

MBN1200E17D

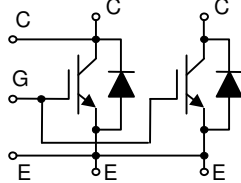
PRELIMINARY SPEC.

Silicon N-channel IGBT

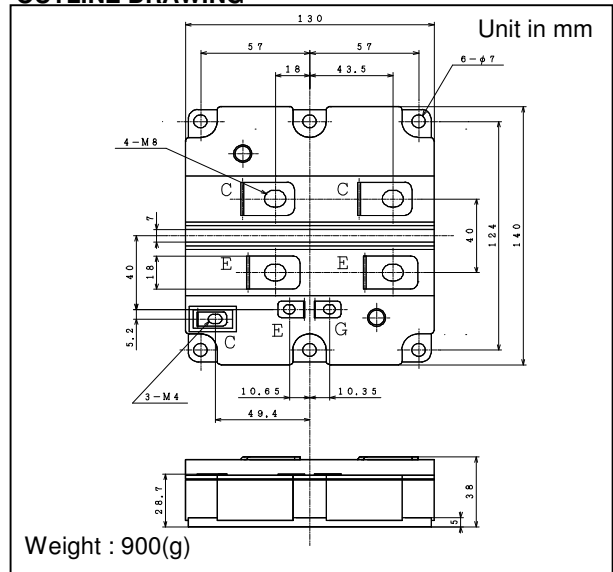
FEATURES

- * 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).

CIRCUIT DIAGRAM



OUTLINE DRAWING



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

Item	Symbol	Unit	MBN1200E17D
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	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

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Collector Emitter Cut-Off Current	I_{CES}	mA	-	-	10	$V_{CE}=1,700\text{V}$, $V_{GE}=0\text{V}$, $T_j=25^\circ\text{C}$	
			-	10	35	$V_{CE}=1,700\text{V}$, $V_{GE}=0\text{V}$, $T_j=125^\circ\text{C}$	
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	2.0	2.7	3.3	$I_C=1,200\text{A}$, $V_{GE}=15\text{V}$, $T_j=125^\circ\text{C}$	
Gate Emitter Threshold Voltage	$V_{GE(TO)}$	V	5.0	6.5	8.0	$V_{CE}=10\text{V}$, $I_C=120\text{mA}$, $T_j=25^\circ\text{C}$	
Input Capacitance	C_{ies}	nF	-	100	-	$V_{CE}=10\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$, $T_j=25^\circ\text{C}$	
Internal Gate Resistance	R_{ge}	Ω	-	0.8	-	$V_{CE}=10\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$, $T_j=25^\circ\text{C}$	
Switching Times	Rise Time	t_r	-	0.6	1.0	$V_{CC}=900\text{V}$, $I_C=1,200\text{A}$	
	Turn On Time	t_{on}	-	0.9	1.8	$L=65\text{nH}$, $C_{GE}=120\text{nF(TBD)}$ (3)	
	Fall Time	t_f	-	0.3	0.7	$R_G=1.5\Omega(\text{TBD})$ (3)	
	Turn Off Time	t_{off}	-	1.4	3.4	$V_{GE}=\pm 15\text{V}$, $T_j=125^\circ\text{C}$	
Peak Forward Voltage Drop	V_{FM}	V	1.3	1.9	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	-	0.5	1.0	$V_{CC}=900\text{V}$, $I_C=I_F=1,200\text{A}$	
Turn On Loss	$E_{on(10\%)}$	J/P	0.09	0.25	0.4	$L=65\text{nH}$, $C_{GE}=120\text{nF(TBD)}$ (3)	
Turn Off Loss	$E_{off(10\%)}$	J/P	0.18	0.35	0.5	$R_G=1.5\Omega(\text{TBD})$ (3)	
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	0.18	0.4	0.6	$V_{GE}=\pm 15\text{V}$, $T_j=125^\circ\text{C}$	
Stray inductance module	L_{SCE}	nH	-	18	-		
Thermal Impedance	IGBT	$R_{th(j-c)}$	K/W	-	-	0.018	Junction to case
	FWD	$R_{th(j-c)}$	K/W	-	-	0.030	
Contact Thermal Impedance	$R_{th(c-f)}$	K/W	-	0.008	-	Case to fin	

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.

