

SM2G50US60

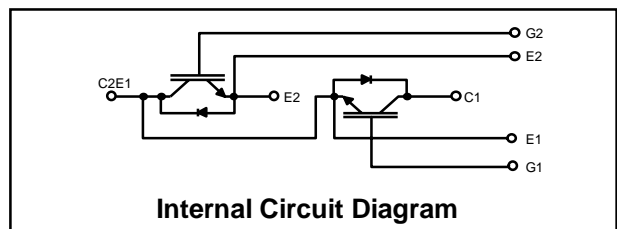
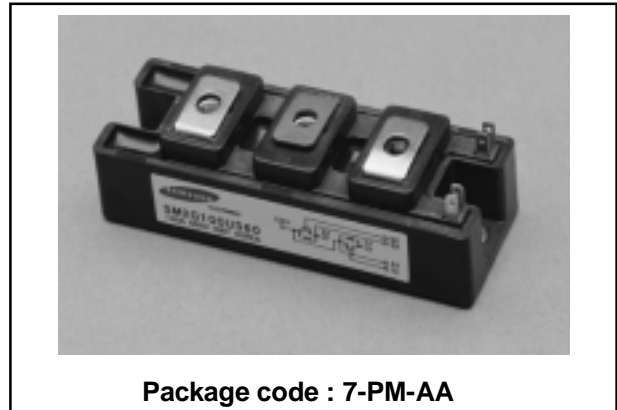
Preliminary
IGBT MODULE

FEATURES

- High Speed Switching
- Low Conduction Loss
: $V_{CE(sat)} = 2.1 \text{ V (typ)}$
- Fast & Soft Anti-Parallel FWD
- Short circuit rated
: Min 10uS at $T_c = 100^\circ\text{C}$

APPLICATIONS

- General Purpose Inverters
- Welding Machine
- Induction Heating
- UPS , CVCF
- Robotics , Servo Controls



ABSOLUTE MAXIMUM RATINGS ($T_c = 25^\circ\text{C}$)

Symbol	Characteristics	Rating	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Collector Current @ $T_c = 25^\circ\text{C}$	50	A
$I_{CM(1)}$	Pulsed Collector Current	100	A
I_F	Diode Continuous Forward Current @ $T_c = 25^\circ\text{C}$	50	A
I_{FM}	Diode Maximum Forward Current	100	A
P_C	Maximum Power Dissipation @ $T_c = 25^\circ\text{C}$	250	W
T_j	Operating Junction Temperature	-40 ~ 150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-40 ~ 125	$^\circ\text{C}$
Viso	Isolation Voltage @ AC 1 min	2500	V
	Mounting Torque @ Power terminals screw :M5	2.0	N.m
	Mounting screw :M5	2.0	N.m

Notes: (1) Repetitive Rating : Pulse width Limited by Max.Junction Temperature

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ELECTRICAL CHARACTERISTICS (IGBT PART)

(T_c=25 °C, Unless Otherwise Specified)

Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units
BV _{CES}	C - E Breakdown Voltage	V _{GE} = 0V , I _C = 250μA	600	-	-	V
ΔV _{CES} / ΔT _J	Temperature Coeff. of Breakdown Voltage	V _{GE} = 0V , I _C = 1mA	-	0.6	-	V/°C
V _{GE(th)}	G - E threshold voltage	I _C = 50mA , V _{CE} = V _{GE}	5	6	8.5	V
I _{CES}	Collector cutoff Current	V _{CE} = V _{CES} , V _{GE} = 0V	-	-	250	uA
I _{GES}	G - E leakage Current	V _{GE} = V _{GES} , V _{CE} = 0V	-	-	100	nA
V _{CE(sat)}	Collector to Emitter saturation voltage	I _C =50A, V _{GE} = 15V @T _C = 25°C	-	2.1	2.7	V
		I _C =50A, V _{GE} = 15V @T _C =100°C	-	2.7	-	V
C _{ies}	Input capacitance	V _{GE} = 0V , f = 1MHz V _{CE} = 30V	-	4200	-	pF
C _{oes}	Output capacitance		-	400	-	pF
C _{res}	Reverse transfer capacitance		-	120	-	pF
td(on)	Turn on delay time	V _{CC} = 300V , I _C = 50A V _{GE} = 15V R _G = 13 Ω Inductive Load	-	90	-	ns
tr	Turn on rise time		-	65	-	ns
td(off)	Turn off delay time		-	184	-	ns
tf	Turn off fall time		-	80	250	ns
E _{on}	Turn on Switching Loss		-	1.5	-	mJ
E _{off}	Turn off Switching Loss		-	0.9	-	mJ
E _{ts}	Total Switching Loss		-	2.4	4.8	mJ
T _{sc}	Short Circuit withstand Time	V _{CC} = 300V, V _{GE} = 15V @T _C = 100°C	10	-	-	uS
Q _g	Total Gate Charge	V _{CC} = 300V V _{GE} = 15V I _C = 50A	-	220	330	nC
Q _{ge}	Gate-Emitter Charge		-	50	-	nC
Q _{gc}	Gate-Collector Charge		-	90	-	nC

