

MBL1200E17D

Silicon N-channel IGBT

FEATURES

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

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Item	Symbol	Unit	MBL1200E17D
Collector Emitter Voltage	V _{CES}	V	1,700
Gate Emitter Voltage	V _{GES}	V	±20
Collector Current	DC	I _C	1,200
	1ms	I _{Cp}	2,400
Forward Current (Free wheel Diode)	DC	I _{F(FWD)}	600
	1ms	I _{FM(FWD)}	1,200
Forward Current (Chopper Diode)	DC	I _{F(chopper)}	1,200
	1ms	I _{FM(chopper)}	2,400
Junction Temperature	T _j	°C	-40 ~ +125
Storage Temperature	T _{stg}	°C	-40 ~ +125 (1)
Isolation Test Voltage	V _{ISO}	V _{RMS}	4,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	2/15 (2)
	Mounting (M6)	-	6 (3)

Notes: (1) Terminal temperature shall not exceed the specified temperature in any operation.

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

ELECTRICAL CHARACTERISTICS

1) IGBT + FWD

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current	I _{CES}	mA	-	-	10	V _{CE} =1,700V, V _{GE} =0V, T _j =25°C
Gate Emitter Leakage Current	I _{GES}	nA	-500	-	+500	V _{GE} =±20V, V _{CE} =0V, T _j =25°C
Collector Emitter Saturation Voltage	V _{CE(sat)}	V	2.1	2.7	3.3	I _C =1,200A, V _{GE} =15V, T _j =125°C
Gate Emitter Threshold Voltage	V _{GE(TO)}	V	5.5	7.0	8.5	V _{CE} =10V, I _C =120mA, T _j =25°C
Input Capacitance	C _{ies}	nF	-	100	-	V _{CE} =10V, V _{GE} =0V, f=100kHz, T _j =25°C
Switching Times	Rise Time	t _r	0.4	0.9	1.5	V _{CC} =900V, I _C =1,200A, L=90nH, C _{GE} =120nF (4) R _G =1.5Ω (4)
	Turn On Time	t _{on}	0.7	1.6	2.4	
	Fall Time	t _f	0.08	0.2	0.4	
	Turn Off Time	t _{off}	0.7	1.7	3.4	
Turn On Loss	E _{on(10%)}	J/P	-	0.37	0.55	V _{GE} =±15V, T _j =125°C
Turn Off Loss	E _{off(10%)}	J/P	-	0.45	0.65	
Peak Forward Voltage Drop	V _{FM}	V	-	1.9	-	I _F =600A, V _{GE} =0V, T _j =125°C
Thermal Impedance	IGBT	R _{th(j-c)}	-	-	0.020	Junction to case
	FWD	R _{th(j-c)}	-	-	0.060	
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.016	-	Case to fin (at IGBT+FWD part)

2) Chopper DIODE

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current	I _{AKS}	mA	-	-	10.0	V _{AKS} =1,700V, T _j =25°C
Peak Forward Voltage Drop (Between main terminals)	V _F	V	1.9	2.4	2.8	I _F =1,200A, T _j =125°C Terminal Resistance Typ. 0.4mΩ
Reverse Recovery Time	t _{rr}	μs	0.3	0.7	1.0	V _{CC} =900V, I _F =1,200A, L=90nH, C _{GE} =120nF, R _G =1.5Ω (4)
Reverse Recovery Loss	E _{rr(10%)}	J/P	-	0.32	0.5	V _{GE} =±15V, T _j =125°C
Thermal Impedance	R _{th(j-c)}	K/W	-	-	0.030	Junction to case
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.016	-	Case to fin (at Chopper Diode part)

Notes: (4) R_G and C_{GE} value are the test condition's value for decision 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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DEFINITION OF TEST CIRCUIT

