

MBM600E17D

Silicon N-channel IGBT

FEATURES

- * High speed, low loss IGBT module.
- * Low driving power due to low input capacitance MOS gate.
- * Low noise due to ultra soft fast recovery diode.
- * High reliability, high durability module.
- * High thermal fatigue durability.
($\Delta T_c=70^\circ\text{C}$, $N>30,000$ cycles)
- * Isolated heat sink (terminal to base).

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

Item	Symbol	Unit	MBM600E17D
Collector Emitter Voltage	V_{CES}	V	1,700
Gate Emitter Voltage	V_{GES}	V	± 20
Collector Current	DC	I_C	600
	1ms	I_{Cp}	1,200
Forward Current	DC	I_F	600
	1ms	I_{FM}	1,200
Junction Temperature	T_j	$^\circ\text{C}$	-40 ~ +125
Storage Temperature	T_{stg}	$^\circ\text{C}$	-40 ~ +125
Isolation Voltage	V_{ISO}	V_{RMS}	4,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	2/15 (1)
	Mounting (M6)	-	6 (2)

Notes: (1) Recommended Value $1.8 \pm 0.2 / 15^{+0}_{-3}$ N·m (2) Recommended Value 5.5 ± 0.5 N·m

ELECTRIC CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current	I_{CES}	mA	-	-	5.0	$V_{CE}=1,700\text{V}$, $V_{GE}=0\text{V}$, $T_j=25^\circ\text{C}$
Gate Emitter Leakage Current	I_{GES}	nA	-500	-	+500	$V_{CE}=1,700\text{V}$, $V_{GE}=0\text{V}$, $T_j=125^\circ\text{C}$
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V	2.1	2.6	3.1	$I_C=600\text{A}$, $V_{GE}=15\text{V}$, $T_j=125^\circ\text{C}$
Gate Emitter Threshold Voltage	$V_{GE(TO)}$	V	5.0	6.5	8.0	$V_{CE}=10\text{V}$, $I_C=60\text{mA}$, $T_j=25^\circ\text{C}$
Input Capacitance	C_{ies}	nF	-	50	-	$V_{CE}=10\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$, $T_j=25^\circ\text{C}$
Internal Gate Resistance	$R_{g(int)}$	Ω	-	2.7	-	
Switching Times	Rise Time	t_r	0.25	0.5	1.0	$V_{CC}=900\text{V}$, $I_C=600\text{A}$ $L=100\text{nH}$, $C_{GE}=68\text{nF}$ (3) $R_G=1.5\Omega$ (3) $V_{GE}=\pm 15\text{V}$, $T_j=125^\circ\text{C}$
	Turn On Time	t_{on}	0.4	0.8	1.6	
	Fall Time	t_f	0.25	0.5	1.0	
	Turn Off Time	t_{off}	0.75	1.5	3.0	
Peak Forward Voltage Drop	V_{FM}	V	1.4	1.9	2.3	$I_F=600\text{A}$, $V_{GE}=0\text{V}$, $T_j=125^\circ\text{C}$
Reverse Recovery Time	t_{rr}	μs	0.1	0.5	1.0	$V_{CC}=900\text{V}$, $I_C=I_F=600\text{A}$, $L=100\text{nH}$, $C_{GE}=68\text{nF}$ (3)
Turn On Loss	$E_{on(10\%)}$	J/P	-	0.13	0.2	$R_G=1.5\Omega$ (3)
Turn Off Loss	$E_{off(10\%)}$	J/P	-	0.2	0.3	$R_G=1.5\Omega$ (3)
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	-	0.2	0.3	$V_{GE}=\pm 15\text{V}$, $T_j=125^\circ\text{C}$

Notes:(3) R_G and C_{GE} value is the test condition's value for evaluation of the switching times, not recommended value.

Please, determine the suitable R_G and C_{GE} value after the measurement of switching waveforms (overshoot voltage, etc.) with appliance mounted.

- * Please contact our representatives at order.
- * For improvement, specifications are subject to change without notice.
- * For actual application, please confirm this spec sheet is the newest revision.