DEFINITION OF TEST CIRCUIT

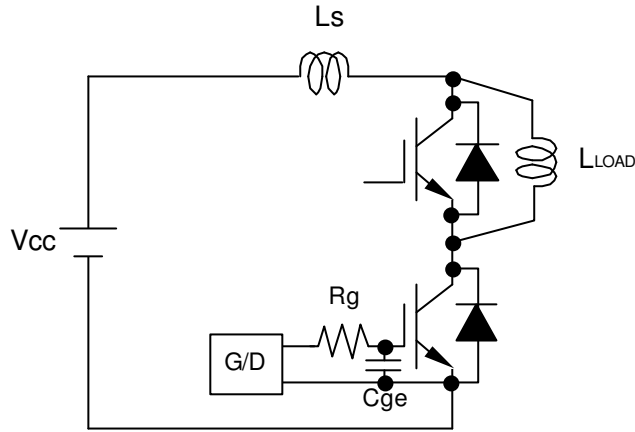


Fig.1 Switching test circuit

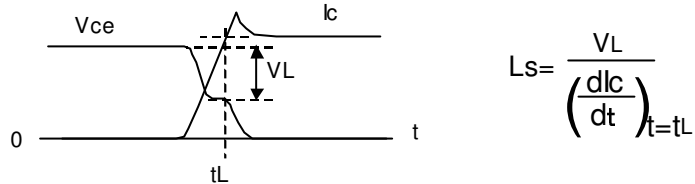


Fig.2 Definition of Ls

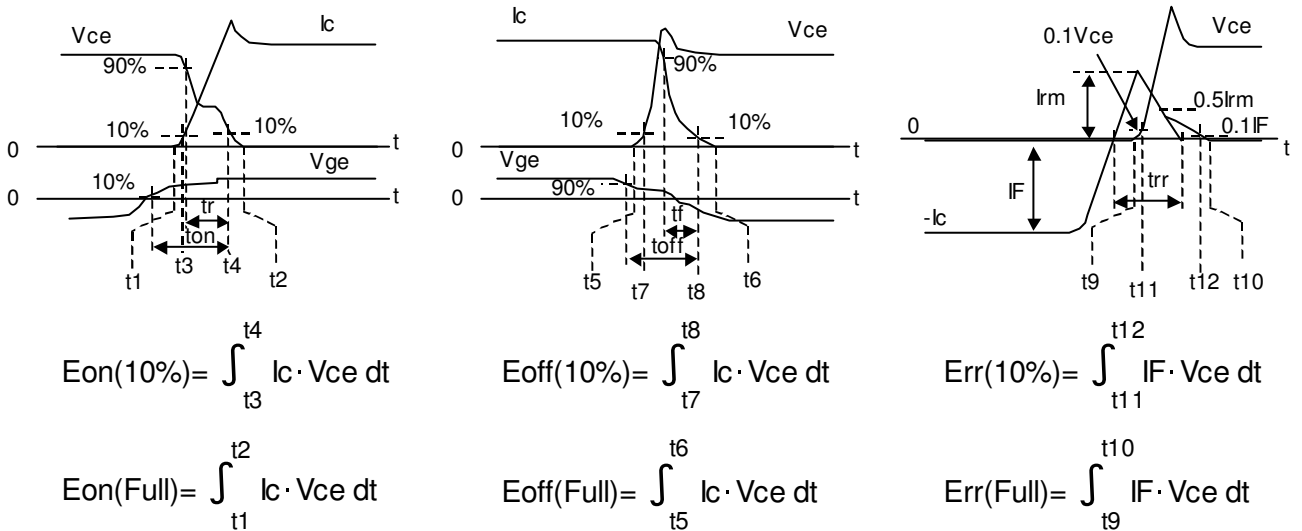
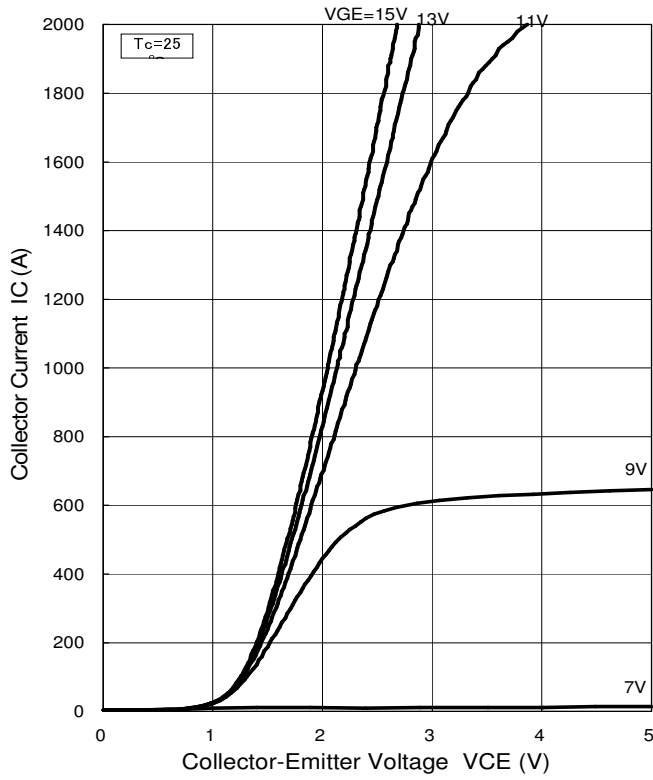