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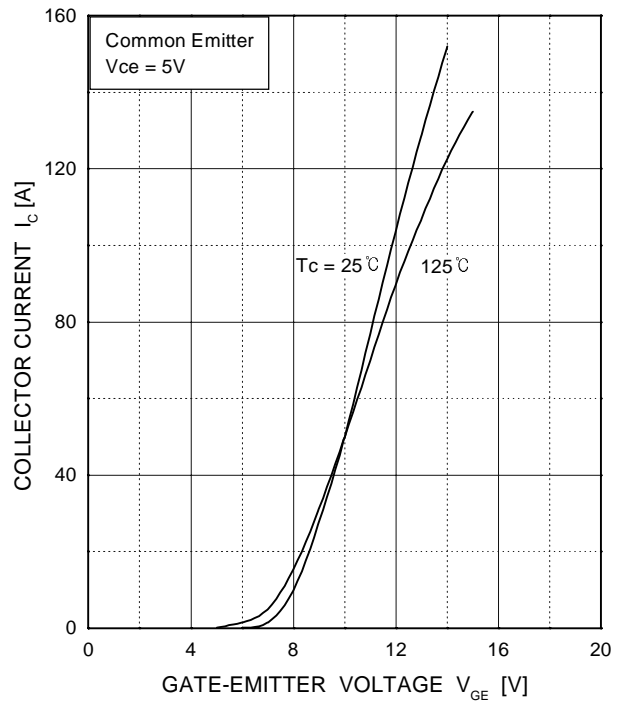
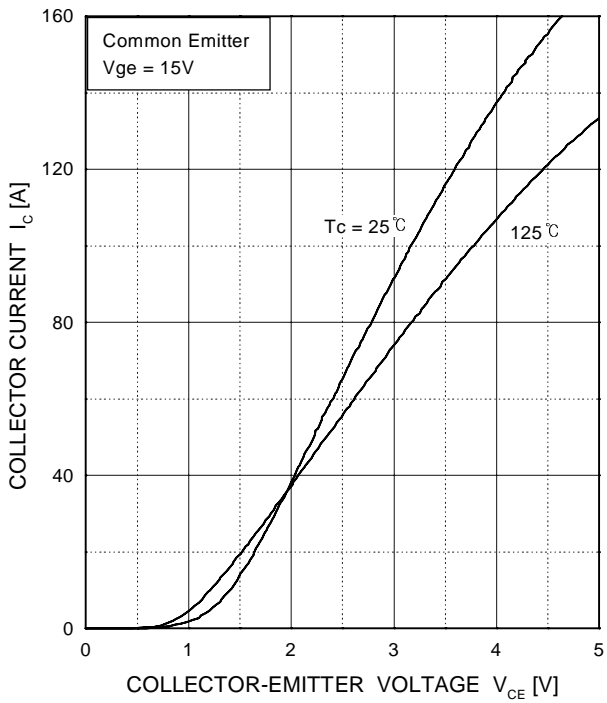
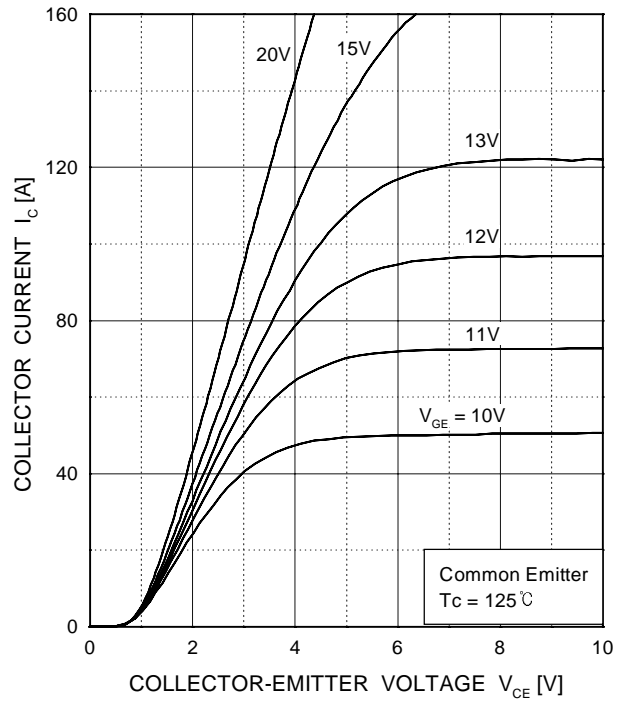
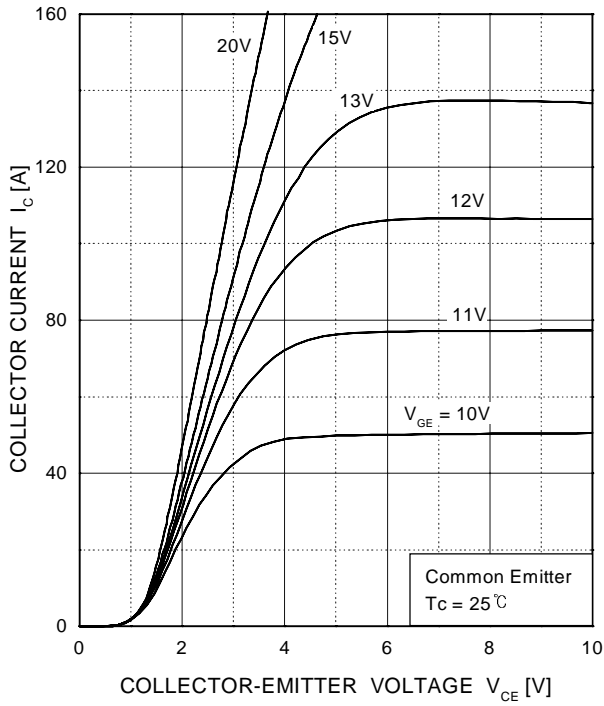
ELECTRICAL CHARACTERISTICS (DIODE PART)

