

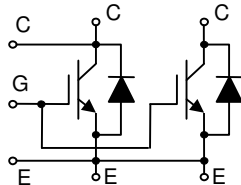
MBN800E33E

Silicon N-channel IGBT 3300V E version

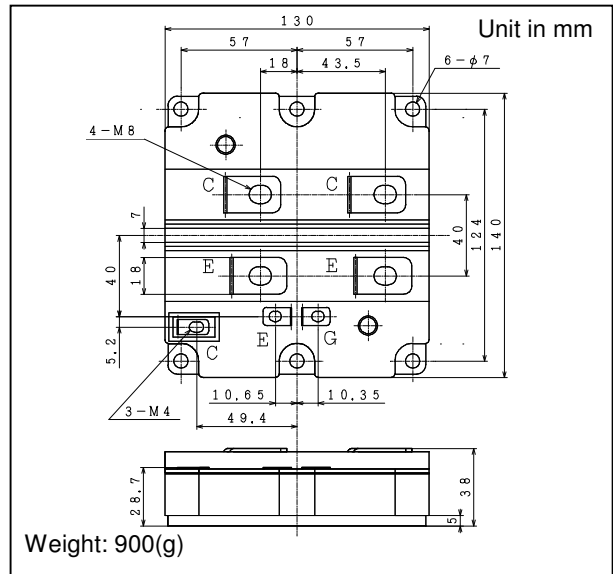
FEATURES

- * Soft switching behavior & low conduction loss:
Soft low-injection punch-through
High conductivity IGBT.
- * Low driving power due to low input capacitance MOS gate.
- * Low noise recovery: Ultra soft fast recovery diode.
- * High thermal fatigue durability:
($\Delta T_c=70K$, $N>30,000$ cycles)
AlSiC base-plate/AlN substrate

CIRCUIT DIAGRAM



OUTLINE DRAWING



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

Item	Symbol	Unit	MBN800E33E
Collector Emitter Voltage	V_{CES}	V	3,300
Gate Emitter Voltage	V_{GES}	V	± 20
Collector Current	DC	I_C	800
	1ms	I_{Cp}	1,600
Forward Current	DC	I_F	800
	1ms	I_{FM}	1,600
Junction Temperature	T_j	$^\circ C$	-40 ~ +125
Storage Temperature	T_{stg}	$^\circ C$	-40 ~ +125
Isolation Voltage	V_{ISO}	V_{RMS}	6,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	2/15 (1)
	Mounting (M6)	-	6 (2)

Notes: (1) Recommended Value $1.8 \pm 0.2 / 15^{+0}$ N·m

(2) Recommended Value 5.5 ± 0.5 N·m

ELECTRICAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current	I_{CES}	mA	-	-	12.0	$V_{CE}=3,300V, V_{GE}=0V, T_j=25^\circ C$
			-	14	40	$V_{CE}=3,300V, V_{GE}=0V, T_j=125^\circ C$
Gate Emitter Leakage Current	I_{GES}	nA	-500	-	+500	$V_{GE}=\pm 20V, V_{CE}=0V, T_j=25^\circ C$
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V	3.0	3.5	4.2	$I_C=800A, V_{GE}=15V, T_j=125^\circ C$
Gate Emitter Threshold Voltage	$V_{GE(To)}$	V	4.5	6.0	7.0	$V_{CE}=10V, I_C=800mA, T_j=25^\circ C$
Input Capacitance	C_{ies}	nF	-	70	-	$V_{CE}=10V, V_{GE}=0V, f=100kHz, T_j=25^\circ C$
Internal Gate Resistance	$R_{g(int)}$	Ω	-	2.0	-	$V_{CE}=10V, V_{GE}=0V, f=100kHz, T_j=25^\circ C$
Switching Times	Rise Time	t_r	1.1	2.1	3.1	$V_{CC}=1,650V, I_C=800A$ $L=120nH$ $R_G=5.6\Omega$ (3) $V_{GE}=\pm 15V, T_j=125^\circ C$
	Turn On Time	t_{on}	1.7	2.5	3.3	
	Fall Time	t_f	1.3	2.2	3.1	
	Turn Off Time	t_{off}	2.7	4.2	5.7	
Peak Forward Voltage Drop	V_{FM}	V	2.0	2.5	3.0	$I_F=800A, V_{GE}=0V, T_j=125^\circ C$
Reverse Recovery Time	t_{rr}	μs	0.2	0.7	1.2	$V_{CC}=1,650V, I_F=800A, L=120nH$ $T_j=125^\circ C$
Turn On Loss	$E_{on(10\%)}$	J/P	-	1.2	1.6	$V_{CC}=1,650V, I_C=800A, L=120nH$
Turn Off Loss	$E_{off(10\%)}$	J/P	-	1.3	1.7	$R_G=5.6\Omega$ (3)
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	-	1.0	1.5	$V_{GE}=\pm 15V, T_j=125^\circ C$
Stray inductance module	L_{SCE}	nH	-	18	-	
Thermal Impedance	IGBT	$R_{th(j-c)}$	-	-	0.013	Junction to case
	FWD	$R_{th(j-c)}$	-	-	0.026	
Contact Thermal Impedance	$R_{th(c-f)}$	K/W	-	0.008	-	Case to fin