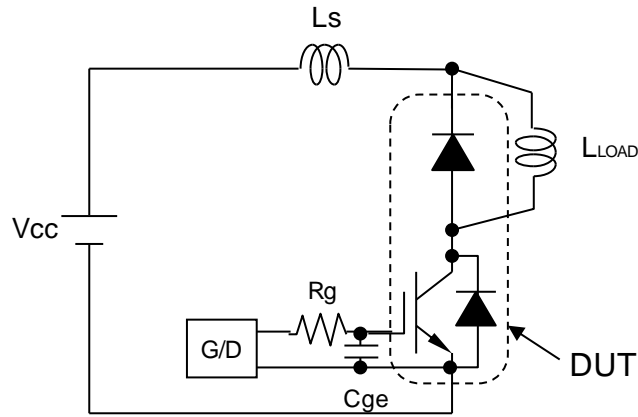


Fig.1 Switching test circuit

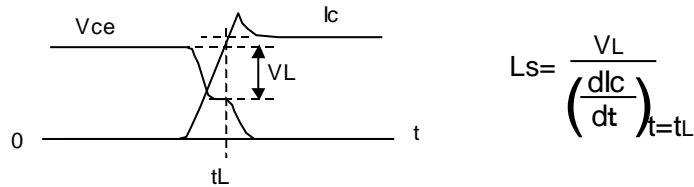


Fig.2 Definition of stray inductance

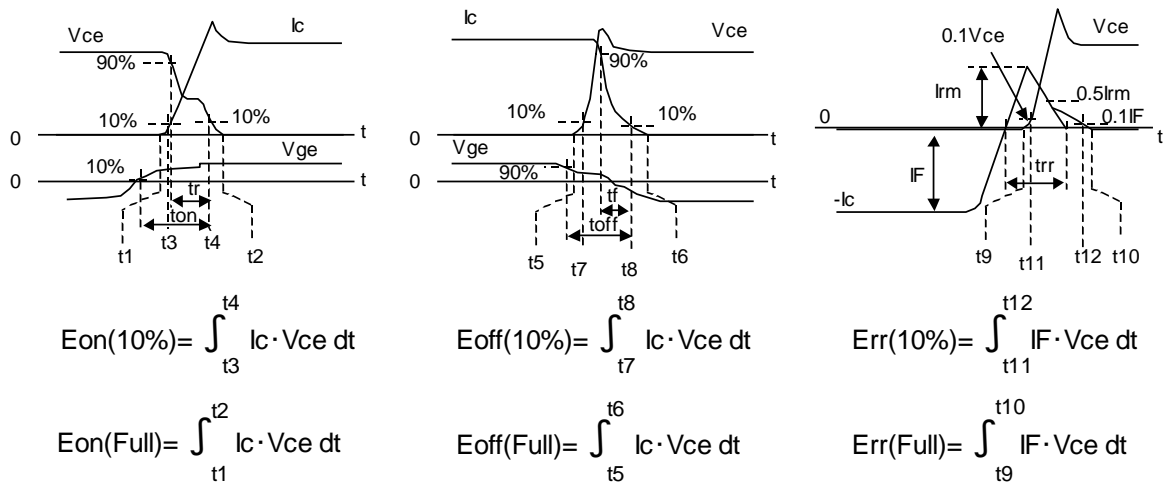
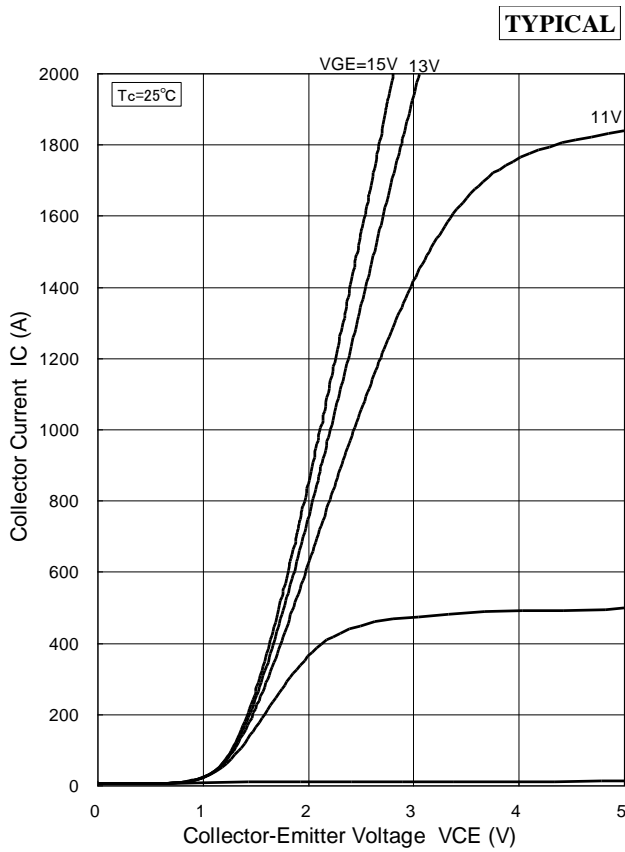