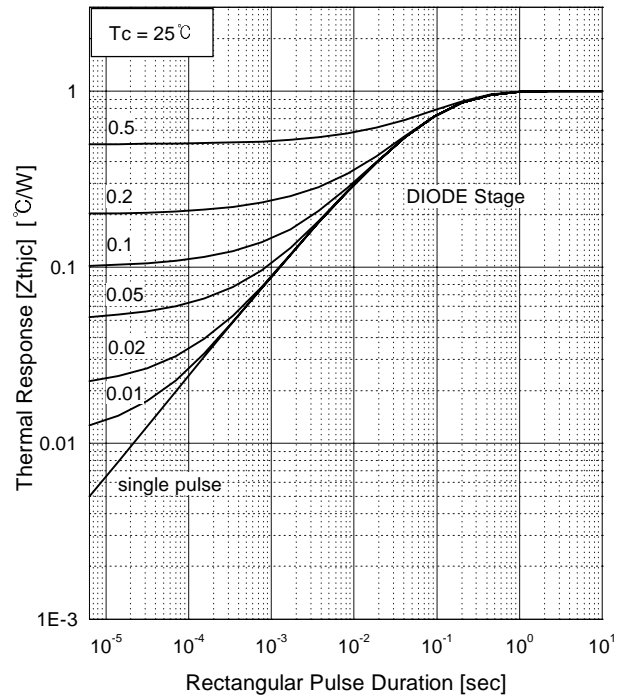
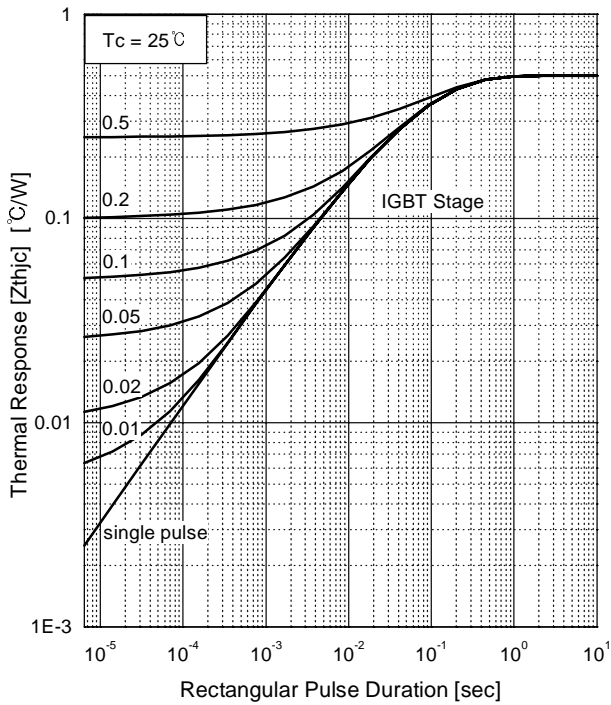
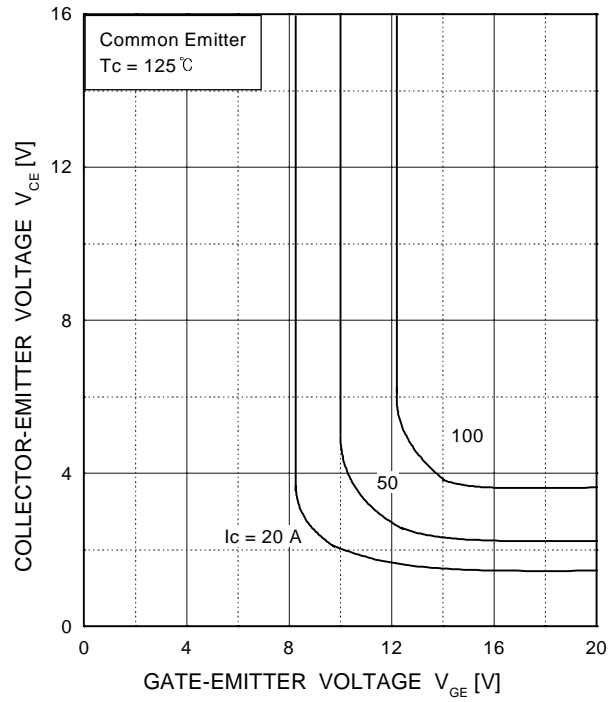
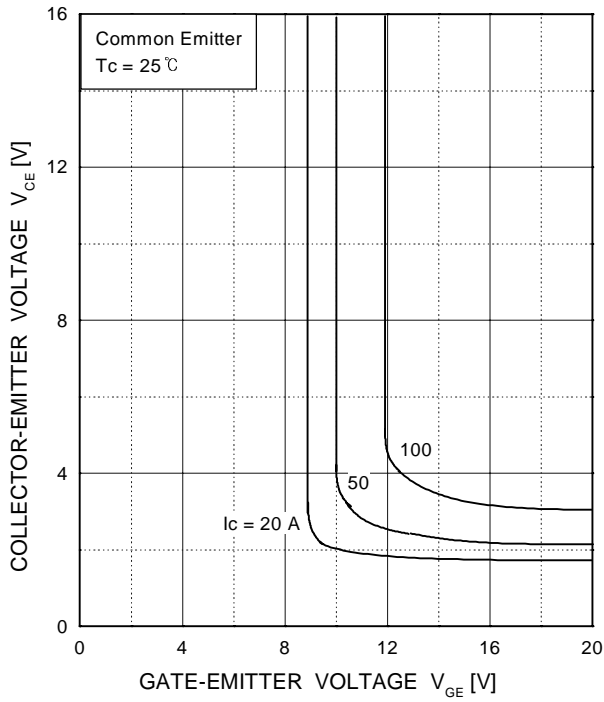
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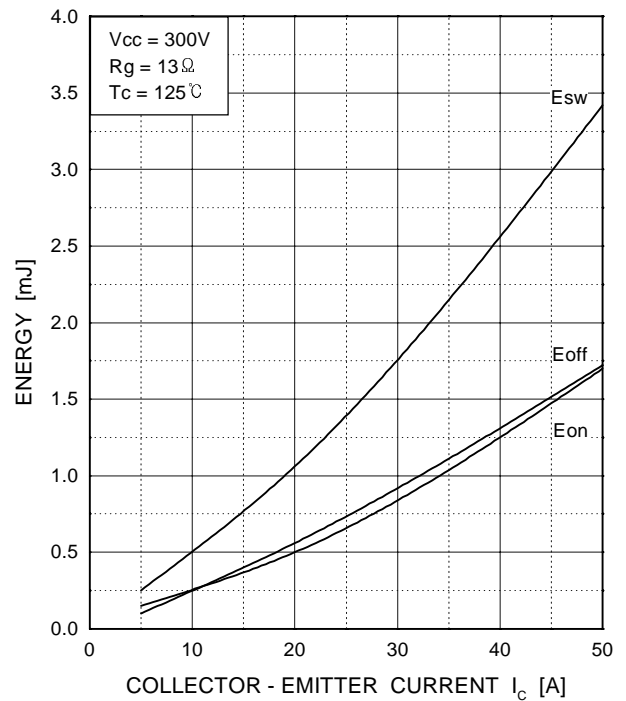
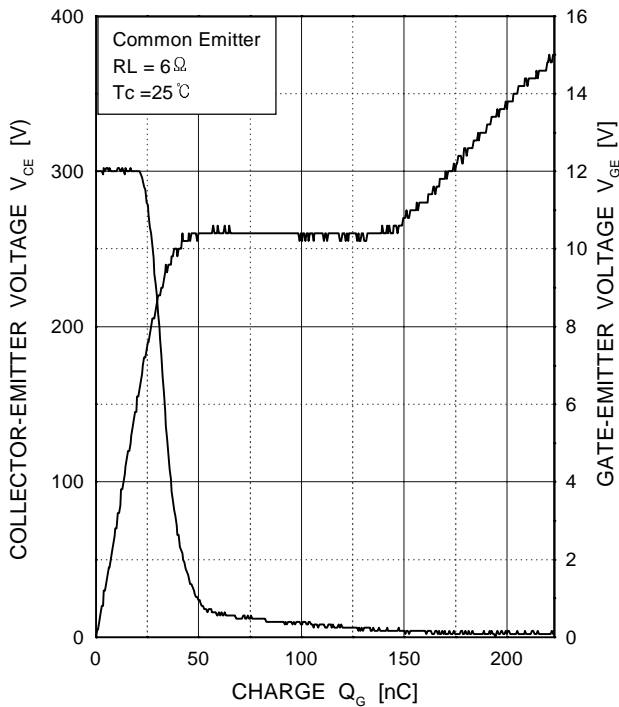
