MBN1200E25C

Silicon N-channel IGBT

FEATURES

- High thermal fatigue durability.
  (delta Tc=70℃, N>30,000cycles)
- Low noise due to ultra soft fast recovery diode.
- High speed, low loss IGBT module.
- Low driving power due to low input capacitance MOS gate.
- High reliability, high durability module.
- Isolated head sink (terminal to base).

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBN1200E25C
Collector Emitter Voltage		V_{CES}	V	2,500
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1,200
	1ms	I_{Cp}		2,400
Forward Current	DC	I_F	A	1,200
	1ms	I_{FM}		2,400
Junction Temperature		T_j	°C	-40 ~ +125
Storage Temperature		T_{stg}	°C	-40 ~ +125
Isolation Voltage		V_{ISO}	V_{RMS}	4,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	N·m	2/10 (1)
	Mounting (M6)	-		6 (2)

Notes: (1) Recommended Value 1.8±0.2/9±1N·m (2) Recommended Value 5.5±0.5N·m

ELECTRICAL CHARACTERISTICS (Tc=25°C)

Item		Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current		I_{CES}	mA	-	-	12	V_{CE}=2,500V, V_{GE}=0V, Tj=25°C
				-	20	60	V_{CE}=2,500V, V_{GE}=0V, Tj=125°C
Gate Emitter Leakage Current		I_{GES}	nA	-500	-	+500	V_{GE}=±20V, V_{CE}=0V, Tj=25°C
Collector Emitter Saturation Voltage		$V_{CE(sat)}$	V	-	3.0	3.5	I_C=1,200A, V_{GE}=15V, Tj=125°C
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	4.0	5.0	6.0	V_{CE}=15V, I_C=120mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	175	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		Rge	Ω	-	2.2	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	µs	-	3.2	4.4	V_{CC}=1,000V, Ic=1,200A
	Turn On Time	t_{on}		-	4.2	5.2	L=100nH
	Fall Time	t_f		-	1.9	3.4	R_G(ON/OFF)=6.8/1.5Ω (3)
	Turn Off Time	t_{off}		-	3.4	5.6	V_{GE}=±15V, Tj=125°C
Peak Forward Voltage Drop		V_{FM}	V	-	2.0	2.5	IF=1,200A, V_{GE}=0V, Tj=125°C
Reverse Recovery Time		t_{rr}	µs	-	0.9	1.4	Vcc=1,000V, IF=1,200A, L=100nH Tj=125°C
Turn On Loss		$E_{on(10\%)}$	J/P	-	1.8	2.3	V_{CC}=1,000V, Ic=1,200A, L=100nH
Turn Off Loss		$E_{off(10\%)}$	J/P	-	1.2	1.7	R_G(ON/OFF)=6.8/1.5Ω (3)
Reverse Recovery Loss		$E_{rr(10\%)}$	J/P	-	0.35	0.85	V_{GE}=±15V, Tj=125°C
Stray inductance module		L_{SCE}	nH	-	12	-	
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.0085	Junction to case
	FWD	Rth(j-c)		-	-	0.017	
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.006	-	Case to fin

Notes :(3) R_G value is the test condition's value for evaluation of the switching times, not recommended value.
Please, determine the suitable R_G value after the measurement of switching waveforms (overshoot voltage, etc.) with appliance mounted.
Counter arm IGBT V_{GE}=-15V

* 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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MBN1200E25C