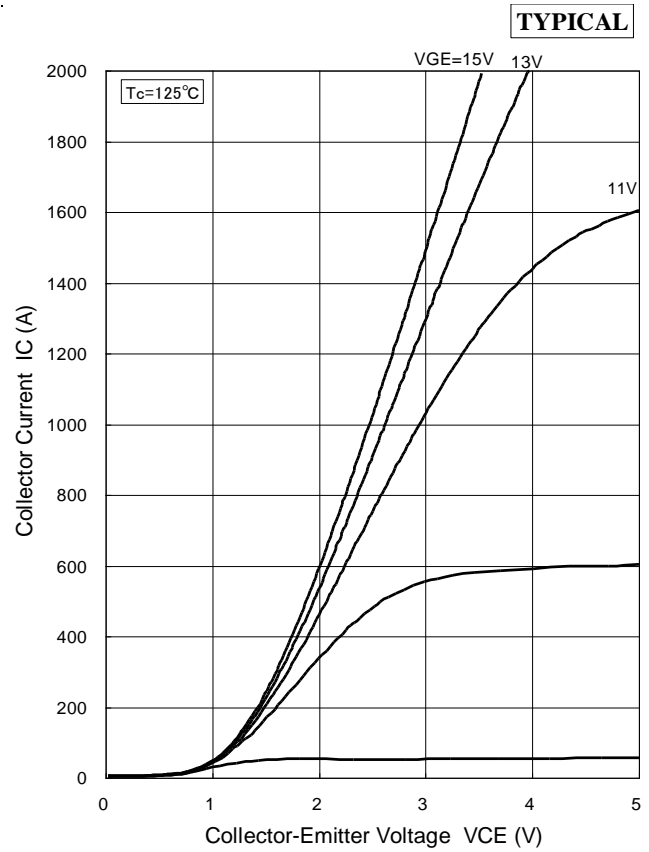
Fig.3 Definition of switching loss

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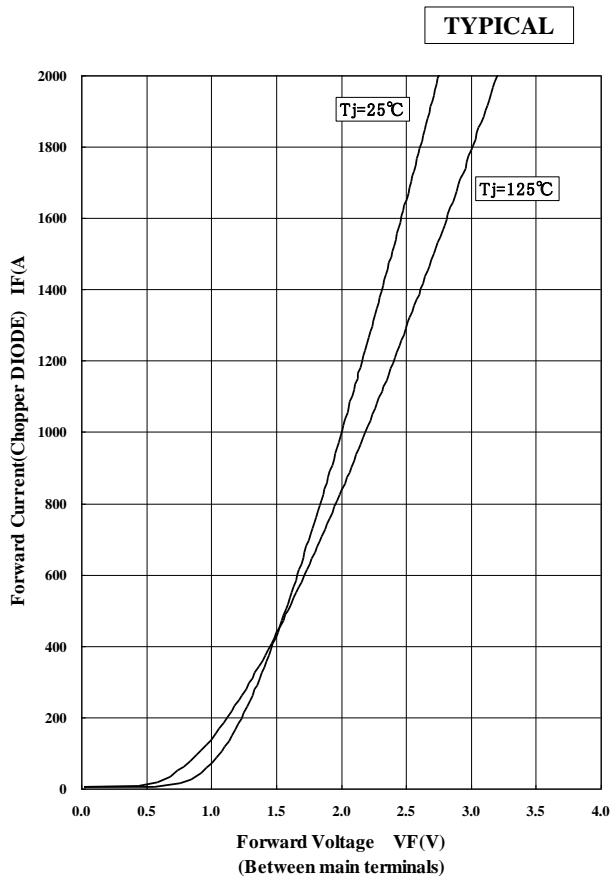
CHARACTERISTICS CURVE STATIC CHARACTERISTICS