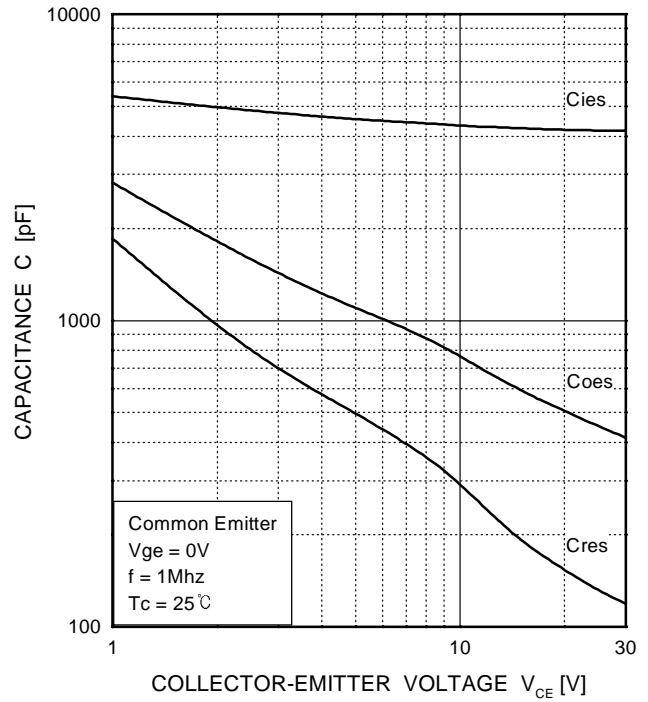
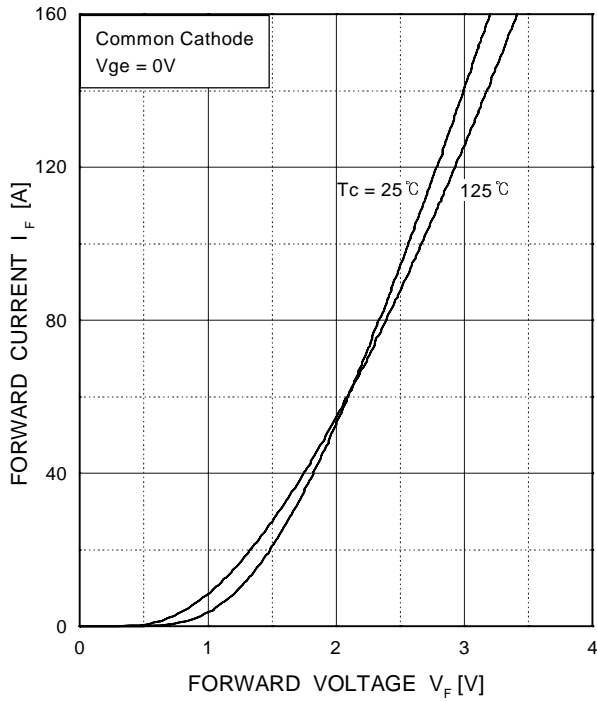
Symbol	Characteristics	Test Conditions	Min	Typ	Max	Units	
V _{FM}	Diode Forward Voltage	I _F =50A	T _c =25 °C	-	1.9	2.8	V
			T _c =100 °C	-	1.8	-	
T _{rr}	Diode Reverse	I _F =50A, V _R =200V di/dt= -100A/uS	T _c =25 °C	-	90	130	nS
	Recovery Time		T _c =100 °C	-	130	-	
I _{rr}	Diode Peak Reverse	I _F =50A, V _R =200V di/dt= -100A/uS	T _c =25 °C	-	5	6.5	A
	Recovery Current		T _c =100 °C	-	7	-	
Q _{rr}	Diode Reverse	I _F =50A, V _R =200V di/dt= -100A/uS	T _c =25 °C	-	225	422	nC
	Recovery Charge		T _c =100 °C	-	455	-	