DEFINITION OF TEST CIRCUIT

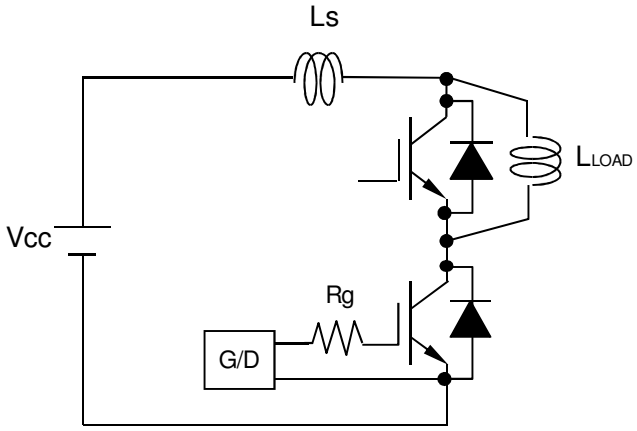
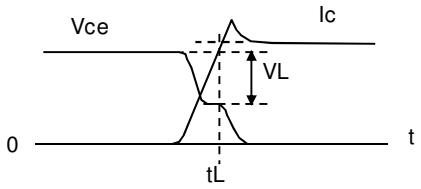
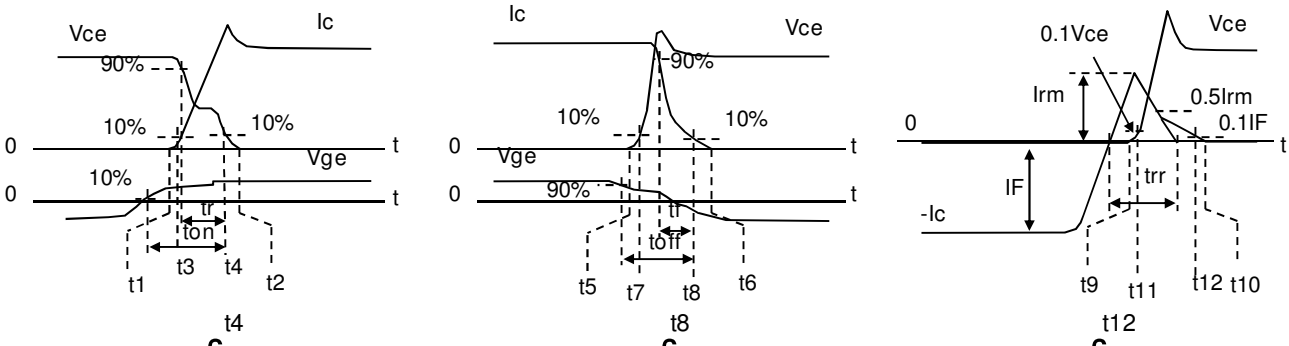


Fig.1 Switching test circuit



$$Ls = \frac{VL}{\left(\frac{dIc}{dt}\right)_{t=tL}}$$

Fig.2 Definition of Ls



$$Eon(10\%) = \int_{t3}^{t4} Ic \cdot Vce\, dt \qquad Eoff(10\%) = \int_{t7}^{t8} Ic \cdot Vce\, dt \qquad Err(10\%) = \int_{t11}^{t12} IF \cdot Vce\, dt$$

$$Eon(Full) = \int_{t1}^{t2} Ic \cdot Vce\, dt \qquad Eoff(Full) = \int_{t5}^{t6} Ic \cdot Vce\, dt \qquad Err(Full) = \int_{t9}^{t10} IF \cdot Vce\, dt$$