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THERMAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.038	Junction to case
	FWD	Rth(j-c)		-	-	0.060	
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.008	-	Case to fin

MODULE MECHANICAL CHARACTERISTICS

Item	Unit	Characteristics	Conditions
Weight	g	900	
Stray inductance in module	LS(CM-EM)	nH	21/arm
Comparative Tracking Index (CTI)			600
Module base plate Material			Al-SiC
Baseplate Thickness	mm		5
Insulation plate Material			Al N
Terminal Surface treatment			Ni plating
Case Material			Poly-Phenilene Sulfide
Fire and Smoke Category			I2 / F3
			NFF 16-102

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DEFINITION OF TEST CIRCUIT

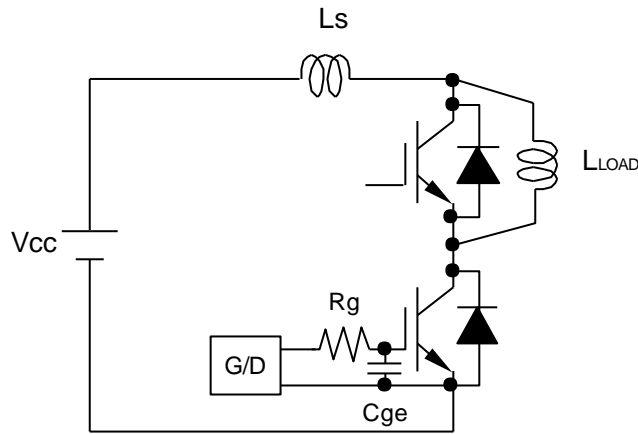


Fig.1 Switching test circuit

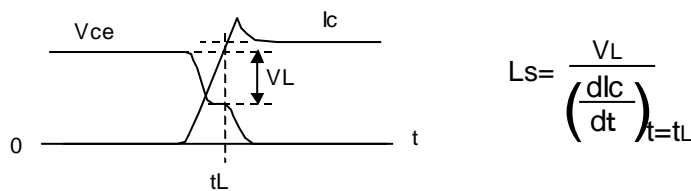


Fig.2 Definition of stray inductance

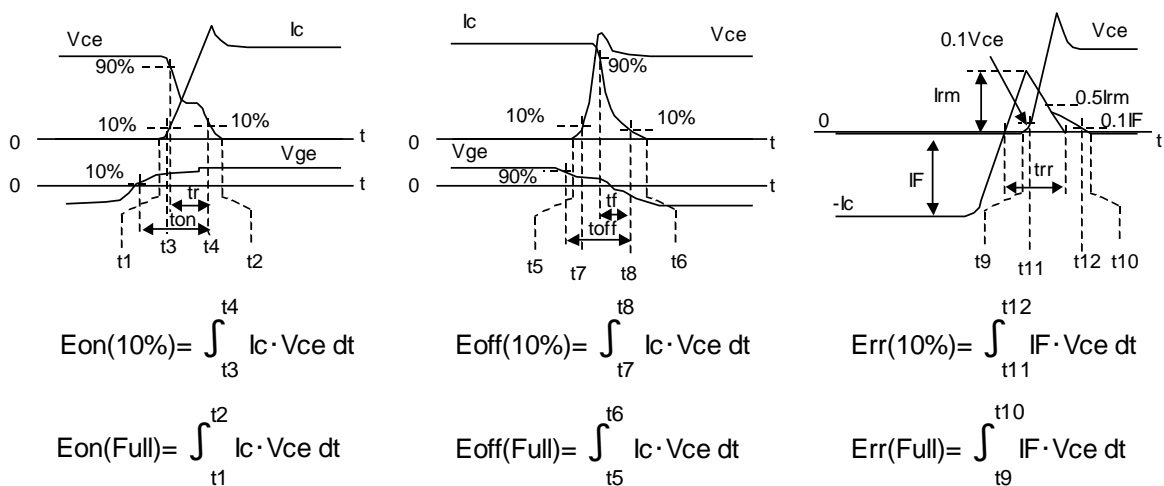
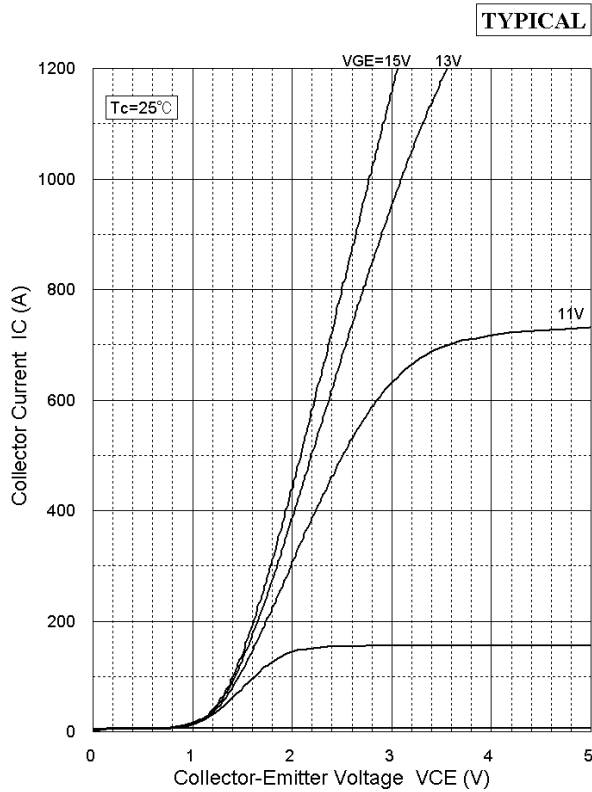