Collector Current vs. Collector to Emitter Voltage



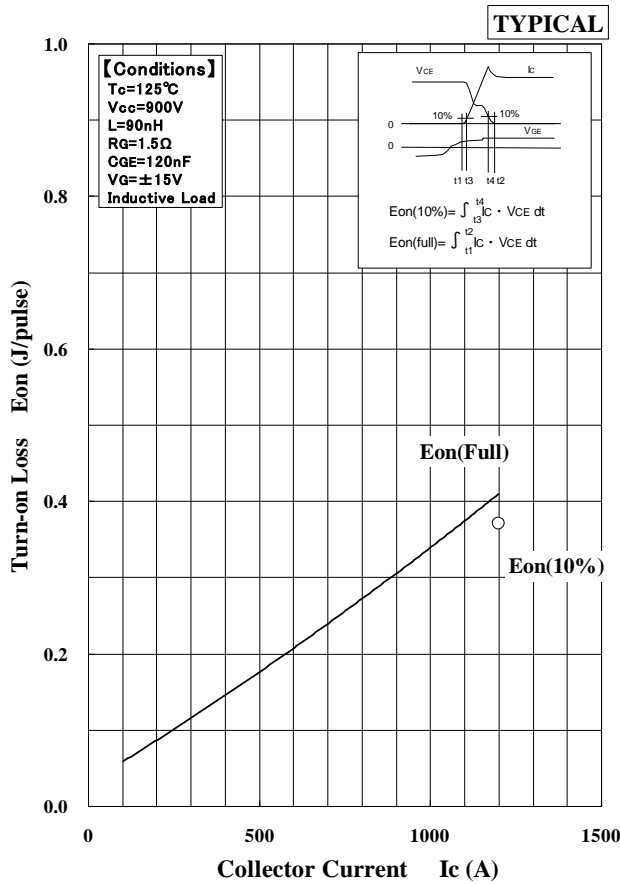
Collector Current vs. Collector to Emitter Voltage