Fig.3 Definition of switching loss

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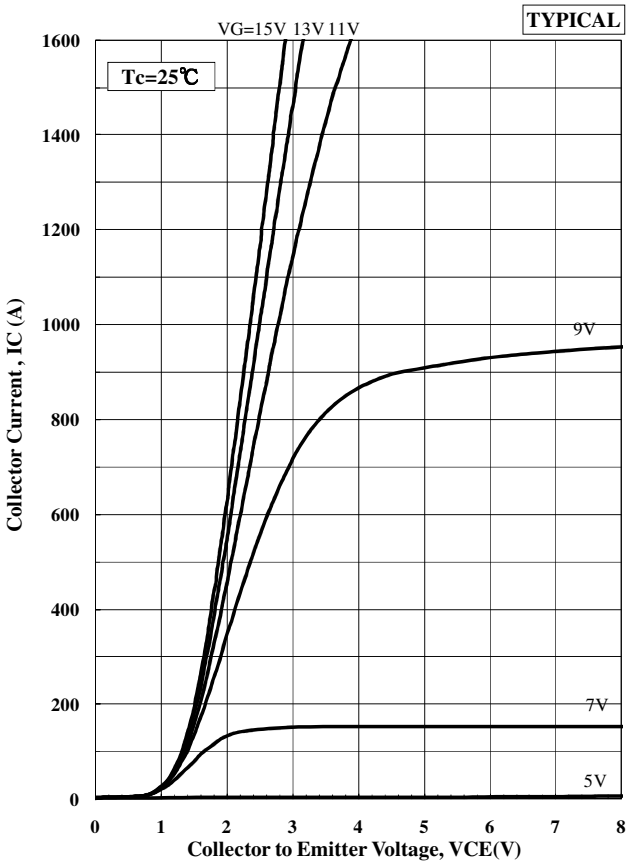
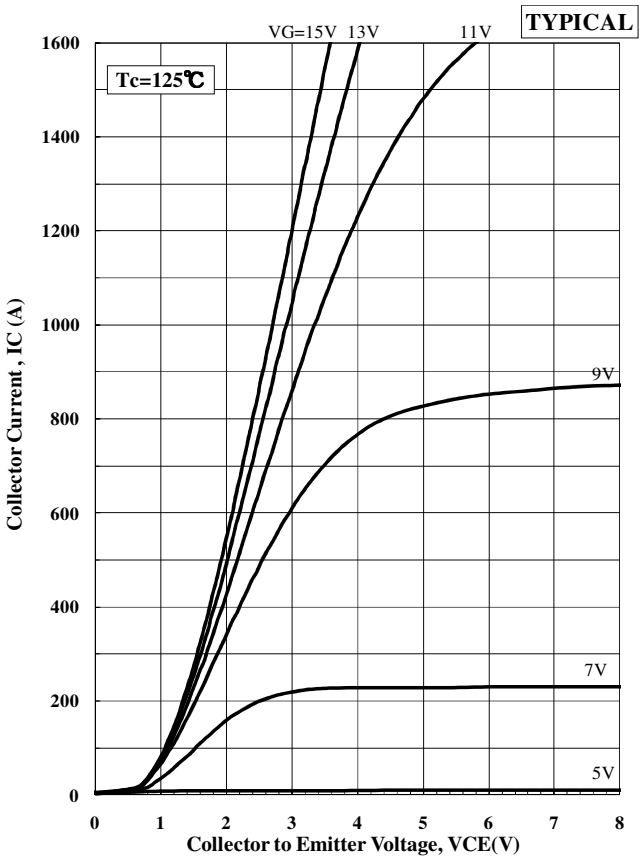
CHARACTERISTICS CURVE