Notes:(3) R_G value is a test condition value for evaluation, not recommended value.

Please, determine the suitable R_G value by measuring switching behaviors.

* 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

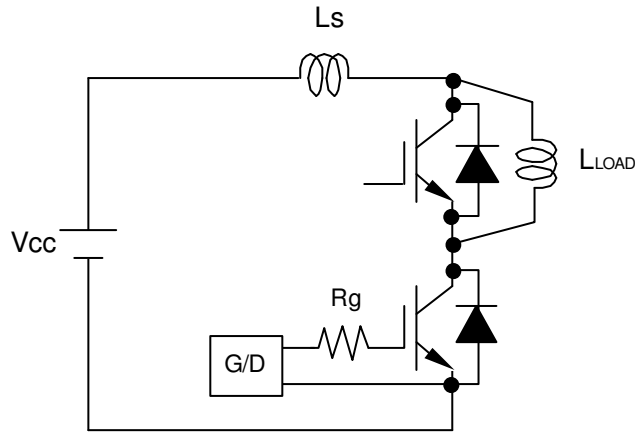


Fig.1 Switching test circuit

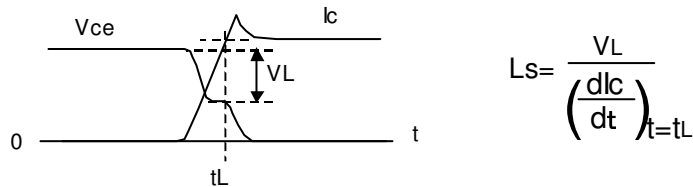


Fig.2 Definition of Ls

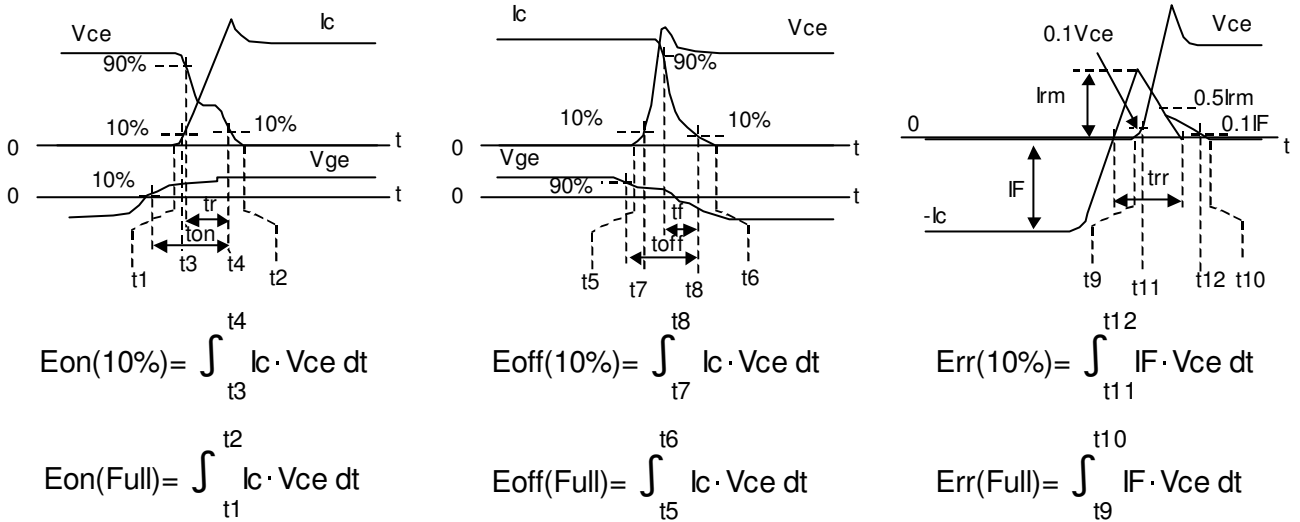
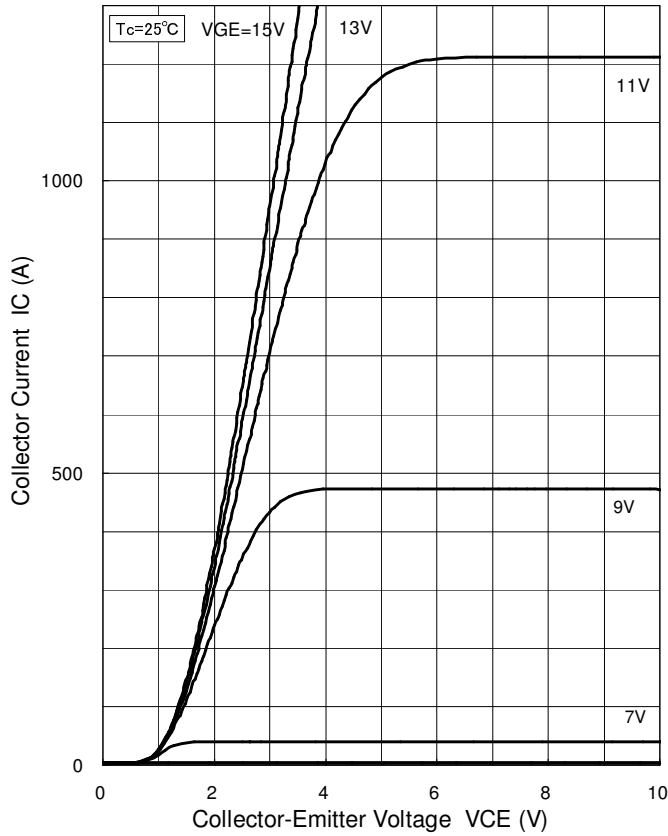