Fig.3 Definition of switching loss

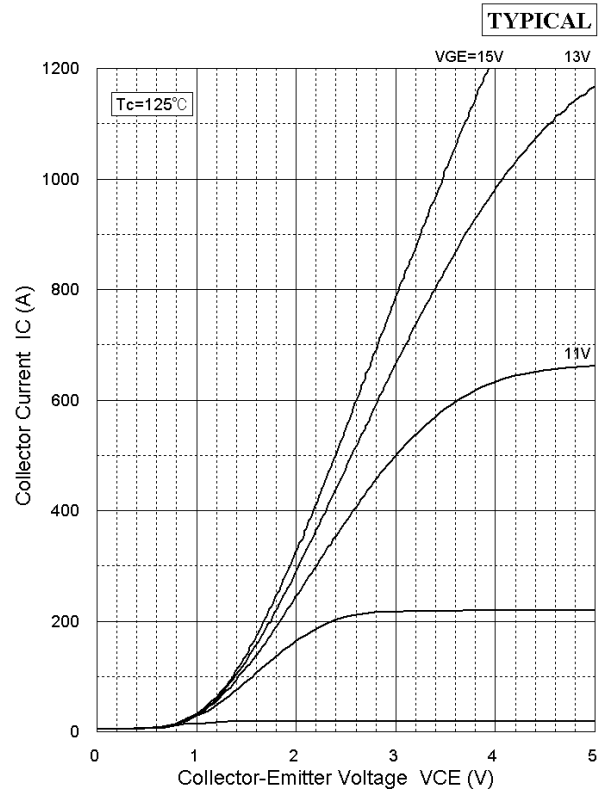
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CHARACTERISTICS CURVE