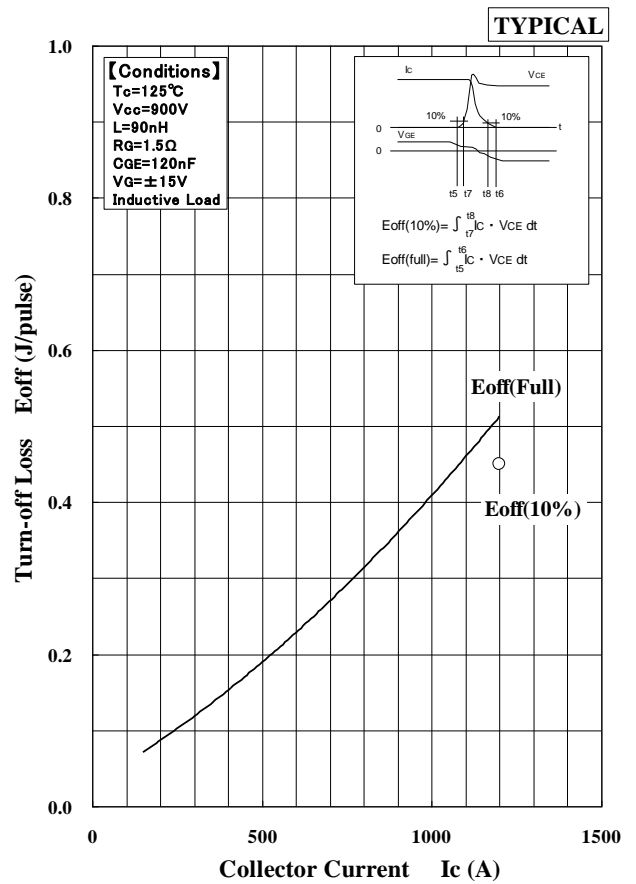
Forward Voltage of Chopper diode

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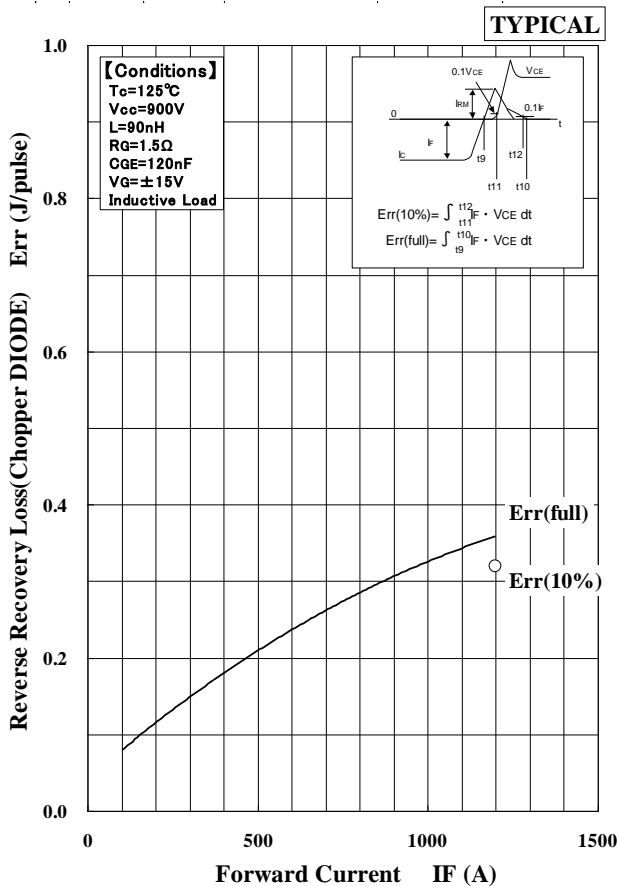
DYNAMIC CHARACTERISTICS DEPENDENCE OF CURRENT



