

MBN1200E25C

Silicon N-channel IGBT

FEATURES

- * High thermal fatigue durability.
($\Delta T_c=70^\circ\text{C}$, $N>30,000$ cycles)
- * 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 ($T_c=25^\circ\text{C}$)

Item	Symbol	Unit	MBN1200E25C
Collector Emitter Voltage	V_{CES}	V	2,500
Gate Emitter Voltage	V_{GES}	V	± 20
Collector Current	DC	I_C	1,200
	1ms	I_{Cp}	2,400
Forward Current	DC	I_F	1,200
	1ms	I_{FM}	2,400
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)	-	2/10 (1)
	Mounting (M6)	-	6 (2)

Notes: (1) Recommended Value $1.8\pm 0.2/9\pm 1\text{N}\cdot\text{m}$ (2) Recommended Value $5.5\pm 0.5\text{N}\cdot\text{m}$

ELECTRICAL CHARACTERISTICS ($T_c=25^\circ\text{C}$)

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

* 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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DEFINITION OF TEST CIRCUIT

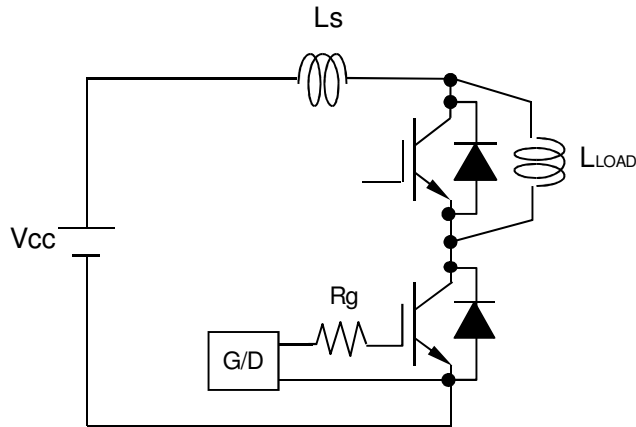


Fig.1 Switching test circuit

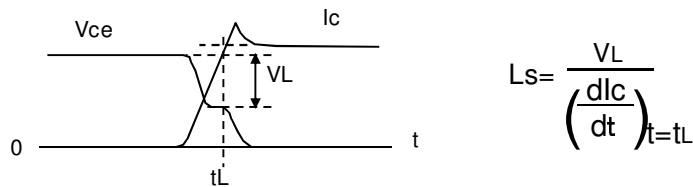


Fig.2 Definition of Ls

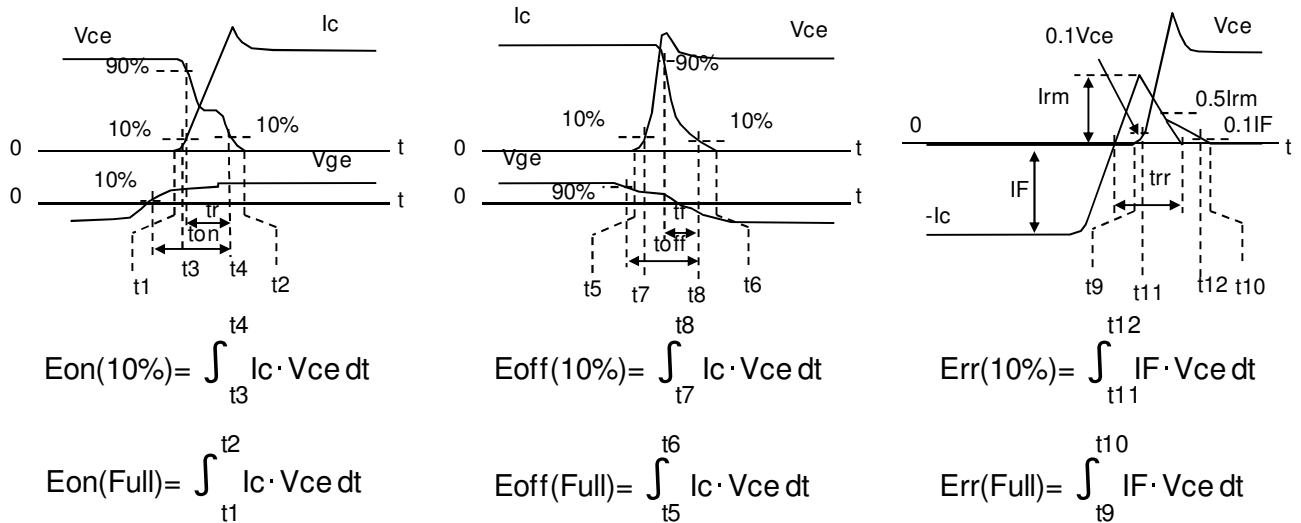
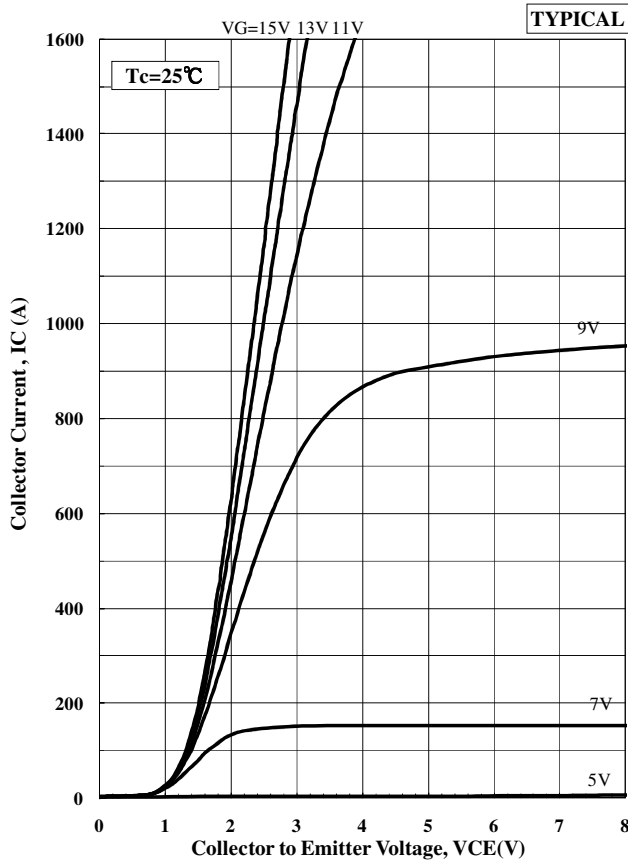


Fig.3 Definition of switching loss

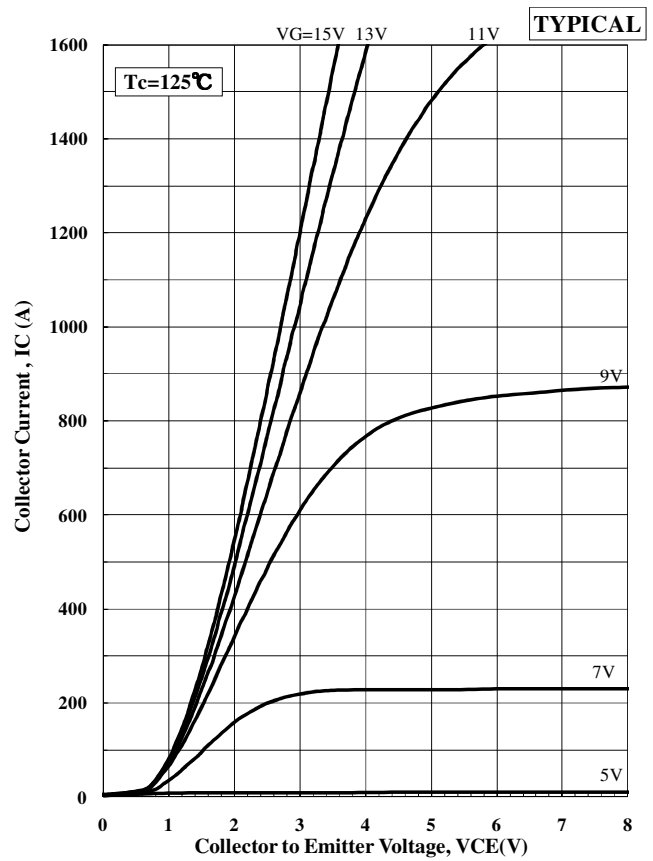
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CHARACTERISTICS CURVE