Fig.3 Definition of switching loss

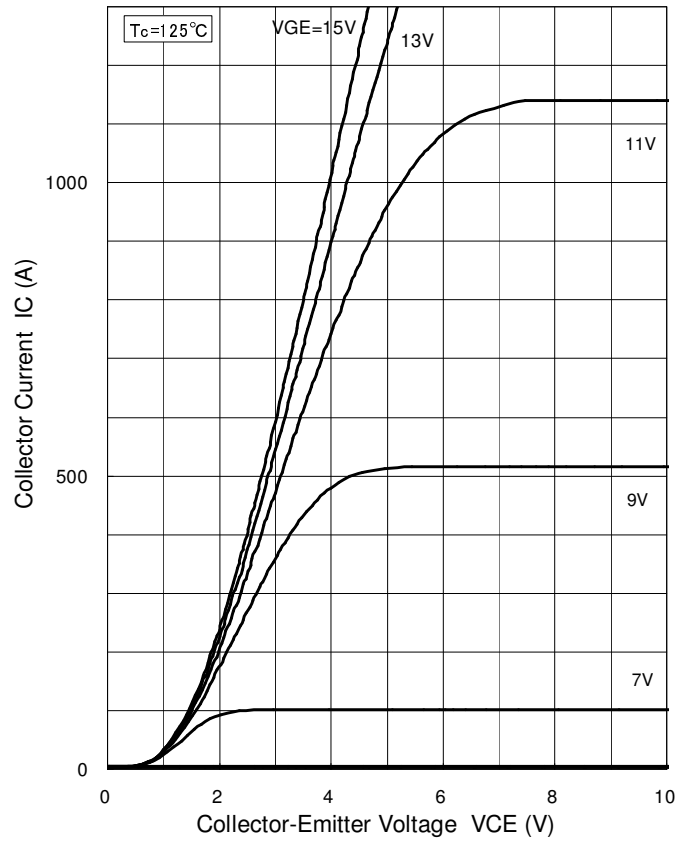
1. STATIC CHARACTERISTICS

TYPICAL



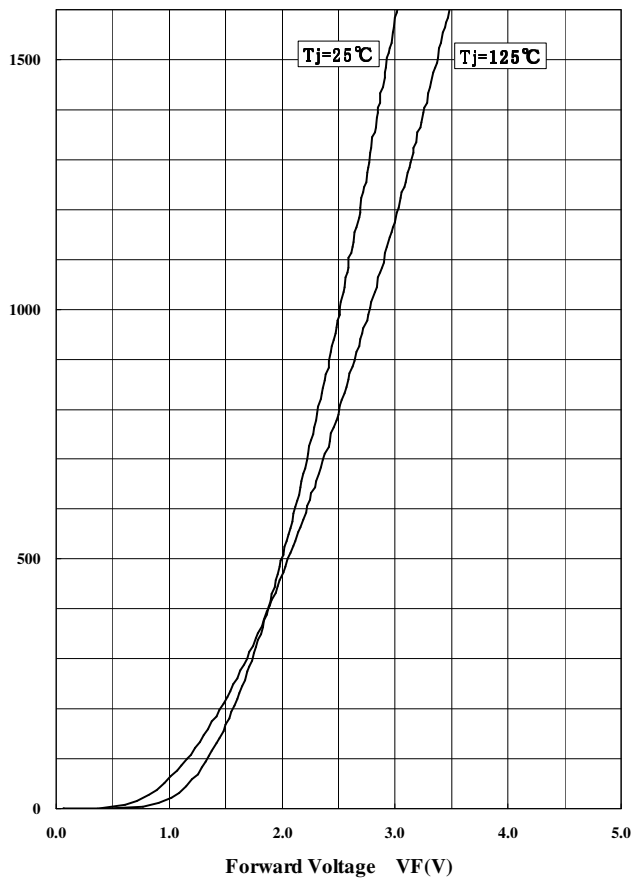