Fig.3 Definition of switching loss

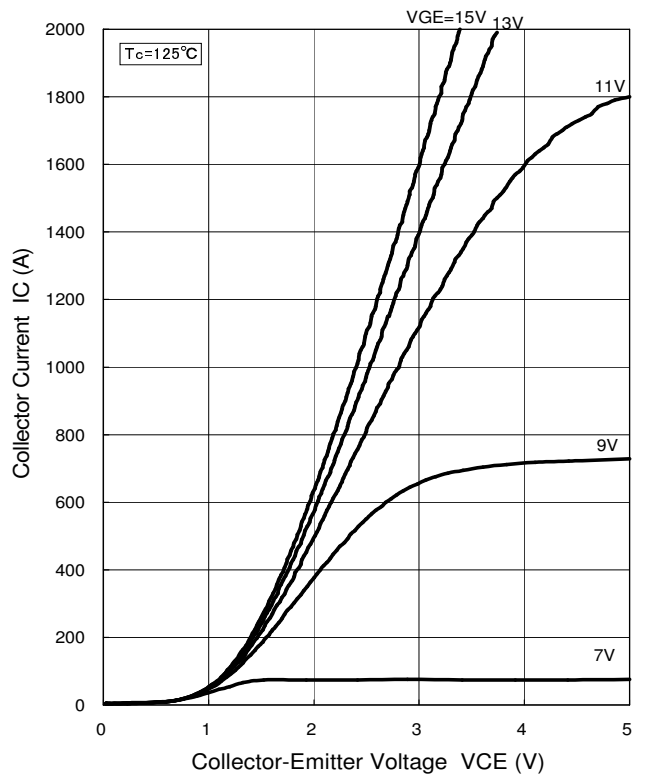
1. STATIC CHARACTERISTICS

TYPICAL



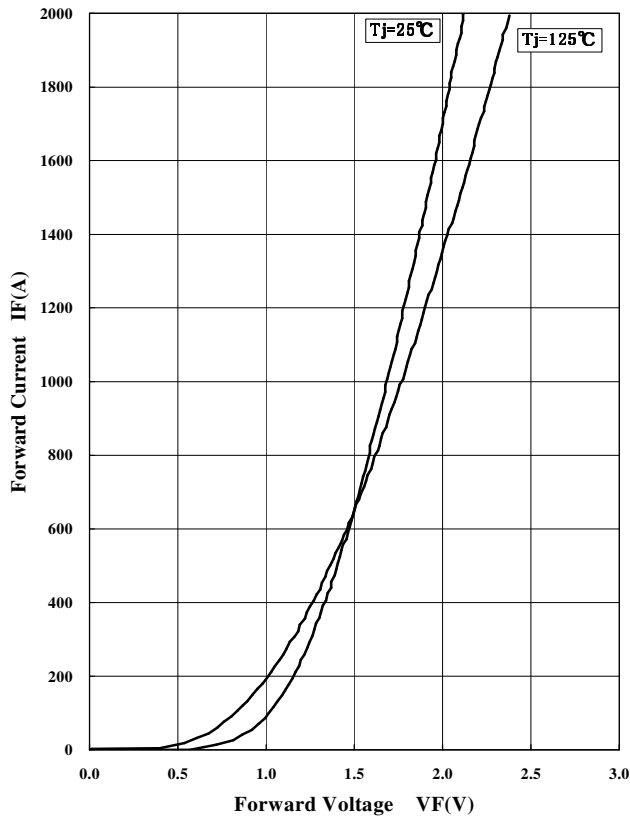
Collector Current vs. Collector to Emitter Voltage