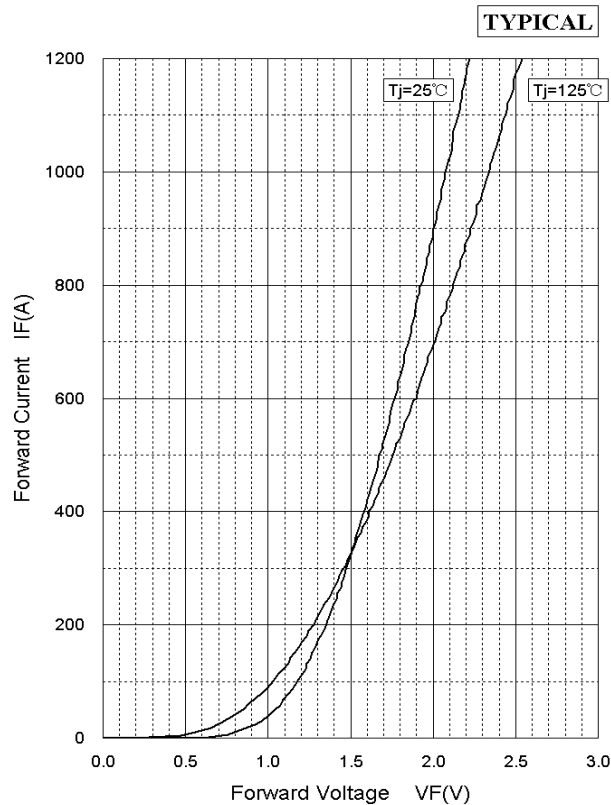
STATIC CHARACTERISTICS



Collector Current vs. Collector to Emitter Voltage



Collector Current vs. Collector to Emitter Voltage

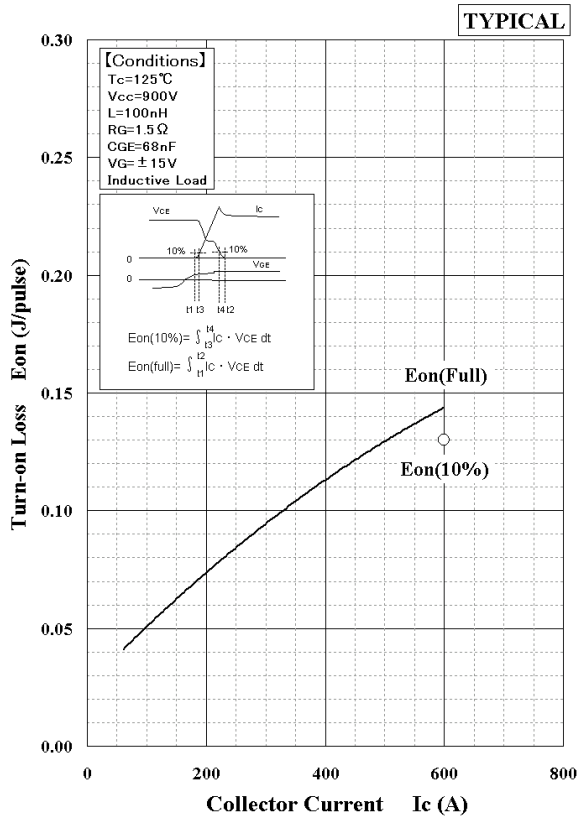


Forward Voltage of free-wheeling diode

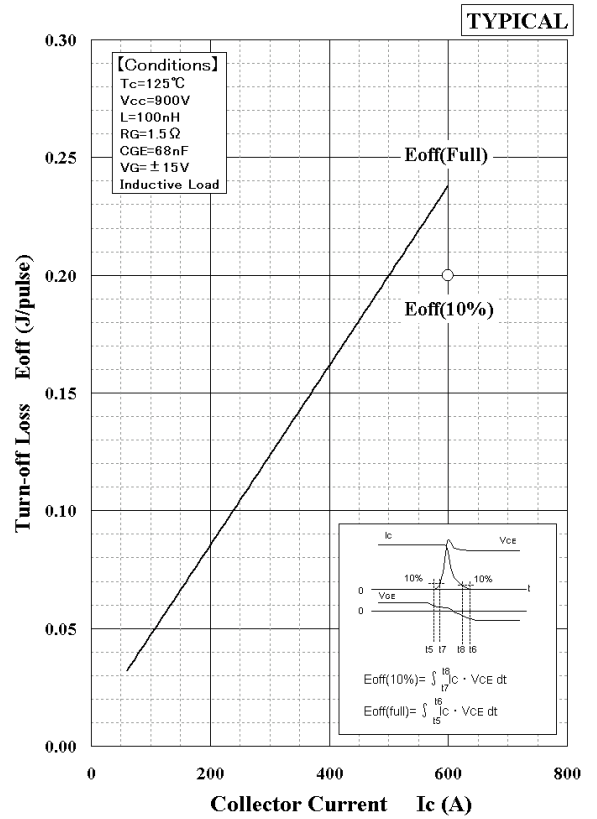
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DYNAMIC CHARACTERISTICS