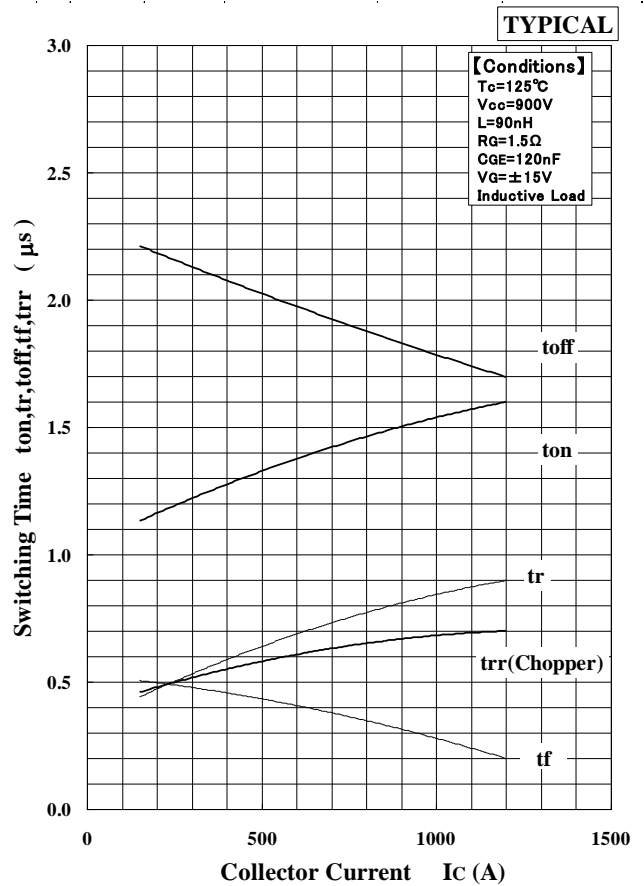
Turn-on Loss vs. Collector Current



Turn-off Loss vs. Collector Current



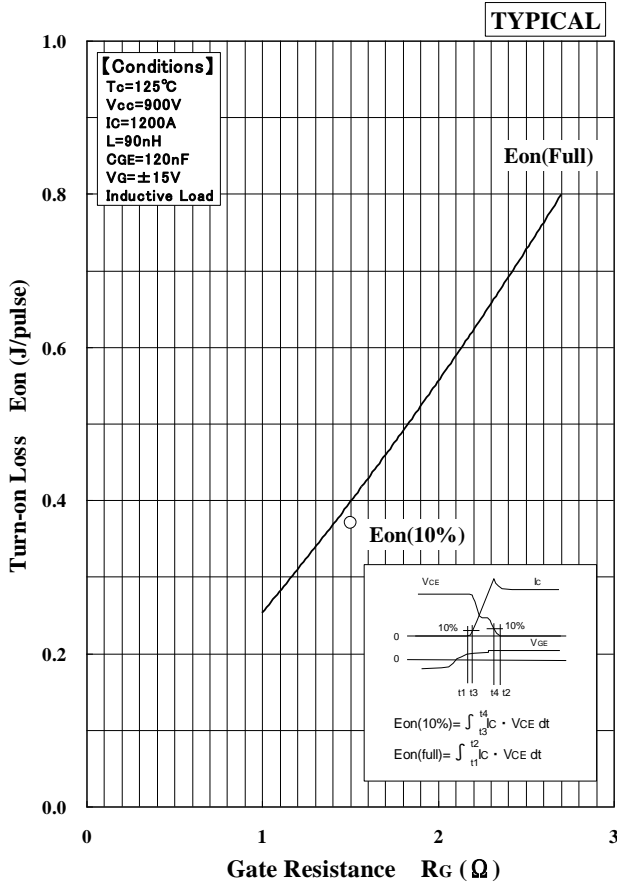
Recovery Loss vs. Collector Current