TYPICAL



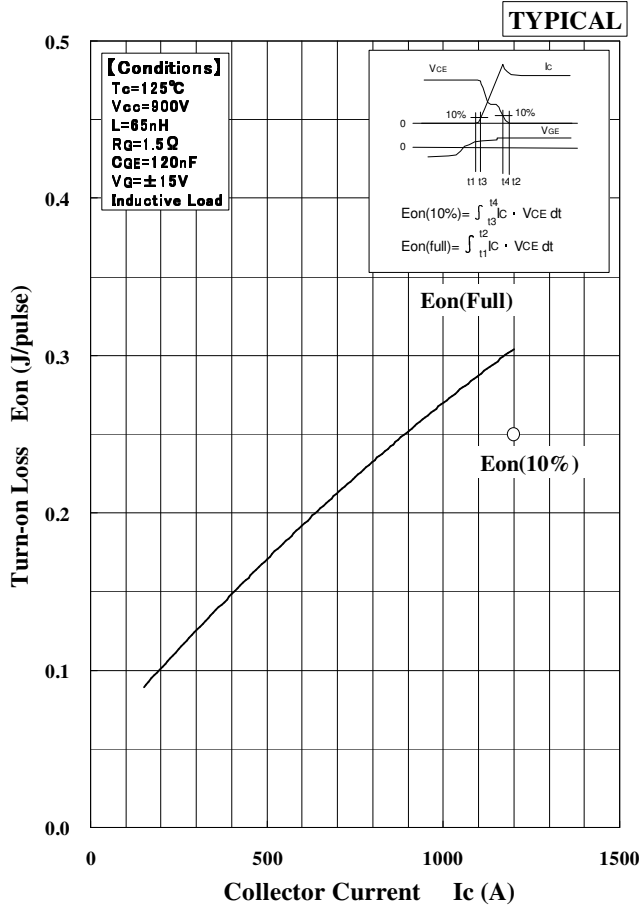
Collector Current vs. Collector to Emitter Voltage