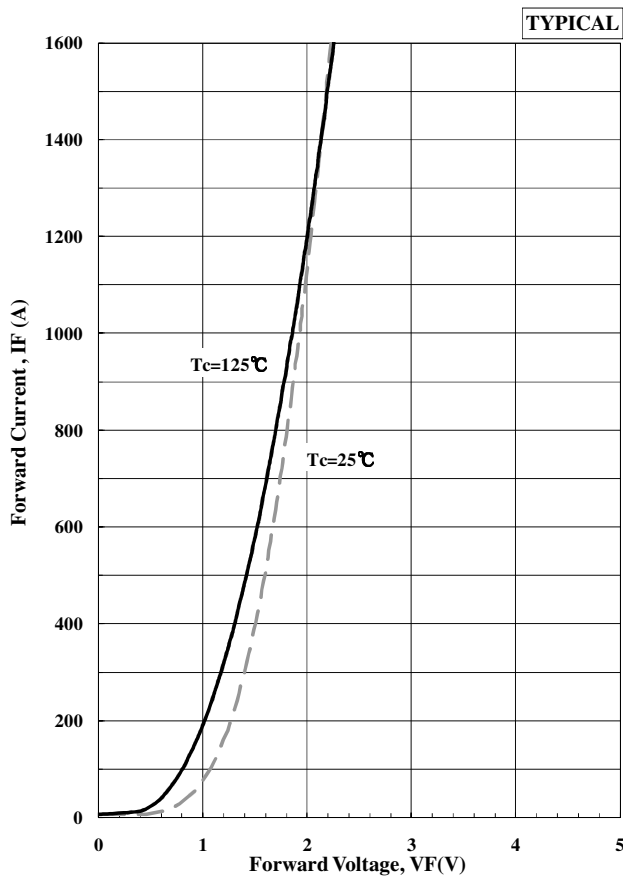
STATIC CHARACTERISTICS



Collector Current vs. Collector to Emitter Voltage



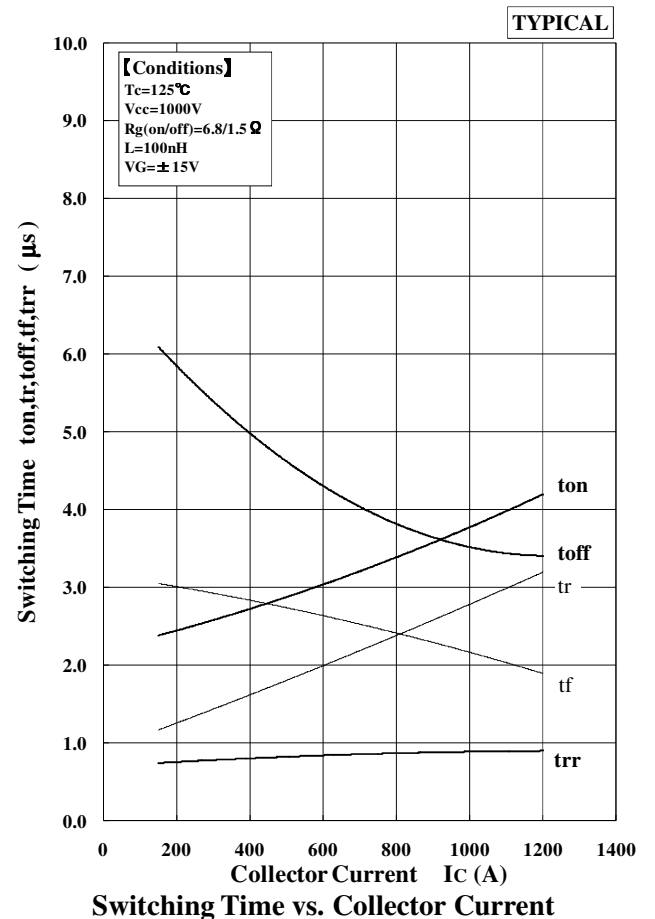