THERMAL RESISTANCE

Symbol	Characteristics	Typ	Max	Units
R _θ JC	Junction-to-Case(IGBT Part, Per 1/2 Module)	-	0.5	°C/W
R _θ JC	Junction-to-Case(DIODE Part, Per 1/2 Module)	-	1.0	°C/W
R _θ CS	Case-to-Sink (Conductive grease applied)	-	0.15	°C/W
Weight	Weight of Module	-	190	°C/W

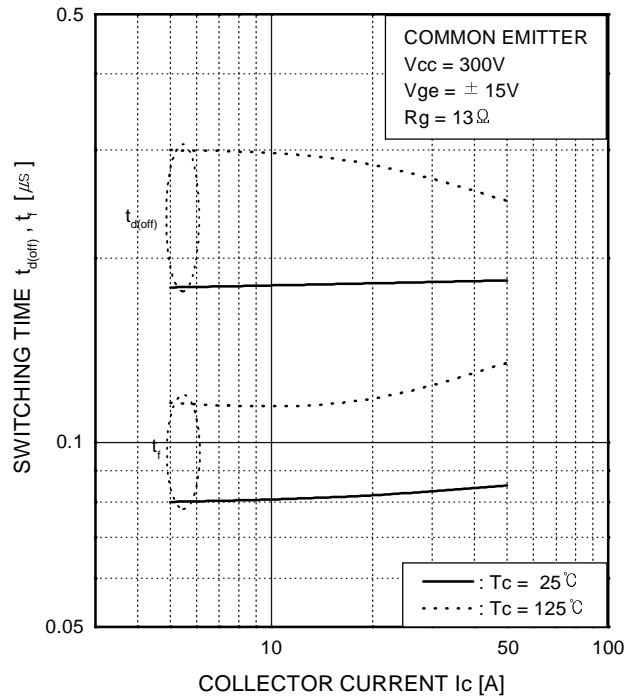
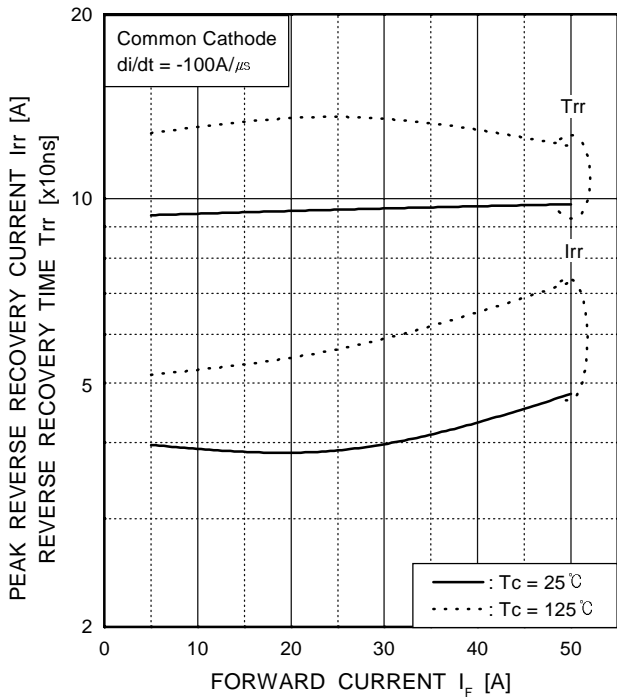
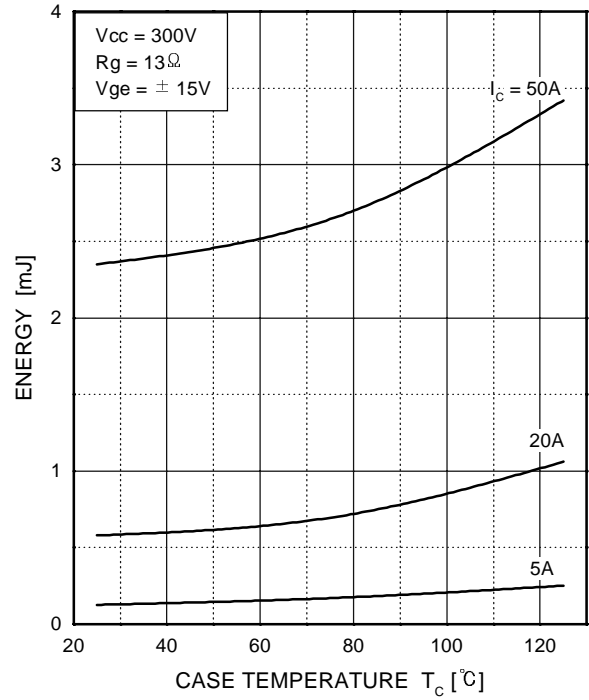
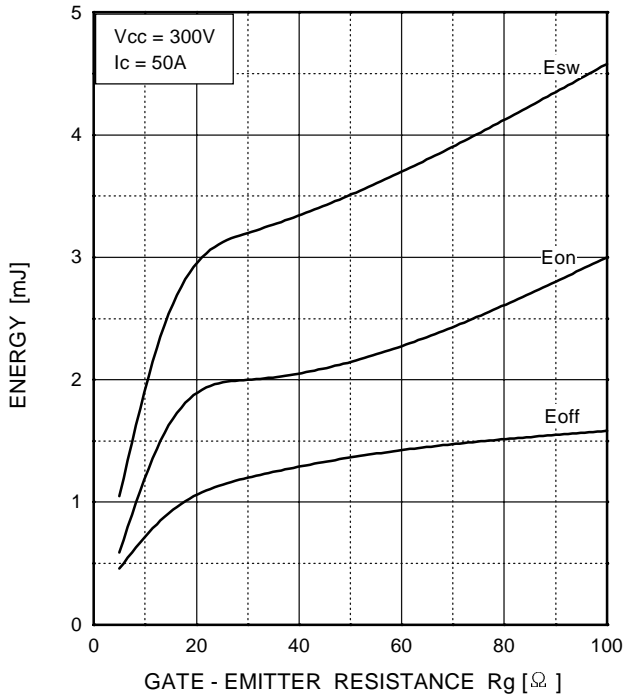