TYPICAL

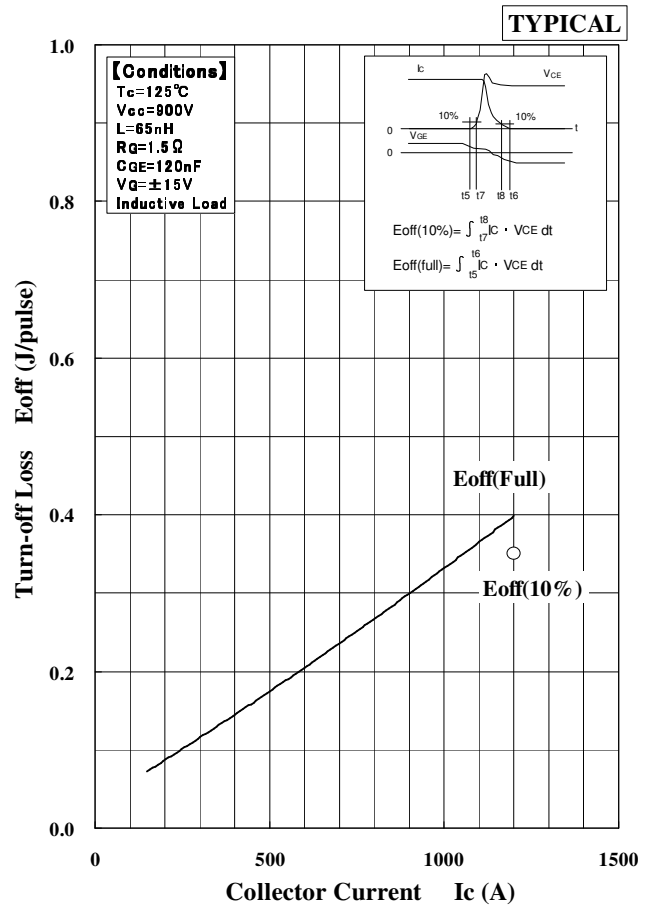


Forward Voltage of free-wheeling diode

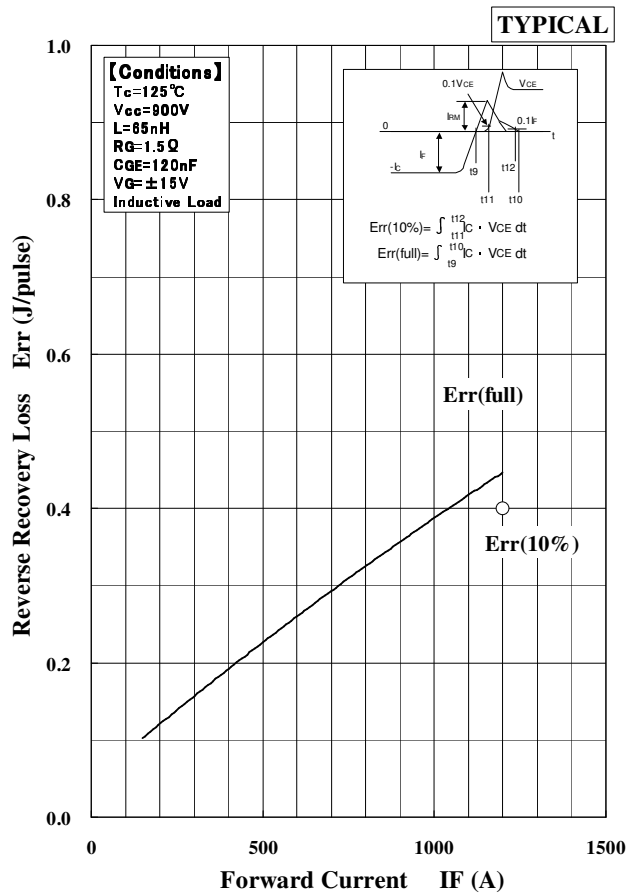
2. DYNAMIC CHARACTERISTICS



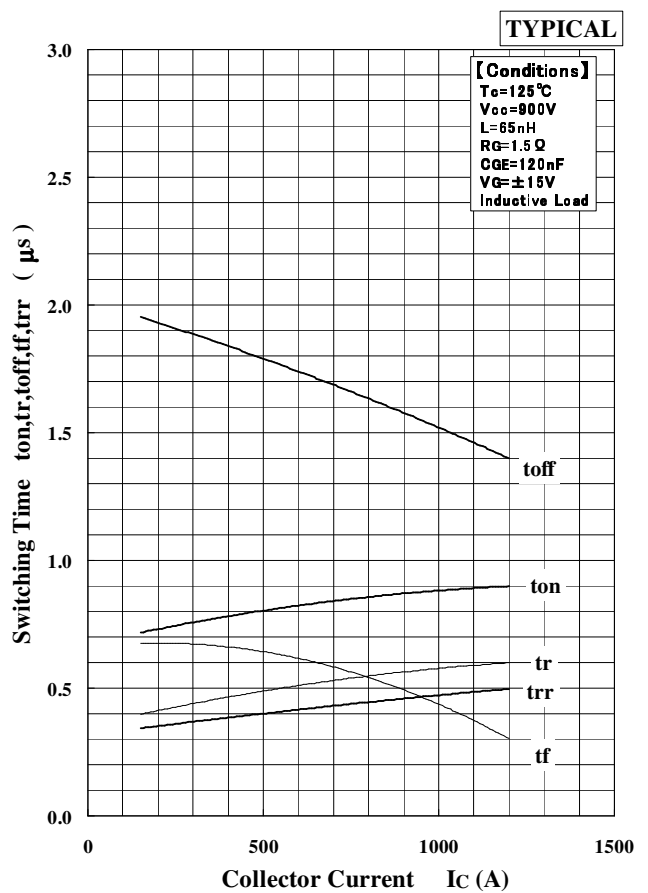
Turn-on Loss vs. Collector Current



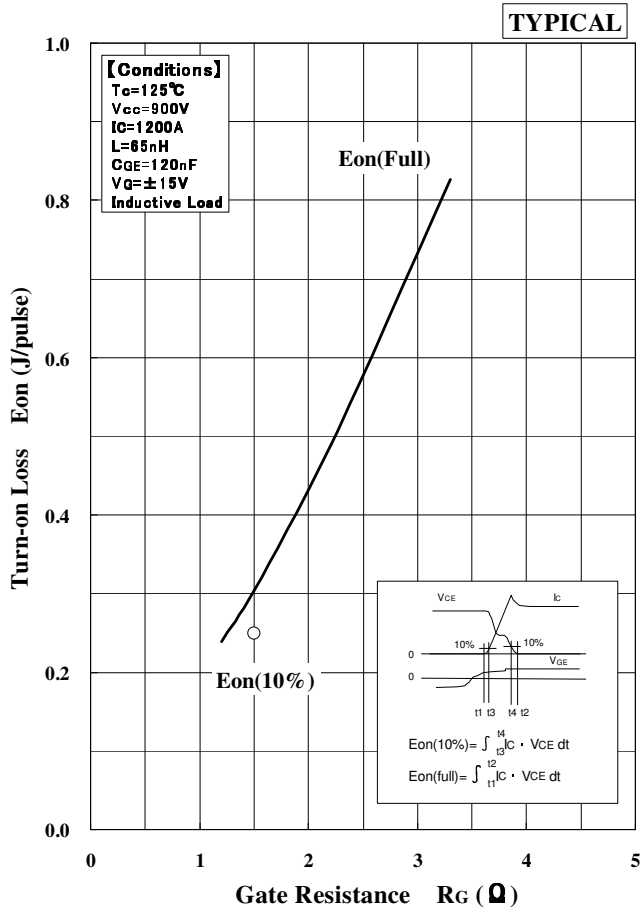
Turn-off Loss vs. Collector Current