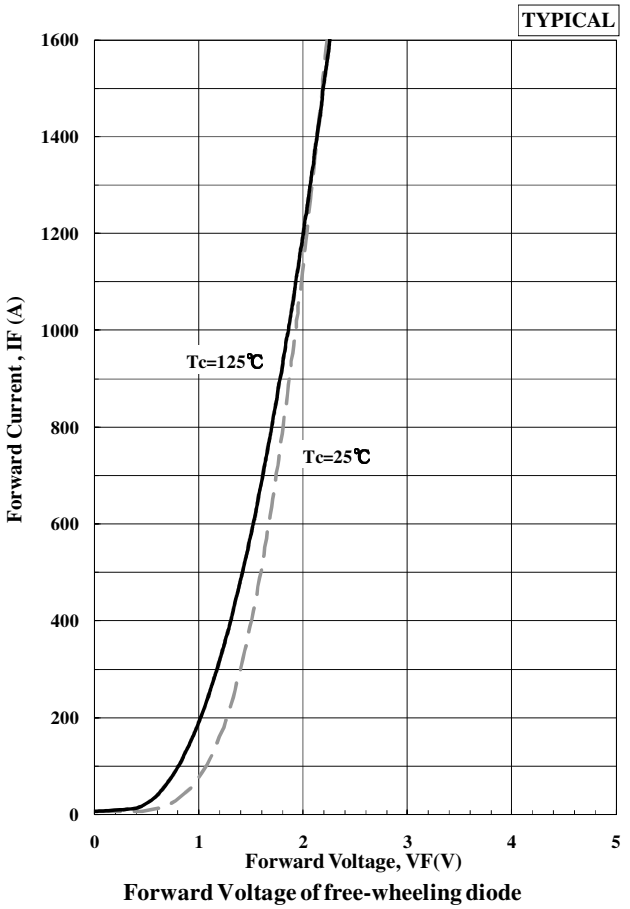
STATIC CHARACTERISTICS



Collector Current vs.Collector to Emitter Voltage



Collector Current vs.Collector to Emitter Voltage



Forward Voltage of free-wheeling diode

