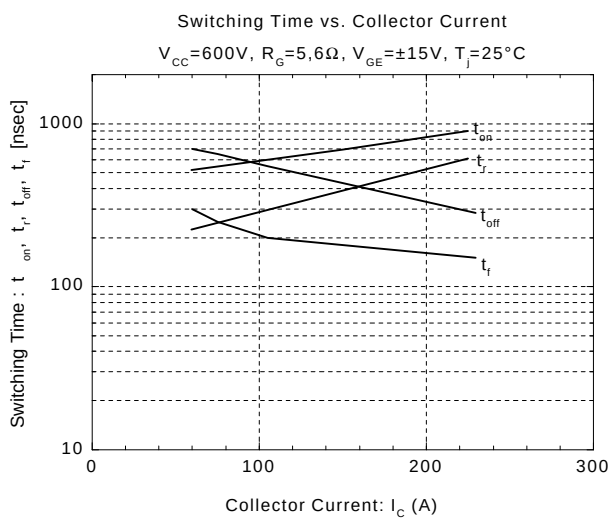
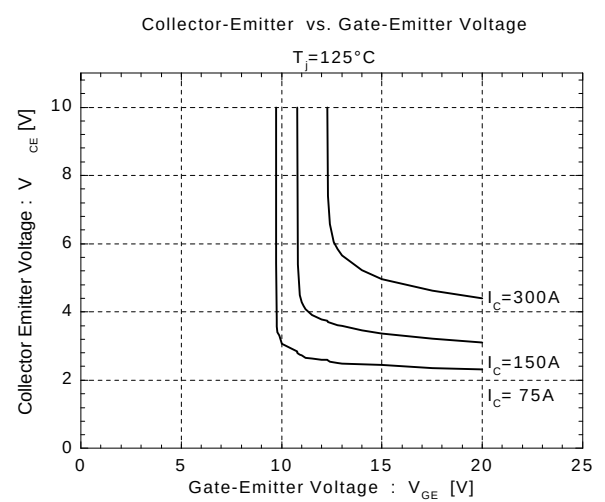
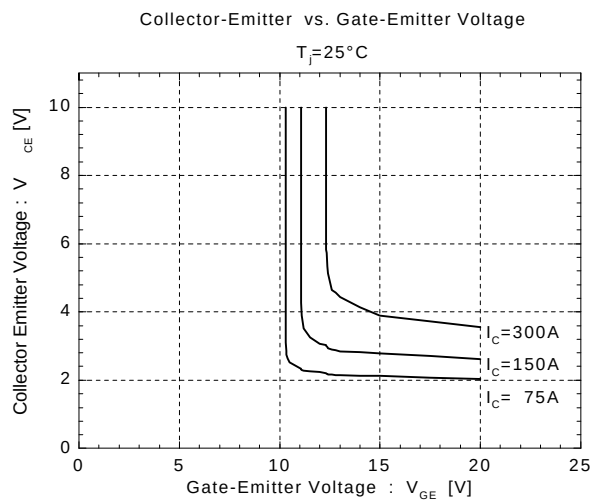
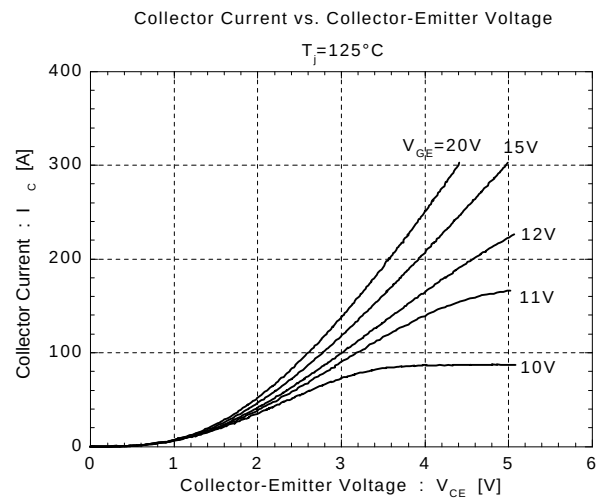
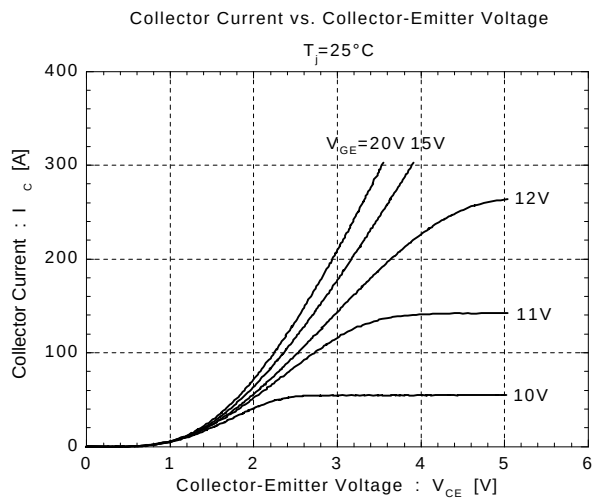