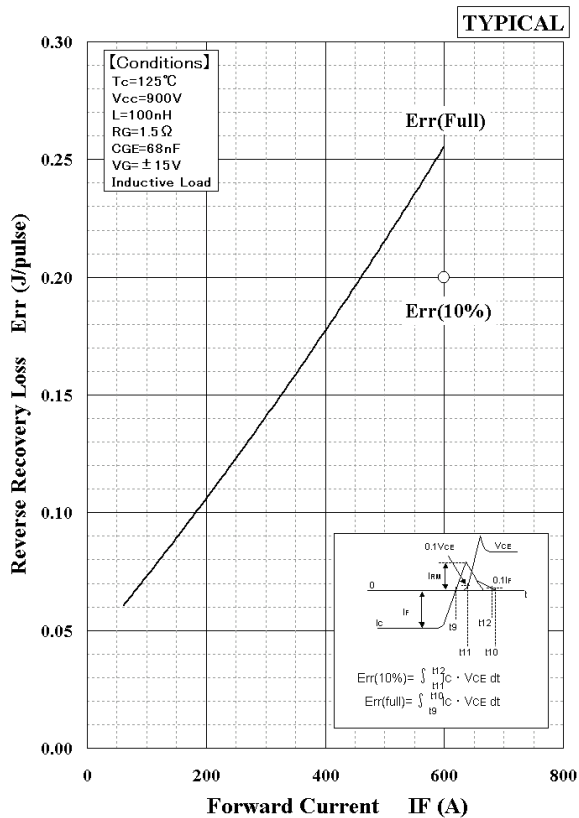
DEPENDENCE OF CURRENT



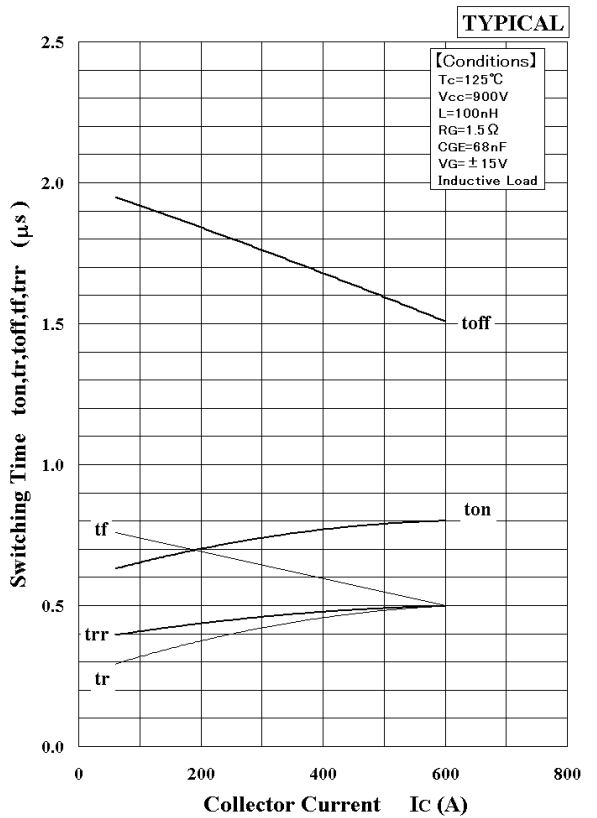
Turn-on Loss vs. Collector Current



Turn-off Loss vs. Collector Current



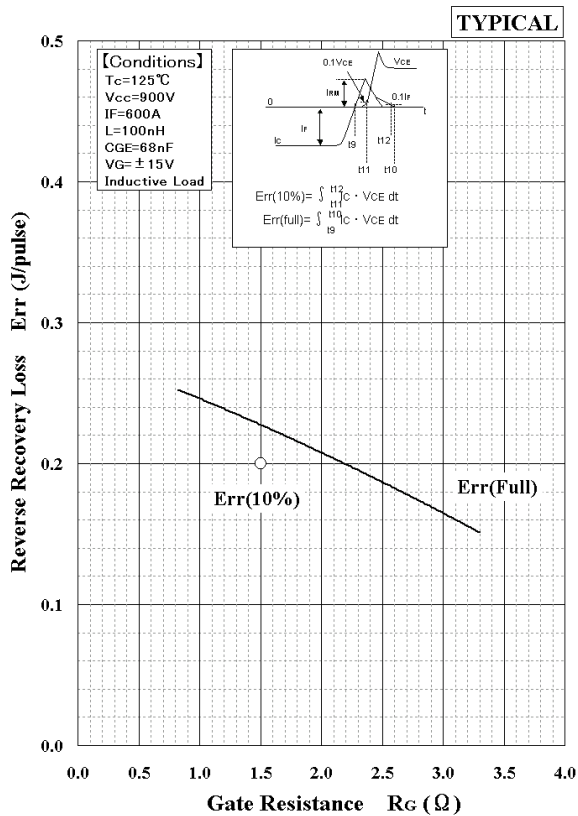
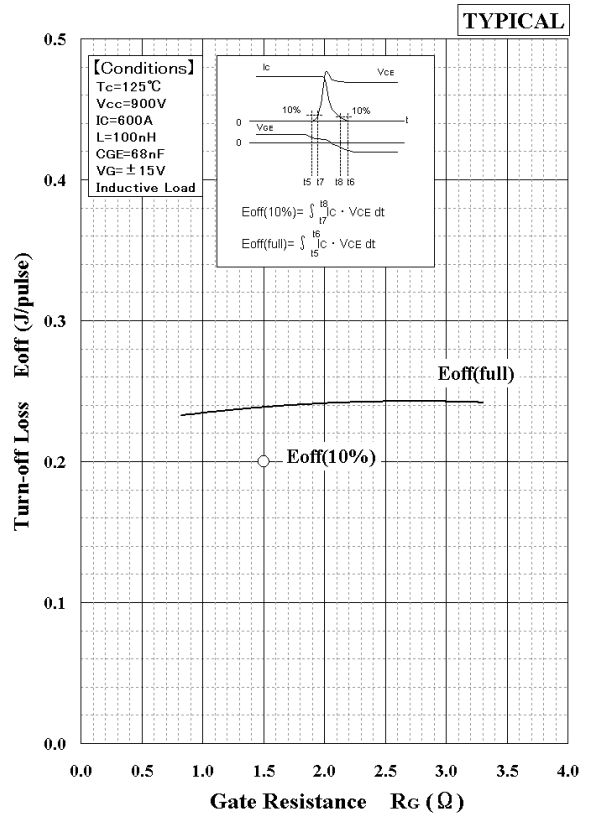
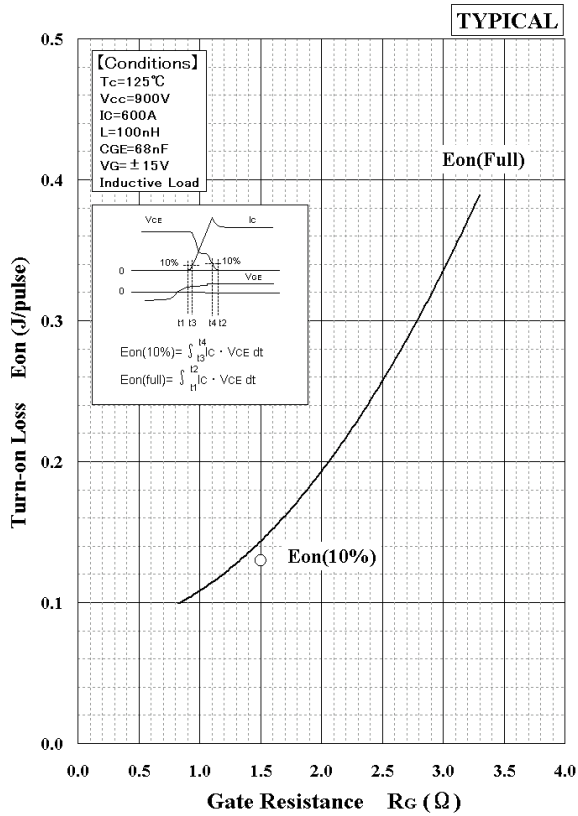
Recovery Loss vs. Collector Current