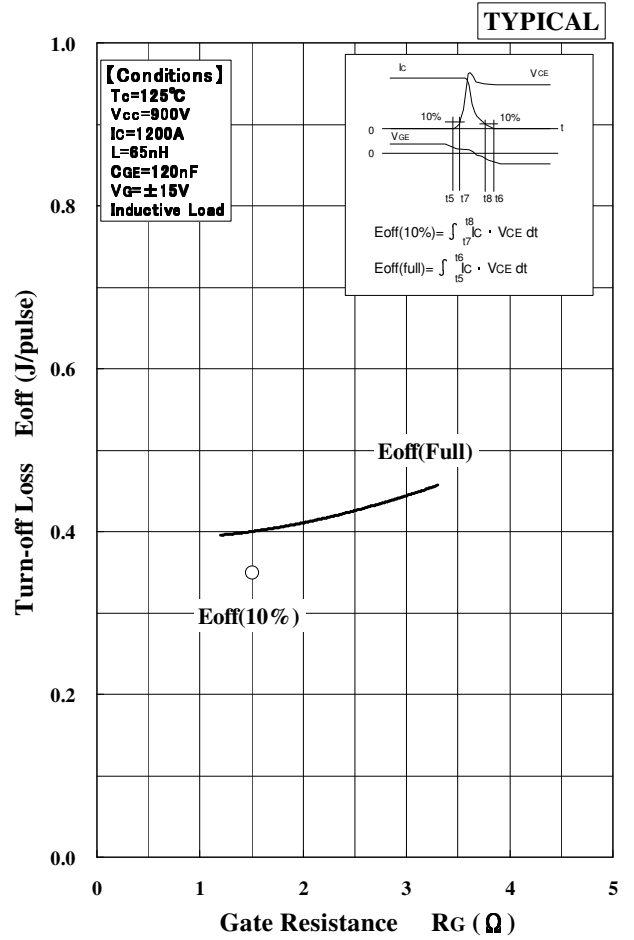
Recovery Loss vs. Forward Current



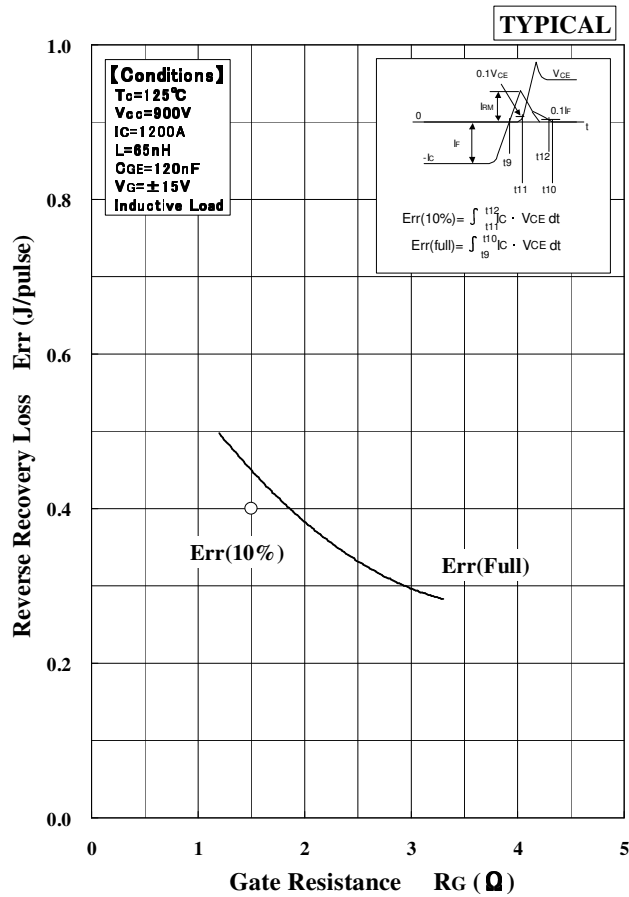
Switching Time vs. Collector Current



Turn-on Loss vs. Gate Resistance

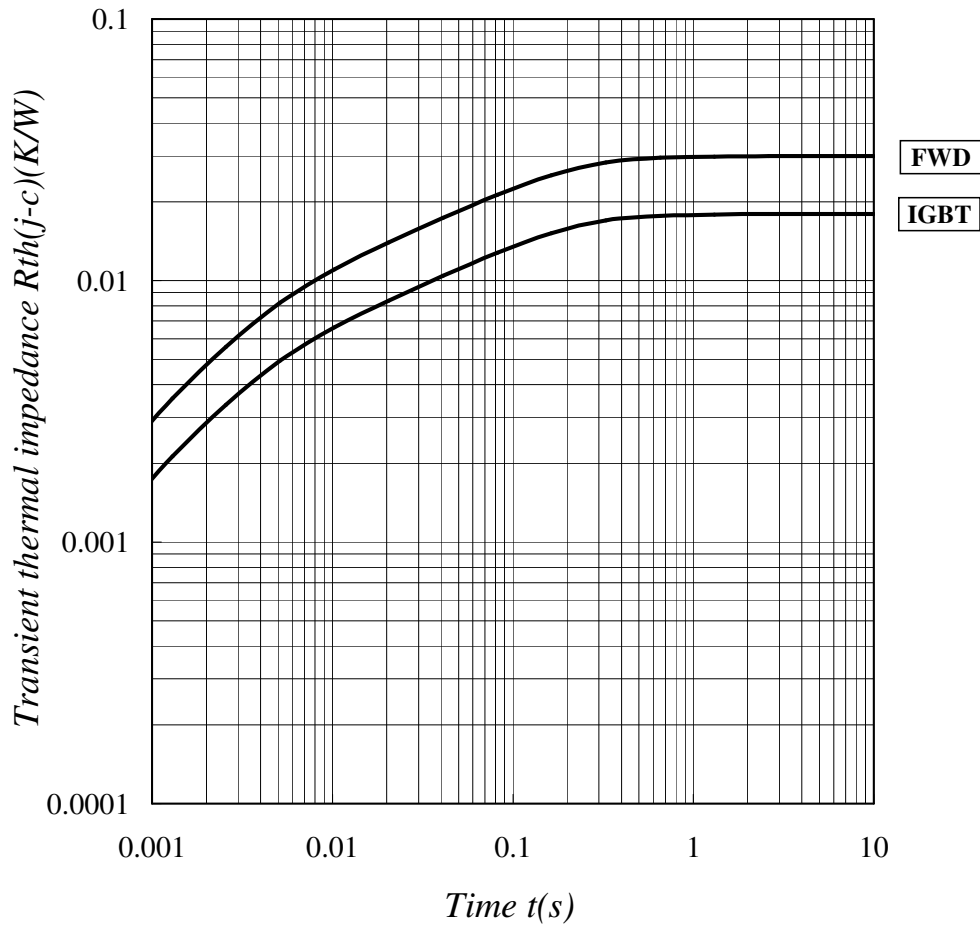


Turn-off Loss vs. Gate Resistance



Recovery Loss vs. Gate Resistance

3. TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve (Maximum Value)

4. Negative environmental impact material

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
Arsenic and its compounds	Si chip

HITACHI POWER SEMICONDUCTORS

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