Collector Current vs. Collector to Emitter Voltage

TYPICAL



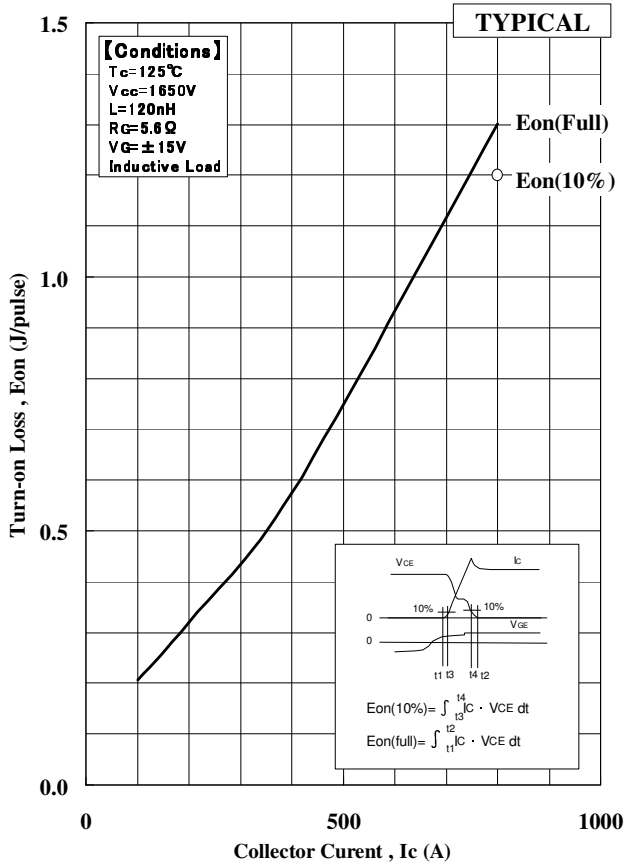
Collector Current vs. Collector to Emitter Voltage