Switching Time vs. Collector Current

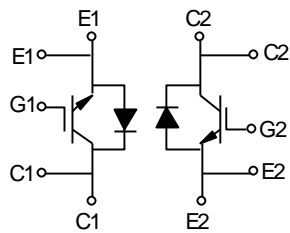
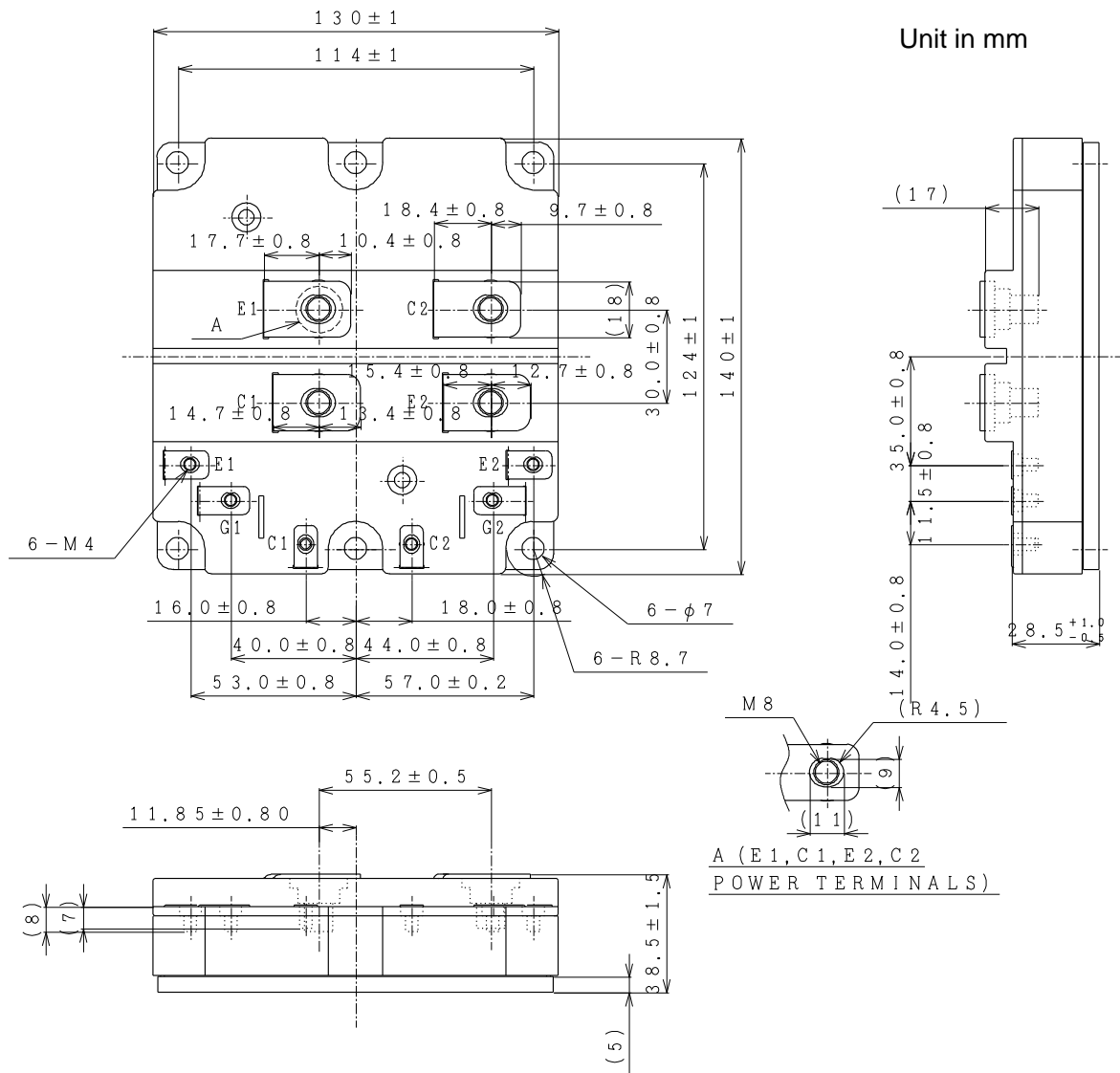
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DEPENDENCE OF RG