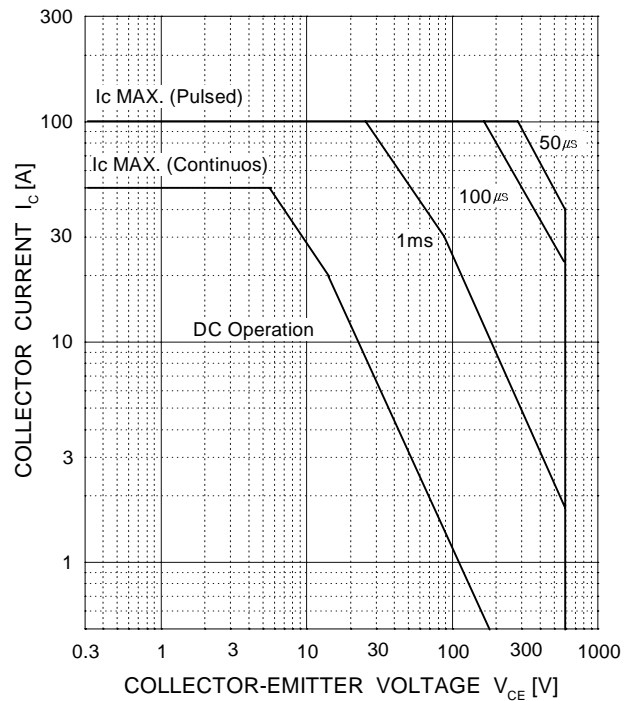
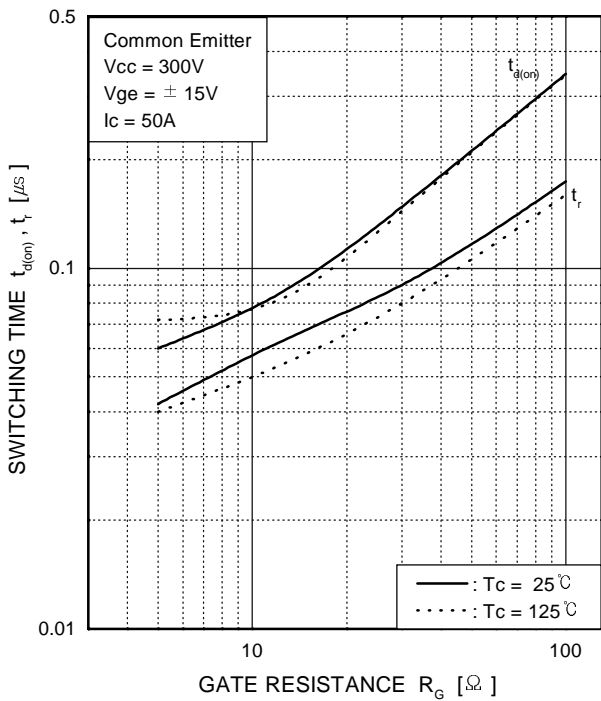
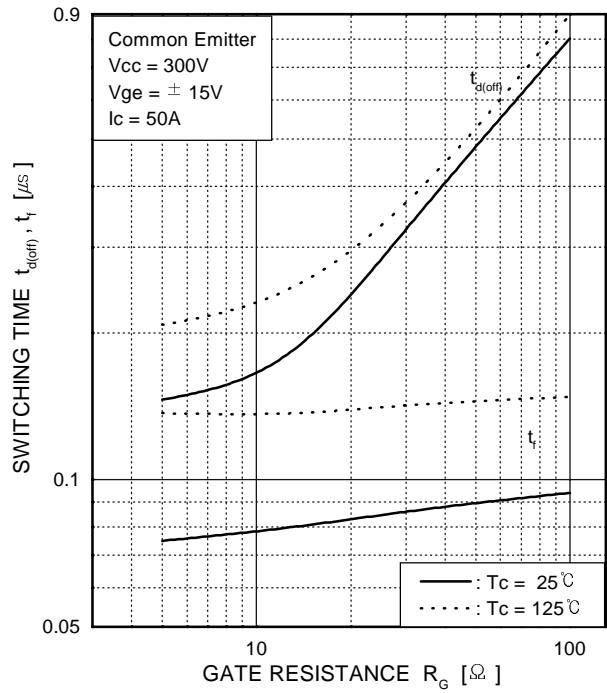
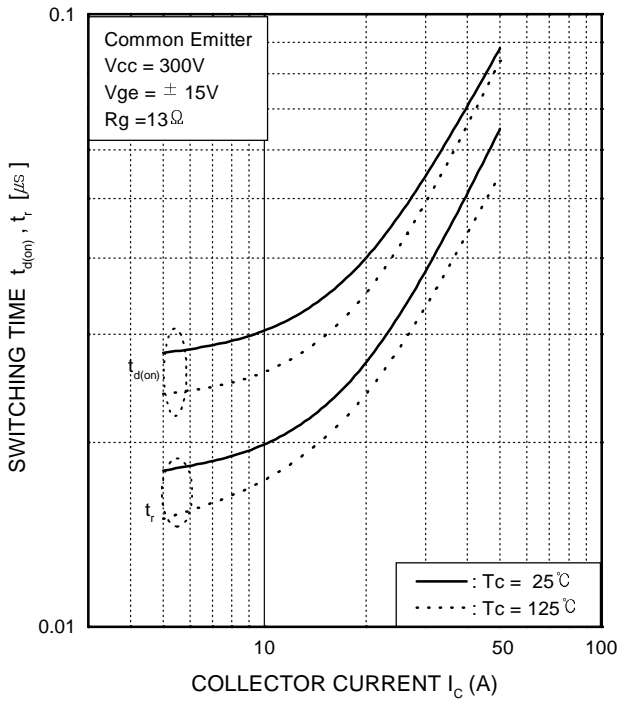
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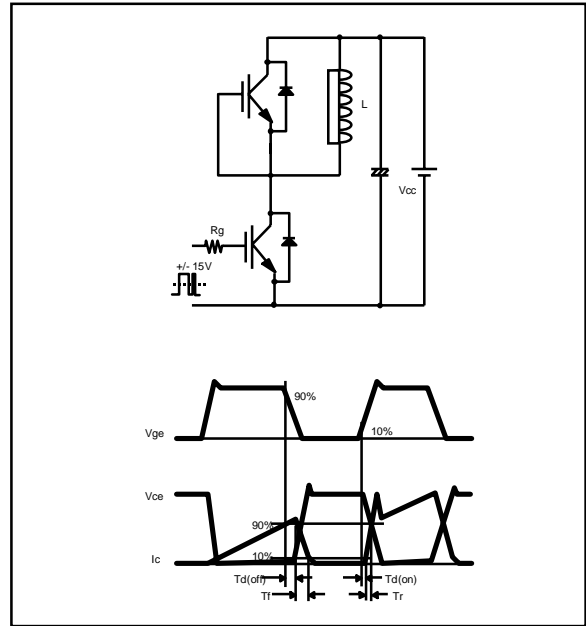