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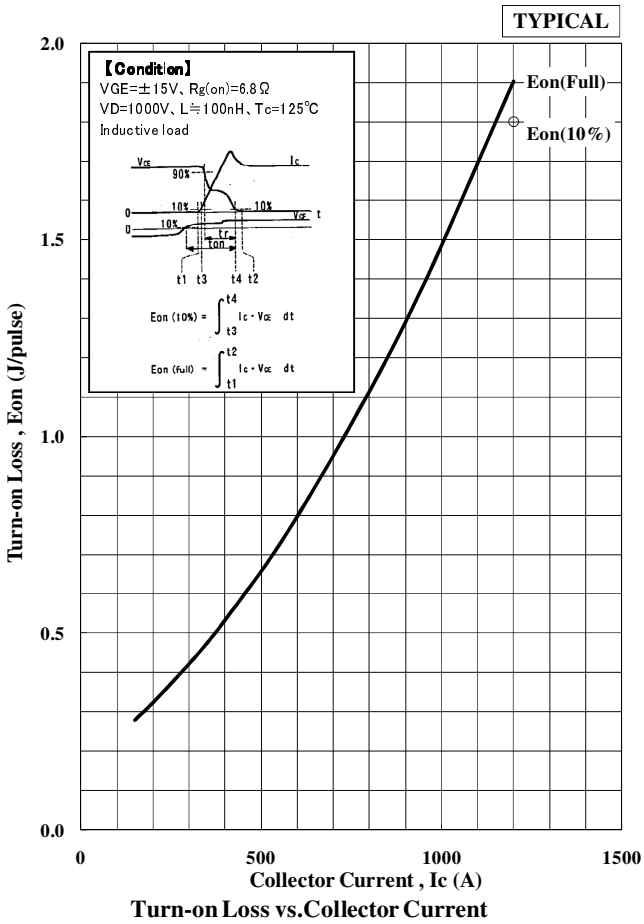
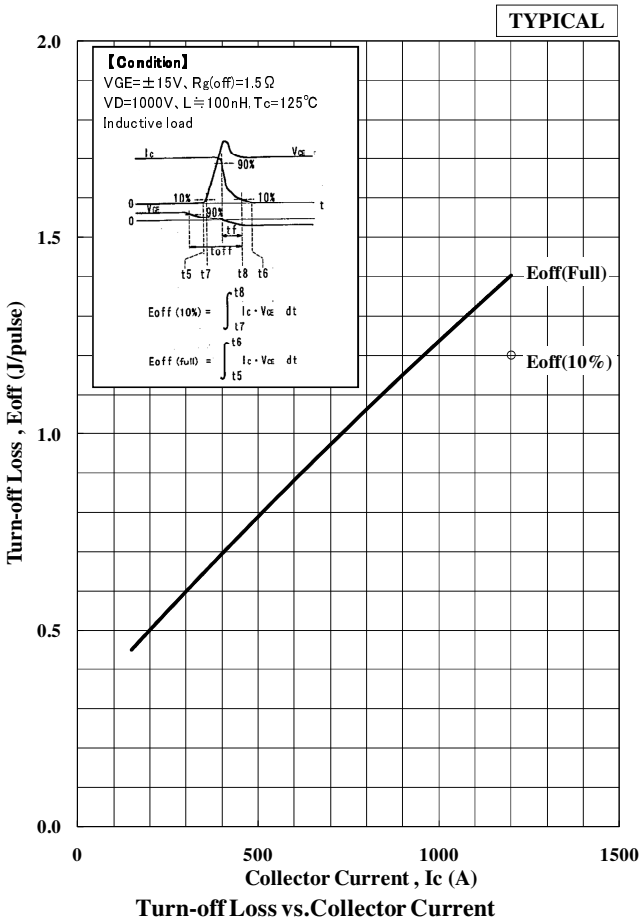
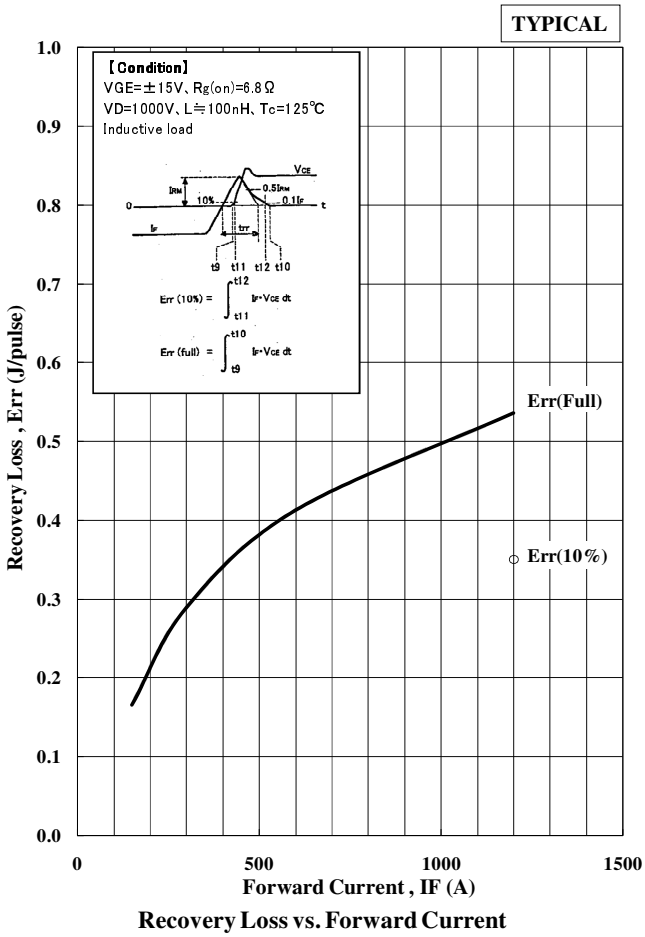
DYNAMIC CHARACTERISTICS