TYPICAL

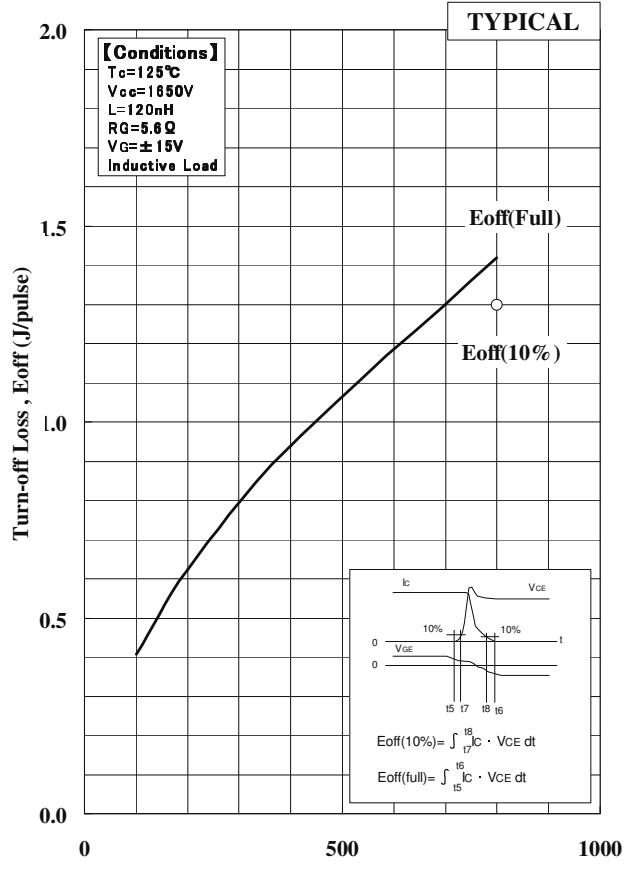


Forward Voltage of free-wheeling diode

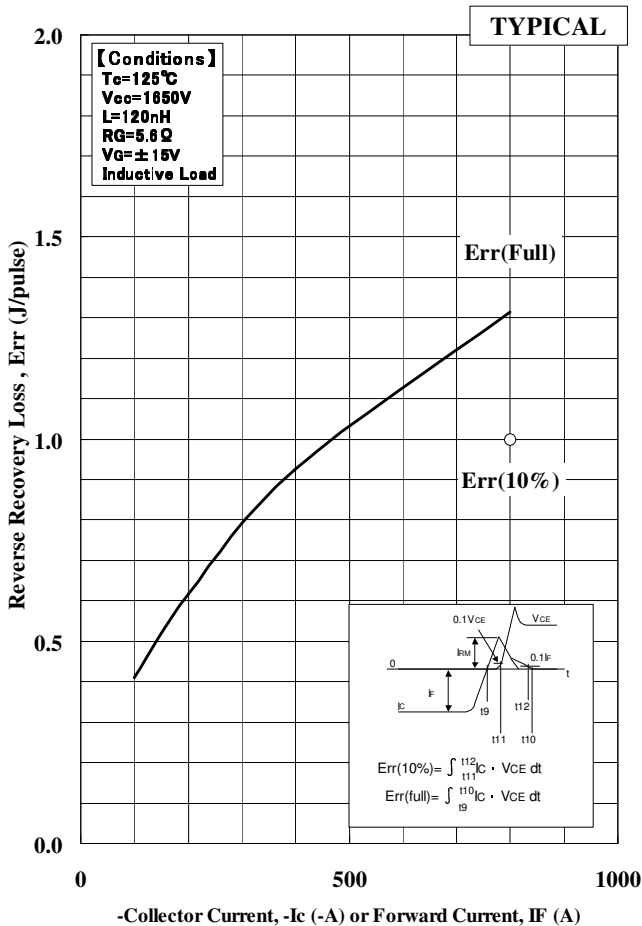