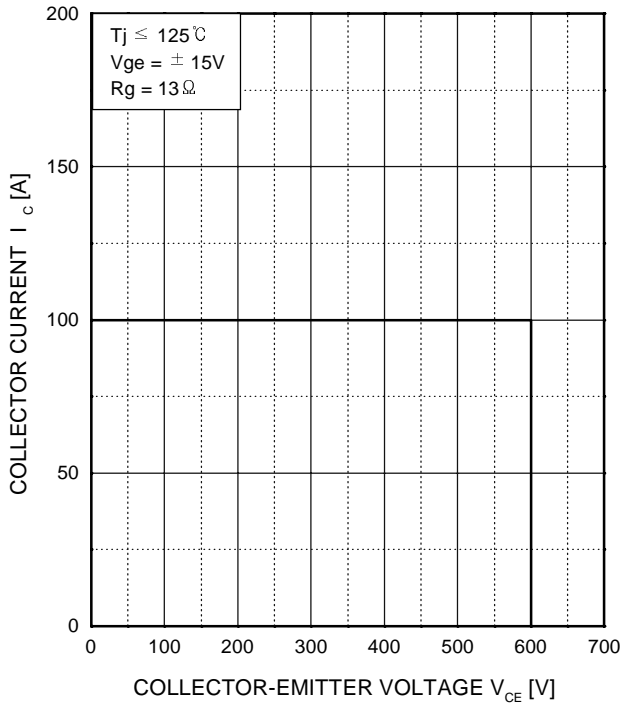
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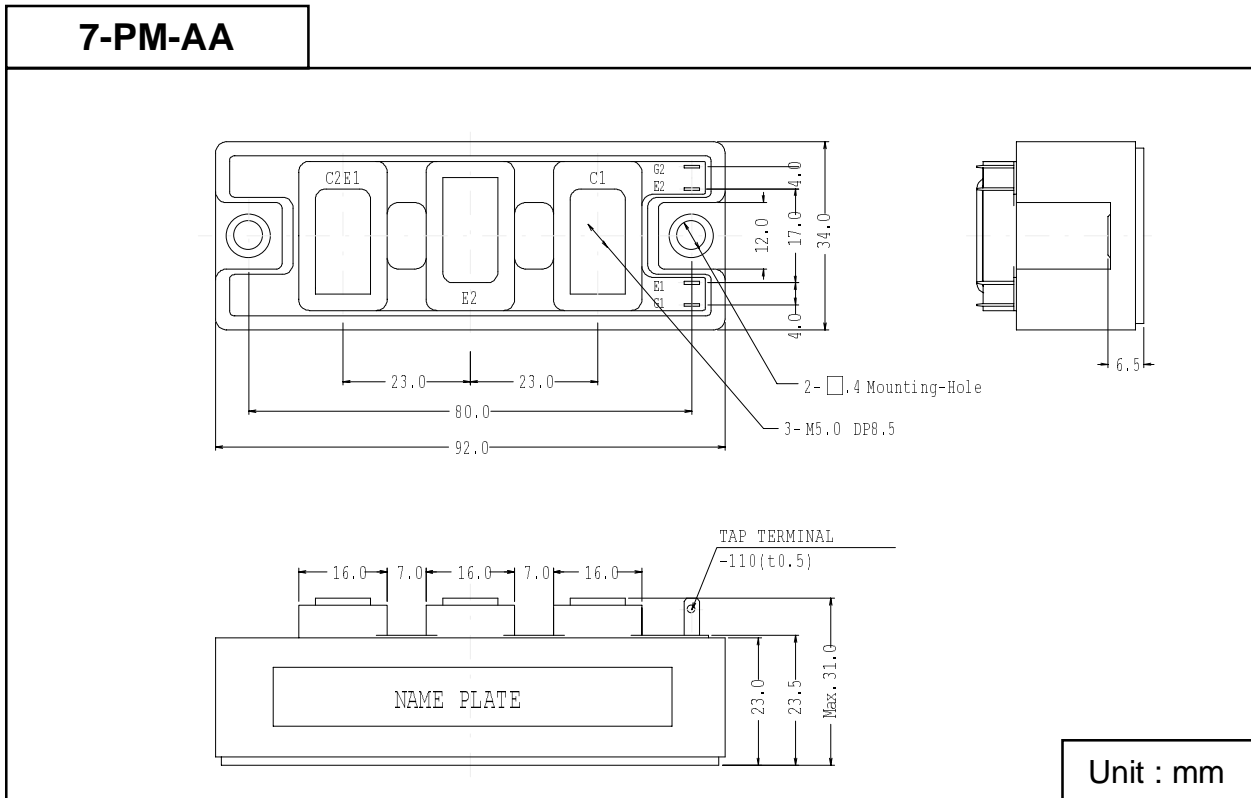


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Inductive Load Test Circuit and Waveforms



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