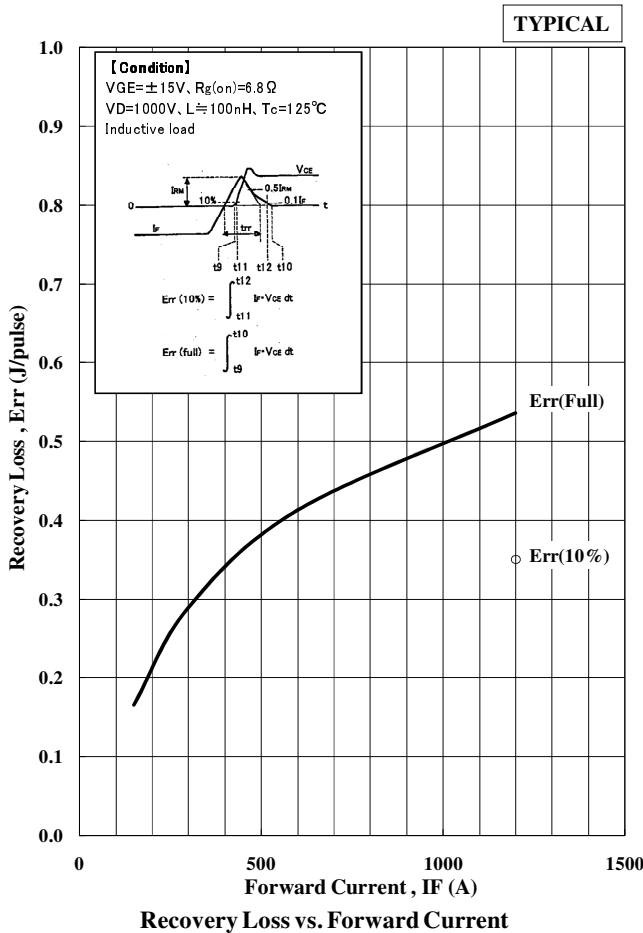
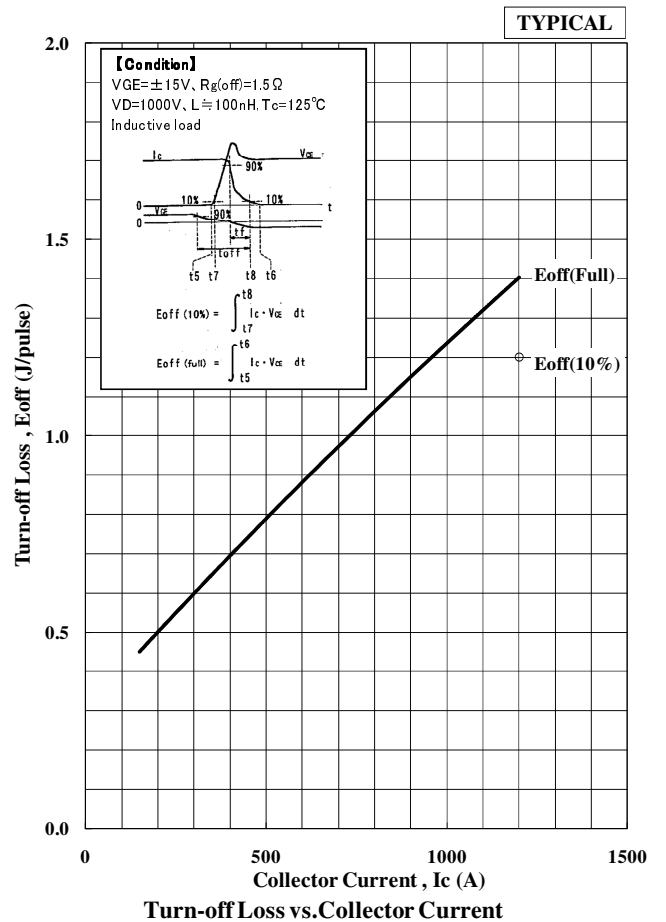
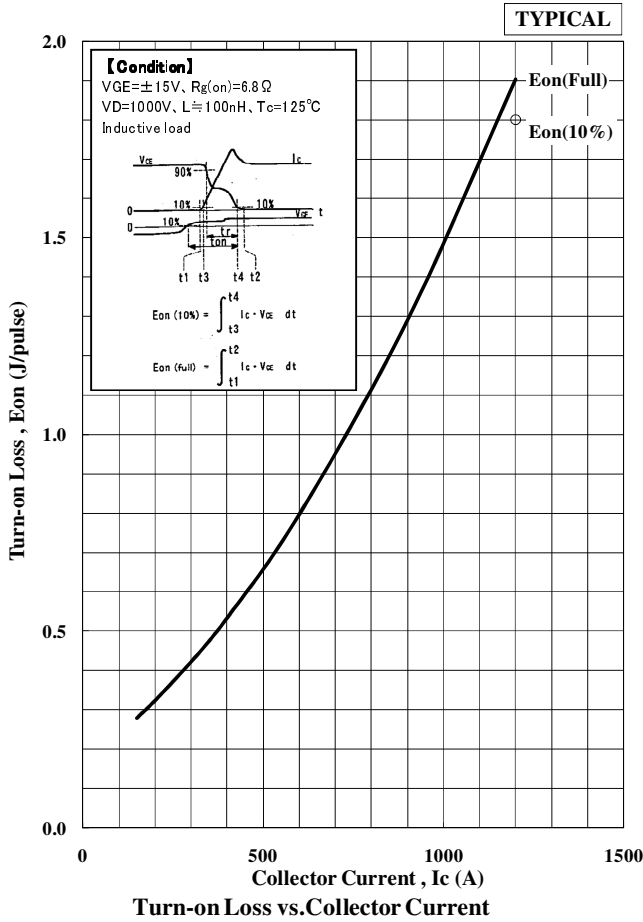
Collector Current vs. Collector to Emitter Voltage