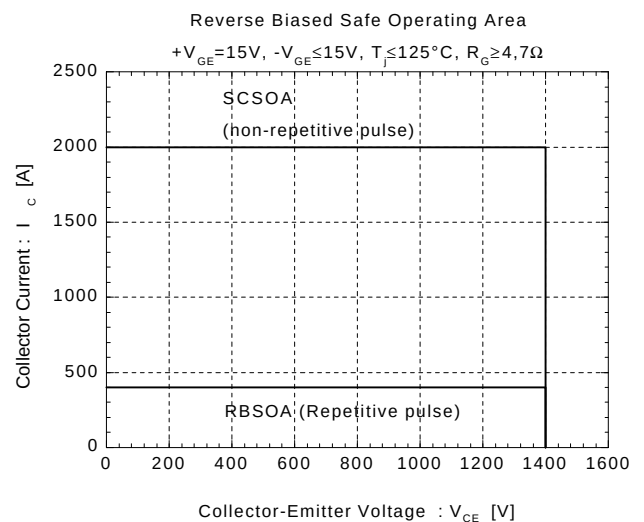
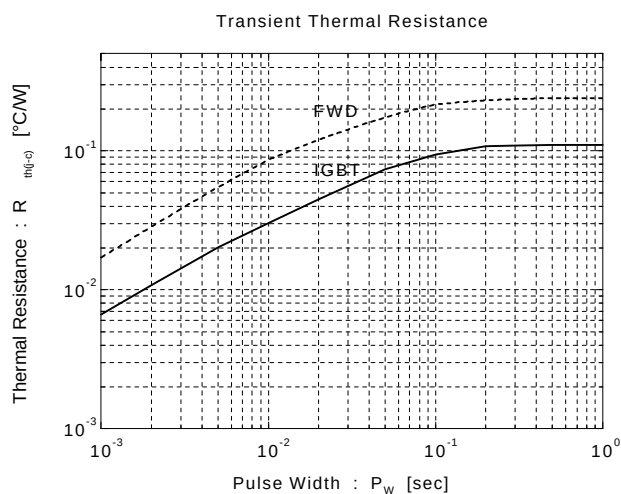
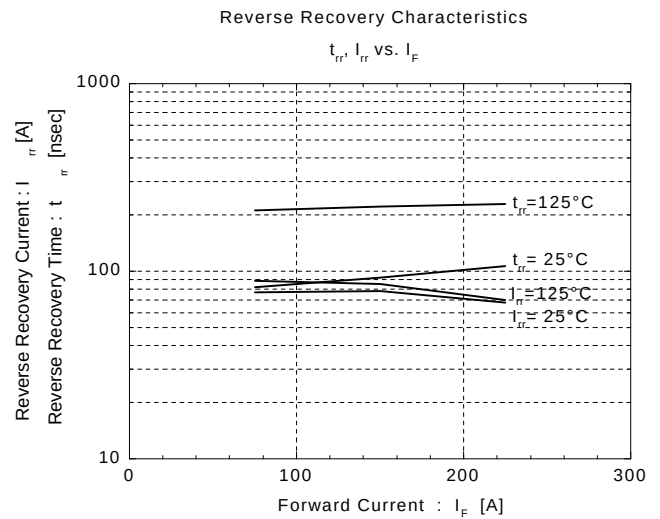
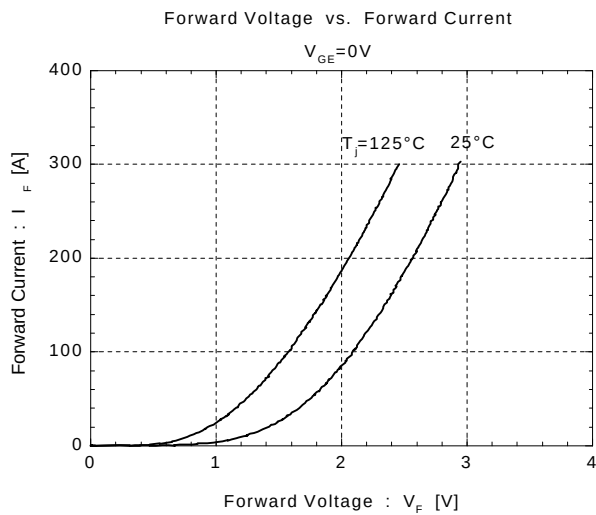
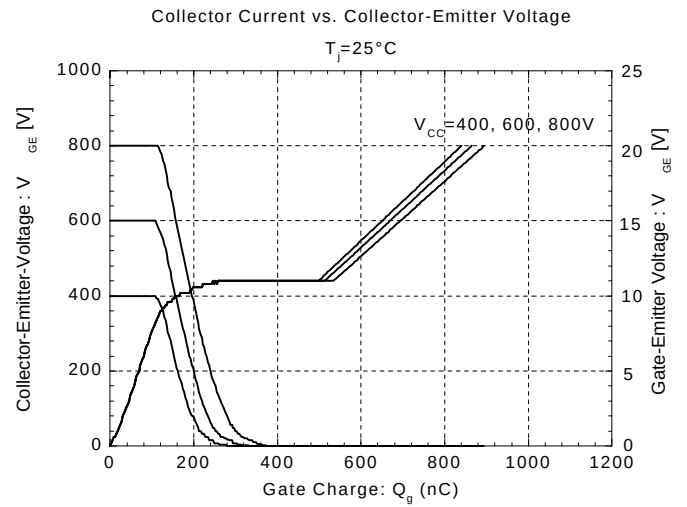
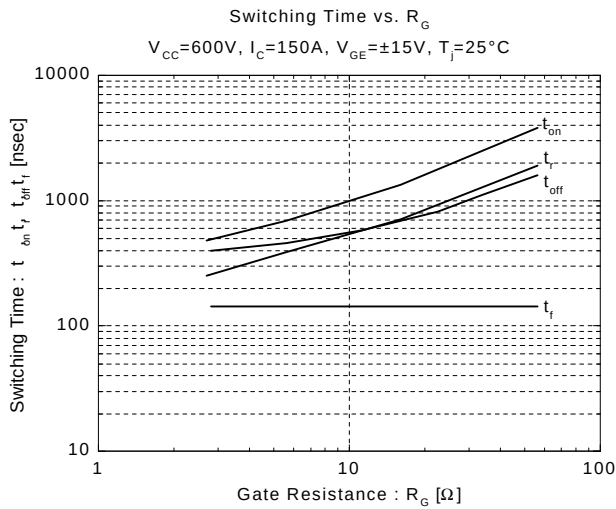
• **Electrical Characteristics** (at $T_j=25^{\circ}\text{C}$)