2. DYNAMIC CHARACTERISTICS



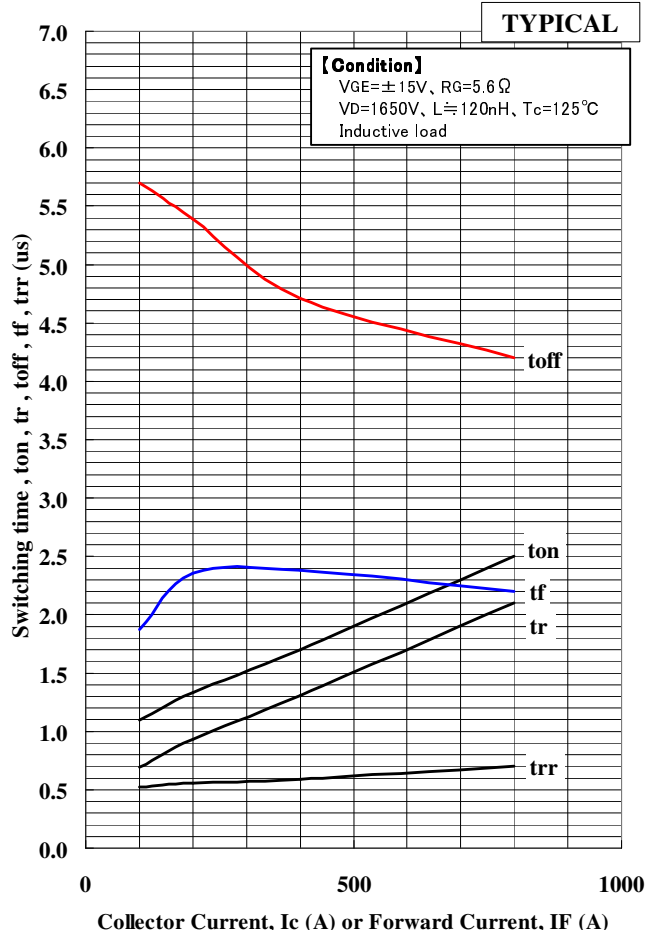
Turn-on Loss vs. Collector Current



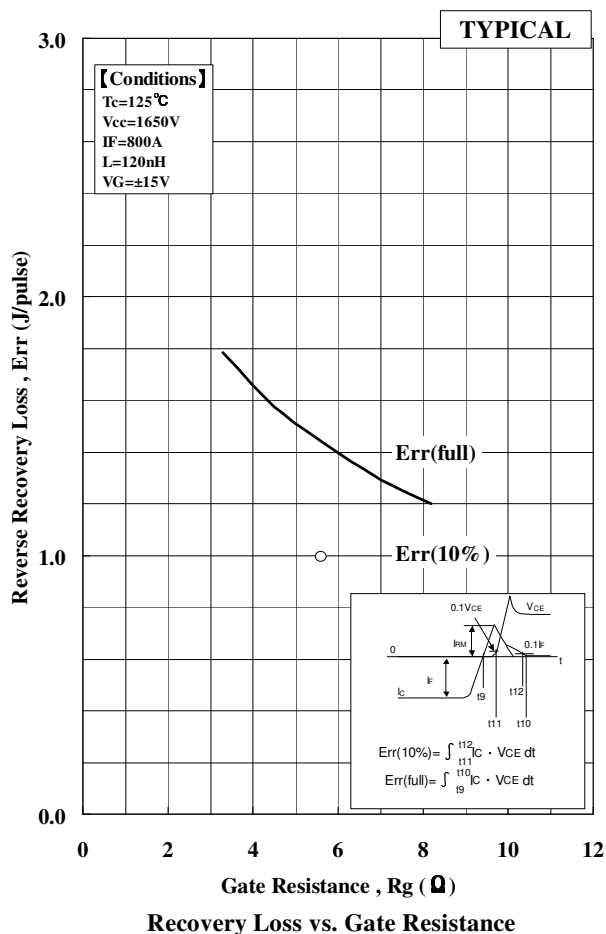