Forward Voltage of free-wheeling diode

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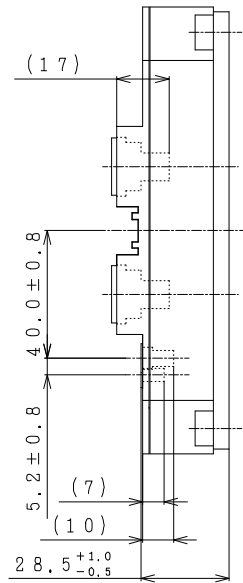
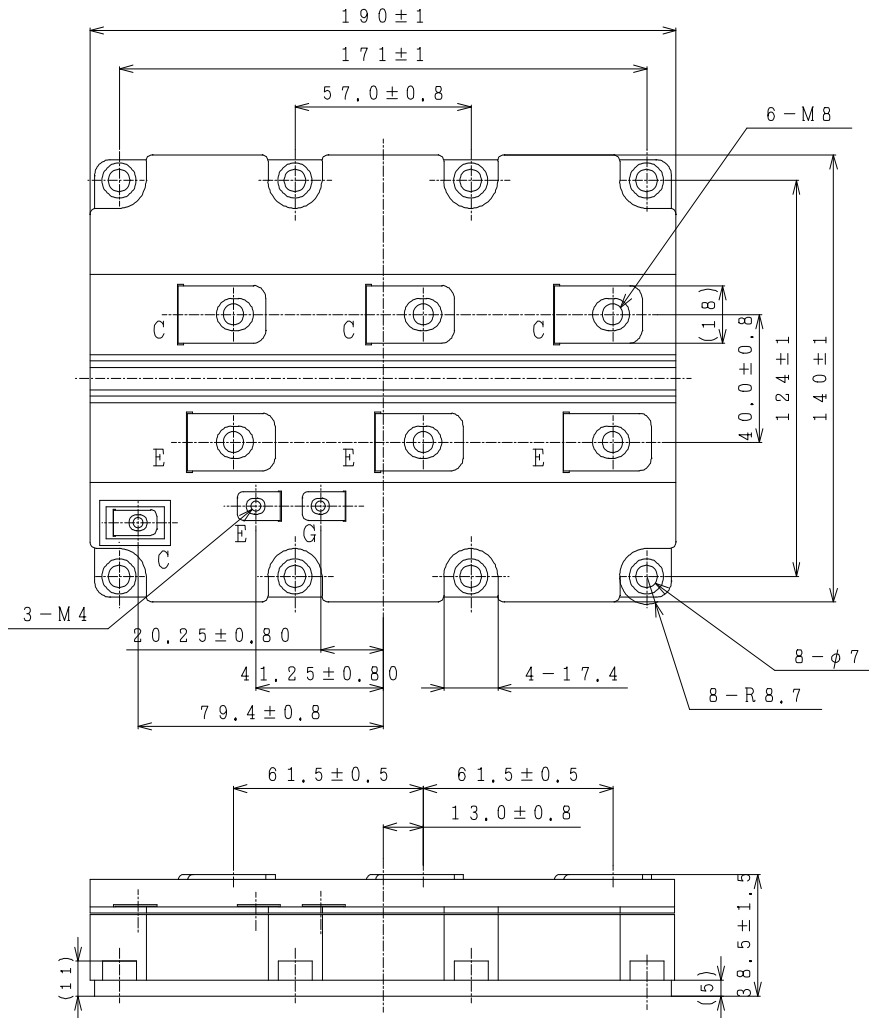
DYNAMIC CHARACTERISTICS