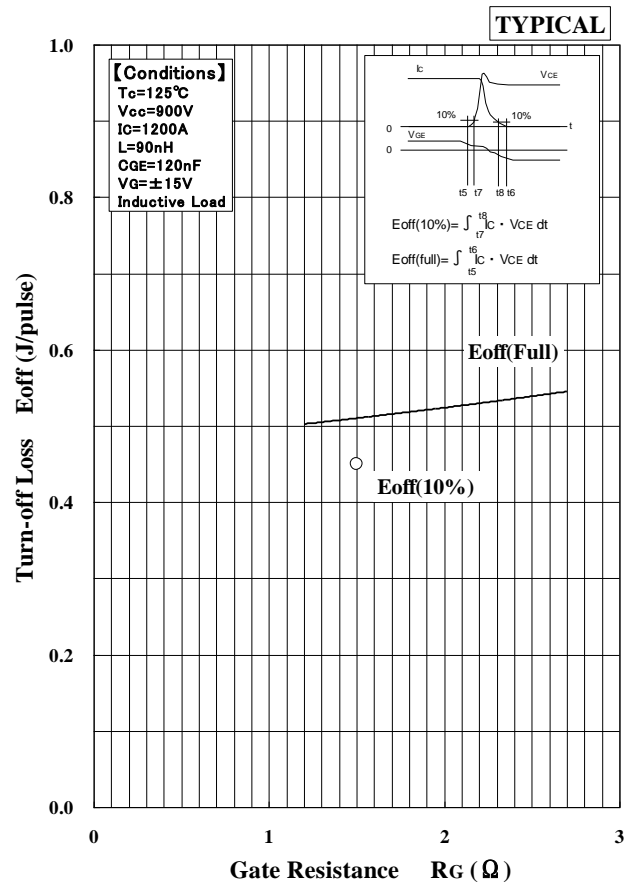
Switching Time vs. Collector Current

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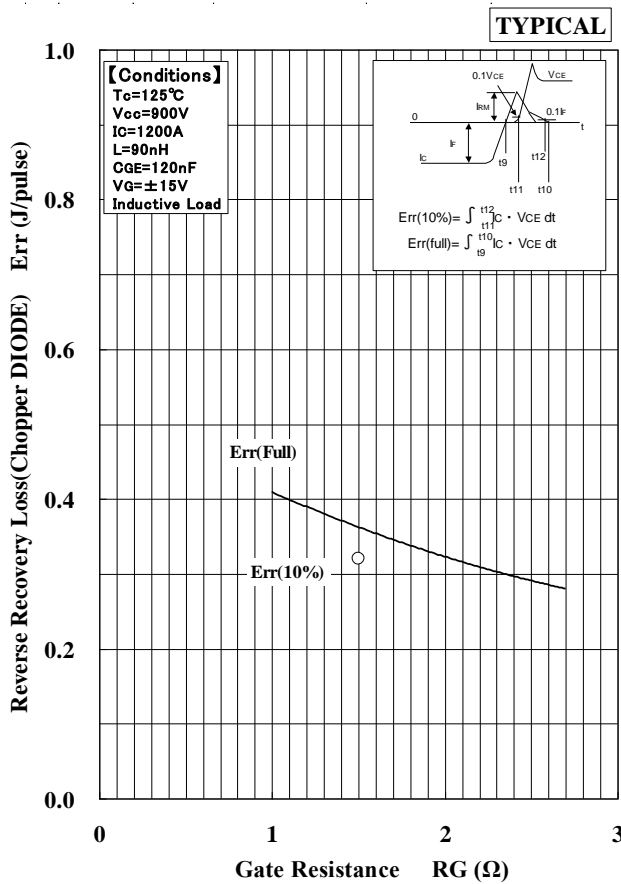
DEPENDENCE OF RG