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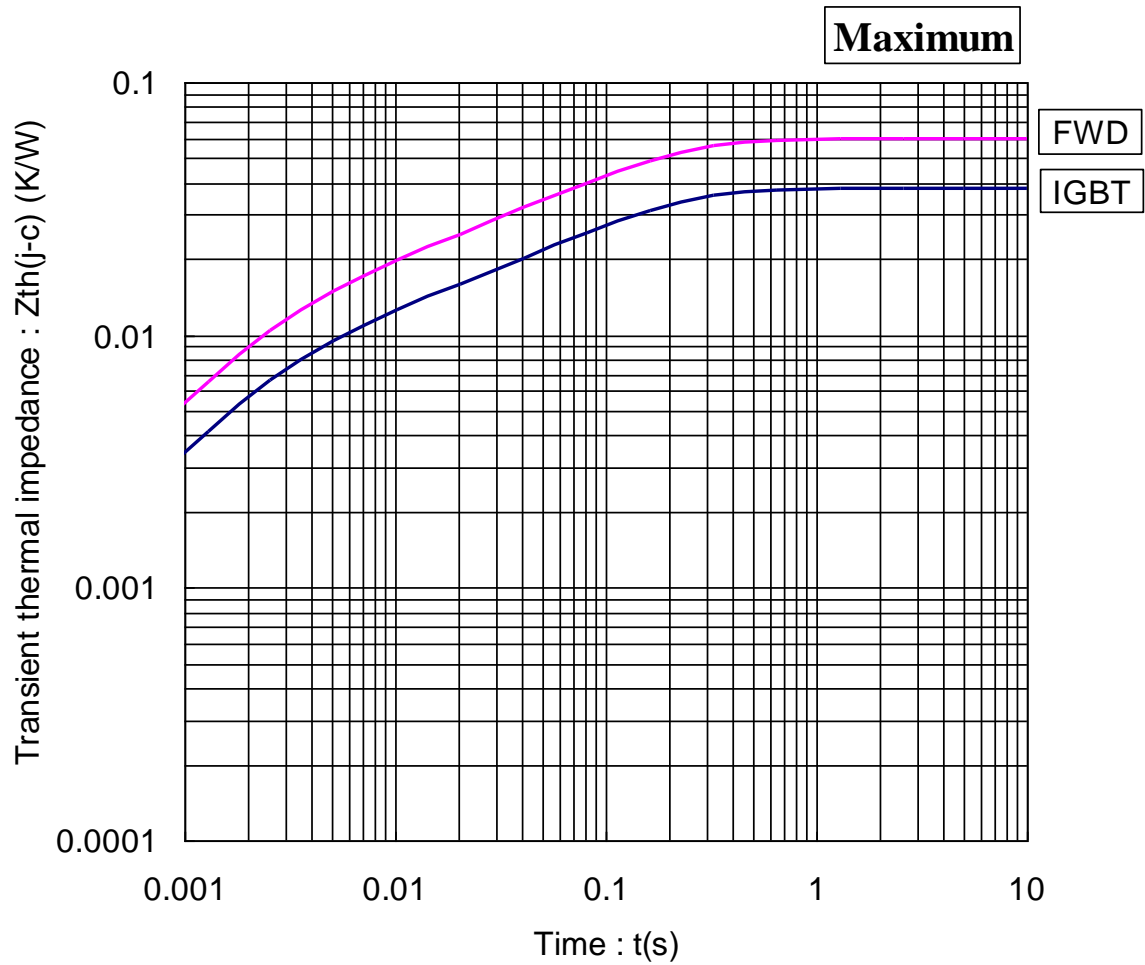
PACKAGE OUTLINE DRAWING