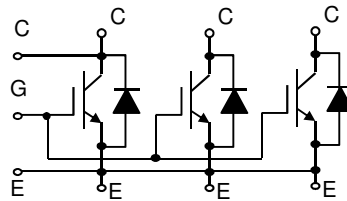
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PACKAGE OUTLINE DRAWING

Unit in mm



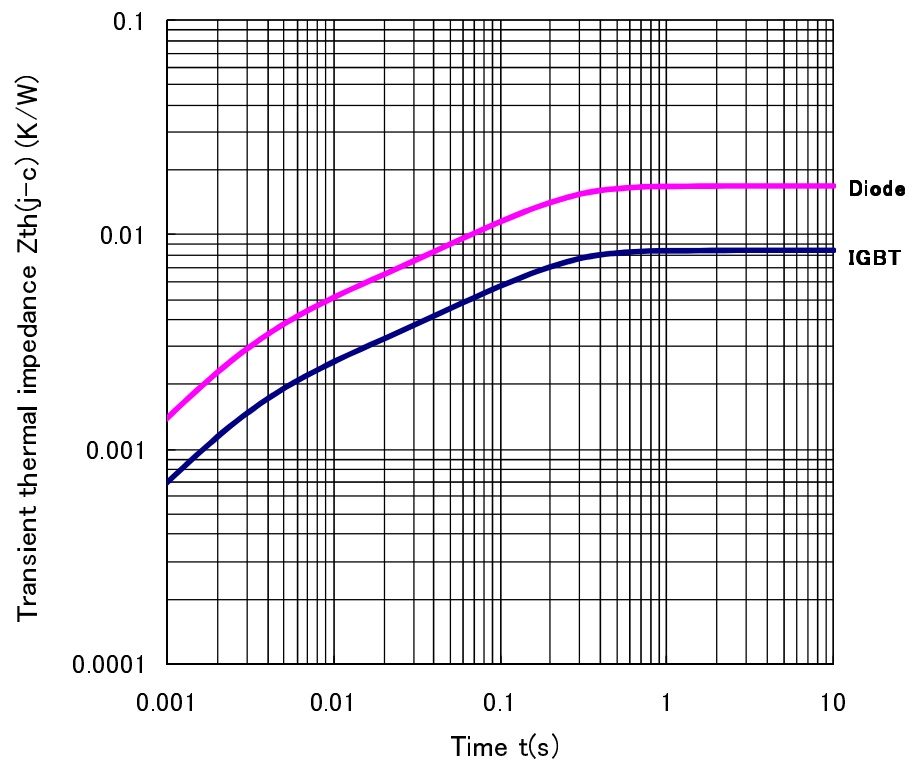
Weight: 1300(g)



Circuit diagram

MBN1200E25C

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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1. The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact Hitachi sales department for the latest version of this data sheets.
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