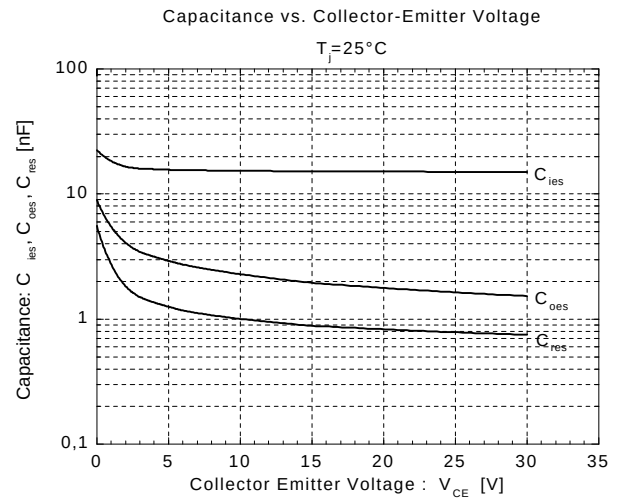
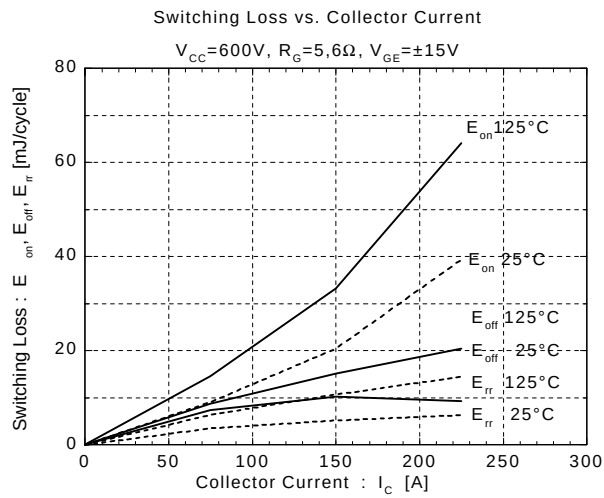
Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Zero Gate Voltage Collector Current	I_{CES}	$V_{GE}=0V$ $V_{CE}=1400V$			2.0	mA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0V$ $V_{GE}=\pm 20V$			400	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{GE}=20V$ $I_C=150mA$	6.0	8.0	9.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$T_J=25^{\circ}C$ $V_{GE}=15V$ $I_C=150A$		2.7	3.0	V
		$T_J=125^{\circ}C$ $V_{GE}=15V$ $I_C=150A$		3.3		
Input capacitance	C_{ies}	$V_{GE}=0V$		15000		pF
Output capacitance	C_{oes}	$V_{CE}=10V$		2000		
Reverse Transfer capacitance	C_{res}	$f=1MHz$		1000		
Turn-on Time	t_{ON}	$V_{CC}=600V$			1.2	μs
	t_r	$I_C=150A$			0.6	
Turn-off Time	t_{OFF}	$V_{GE}=\pm 15V$			1.0	
	t_f	$R_G=5.6\Omega$			0.3	
Diode Forward On-Voltage	V_F	$I_F=150A$ $V_{GE}=0V$		2.4	3.3	V
Reverse Recovery Time	t_{rr}	$I_F=150A$			350	ns

- **Thermal Characteristics**

Items	Symbols	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance	$R_{th(j-c)}$	IGBT			0.11	°C/W
	$R_{th(j-c)}$	Diode			0.24	
	$R_{th(c-f)}$	With Thermal Compound		0.025		







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