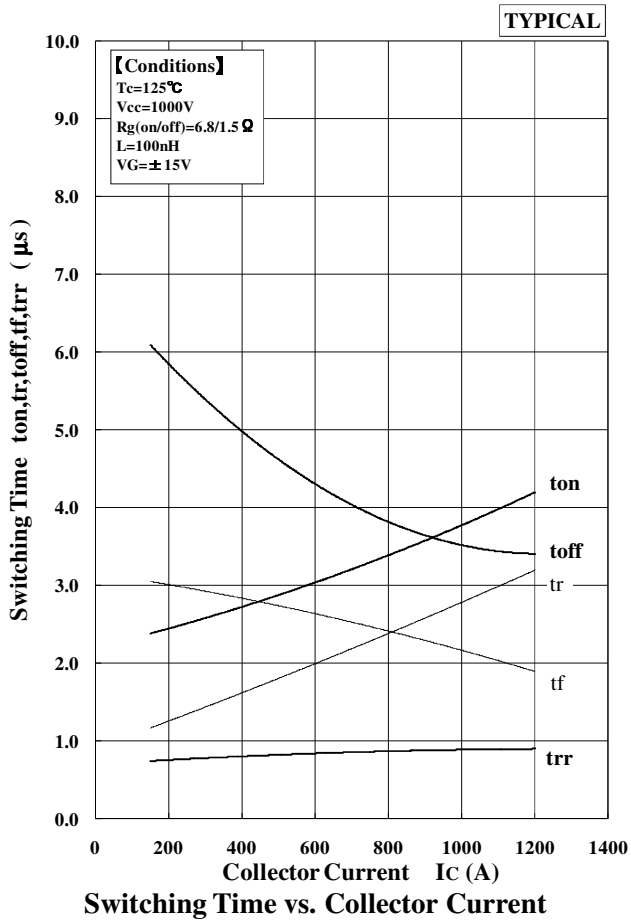
Turn-on Loss vs.Collector Current



Turn-off Loss vs.Collector Current



Recovery Loss vs. Forward Current



Switching Time vs. Collector Current

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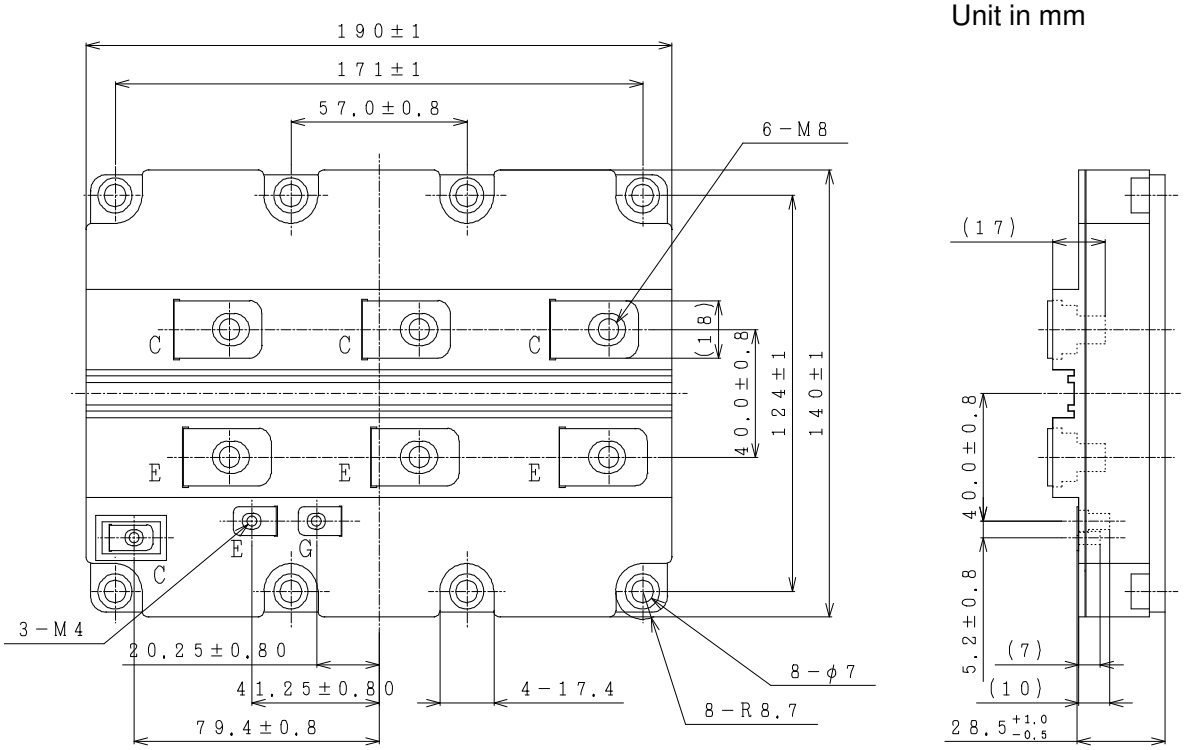
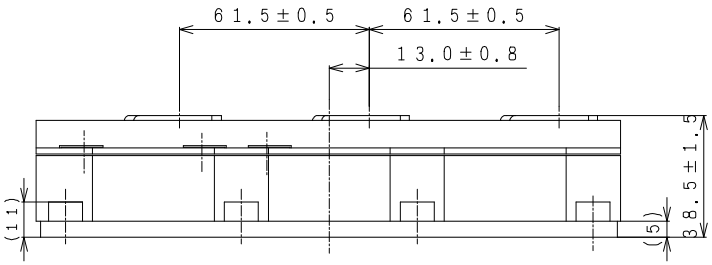
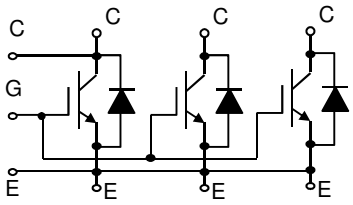
PACKAGE OUTLINE DRAWING