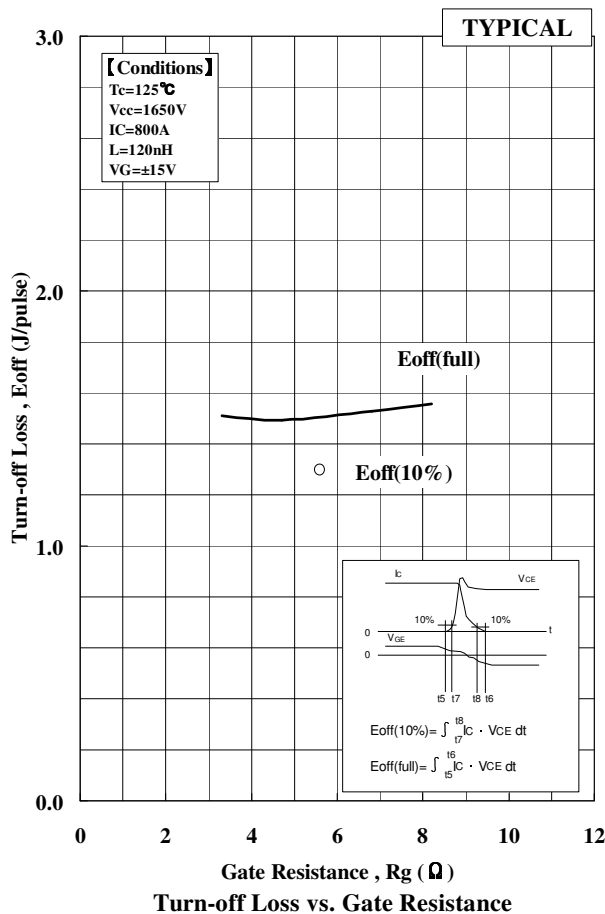
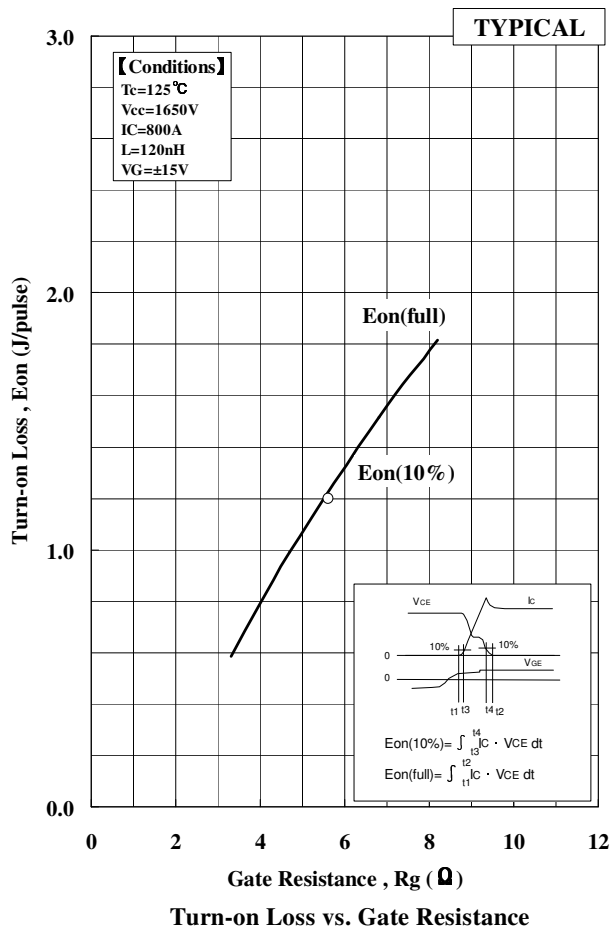
Turn-off Loss vs. Collector Current