Turn-on Loss vs. Gate Resistance



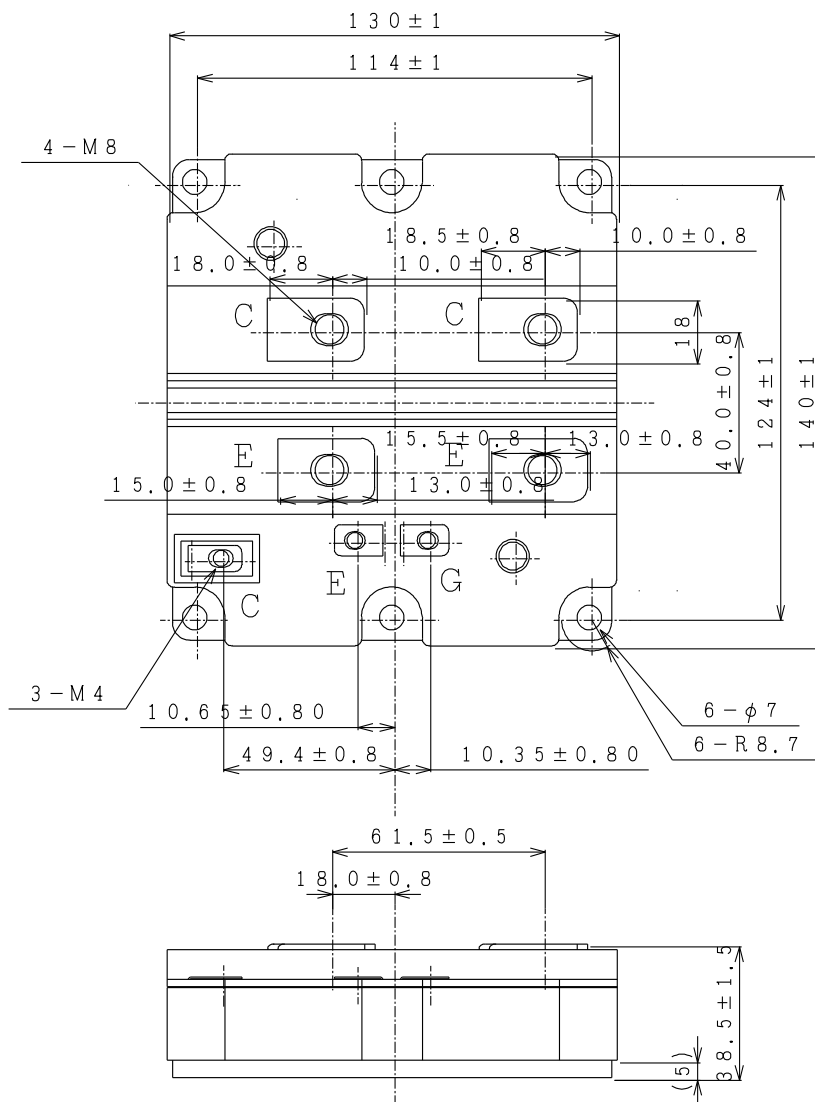
Turn-off Loss vs. Gate Resistance



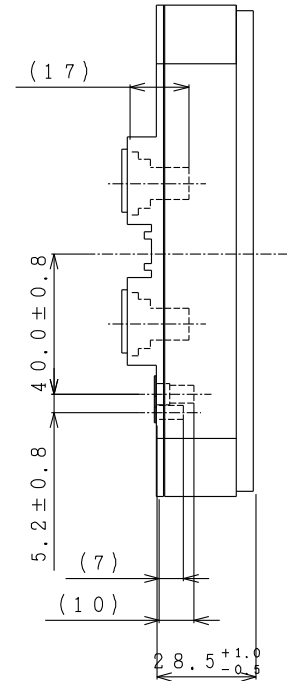
Recovery Loss vs. Gate Resistance

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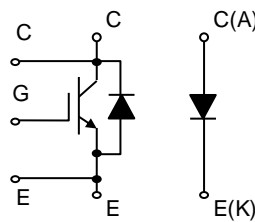
PACKAGE OUTLINE DRAWING



Unit in mm



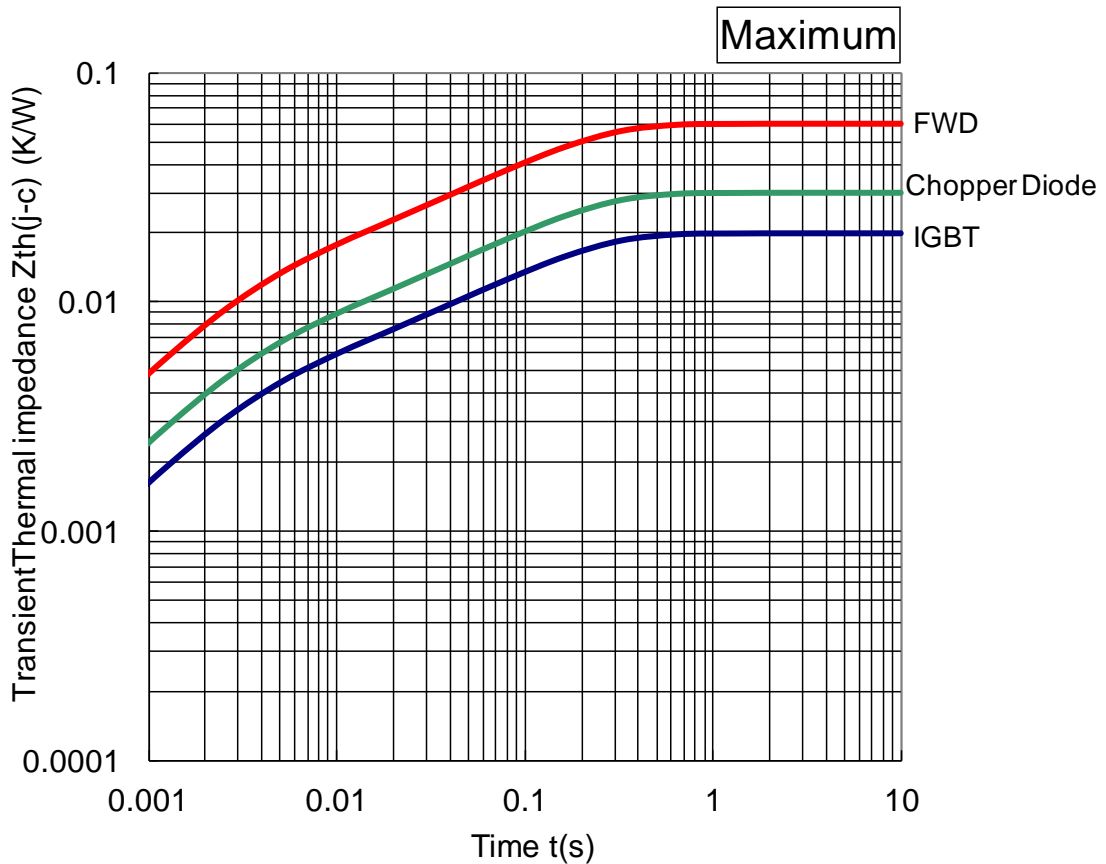
Weight: 900(g)



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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HITACHI POWER SEMICONDUCTORS

Notices

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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