Circuit diagram

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TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

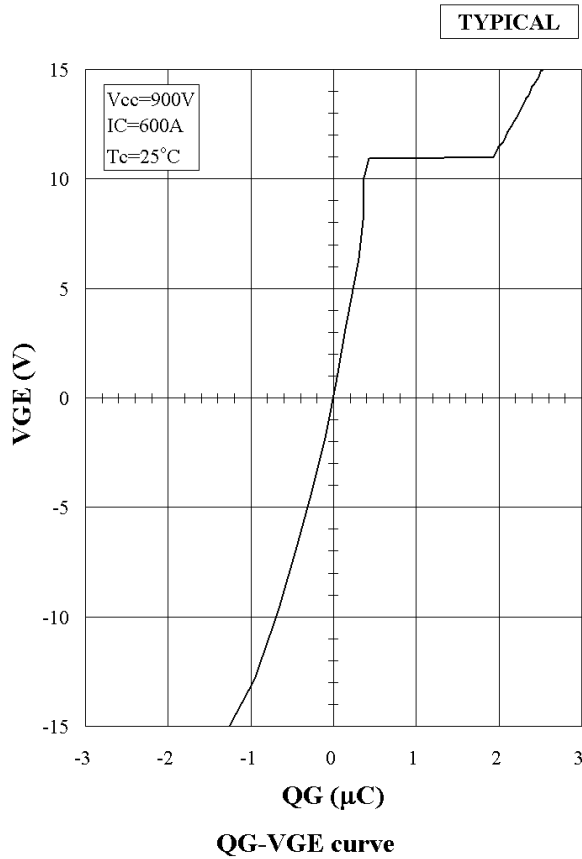
Material declaration

Please note the following materials are contained in the product, in order to keep characteristic and reliability level.

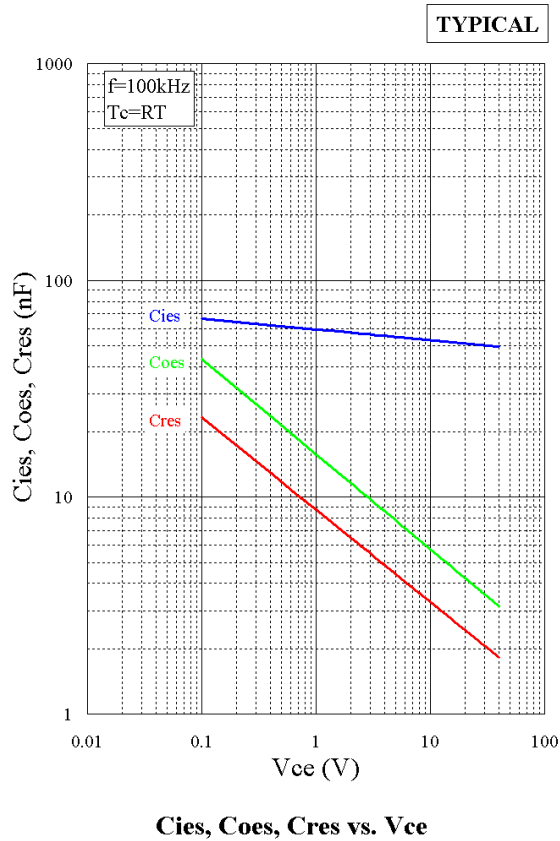
Material	Contained part
Lead (Pb) and its compounds	Solder

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QG-VG curve



Cies, Coes, Cres



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HITACHI POWER SEMICONDUCTORS

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2. Please be sure to read "Precautions for Safe Use and Notices" in the individual brochure before use.
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