Unit in mm





Weight: 1300(g)



Circuit diagram

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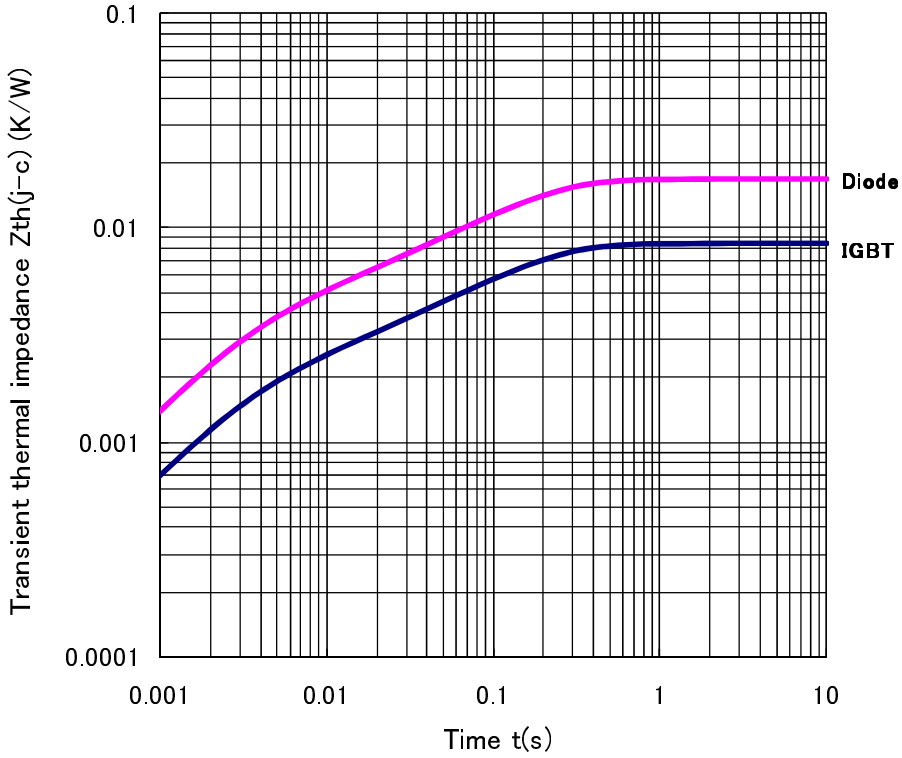
TRANSIENT THERMAL IMPEDANCE



***Transient Thermal Impedance Curve** (Maximum Value)*

Material Declaration

Please note that following materials are contained in the product In order to keep characteristics and reliability level.

Material	Contained part
Lead (Pb) and its compounds	Solder

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HITACHI POWER SEMICONDUCTORS

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