Recovery Loss vs. Collector Current

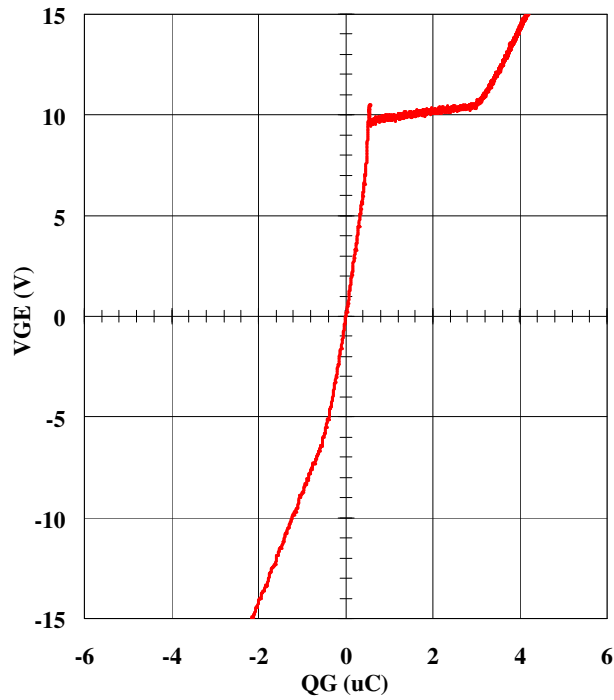


Switching time vs. Collector current



TYPICAL

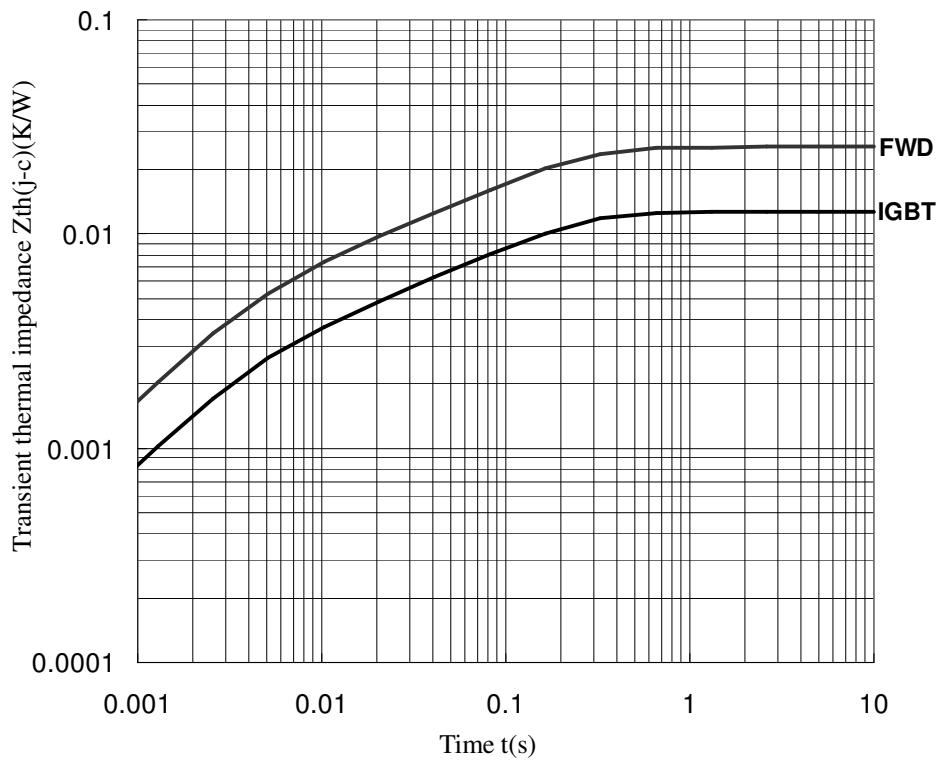
Conditions: $L_s=120\text{nH}$, $V_{CC}=1650\text{V}$, $V_{GE}=\pm 15\text{V}$,
 $R_{G(\text{on/off})}=68\ \Omega / 68\ \Omega$, $T_j=25\text{C}$,



QG-VGE curve

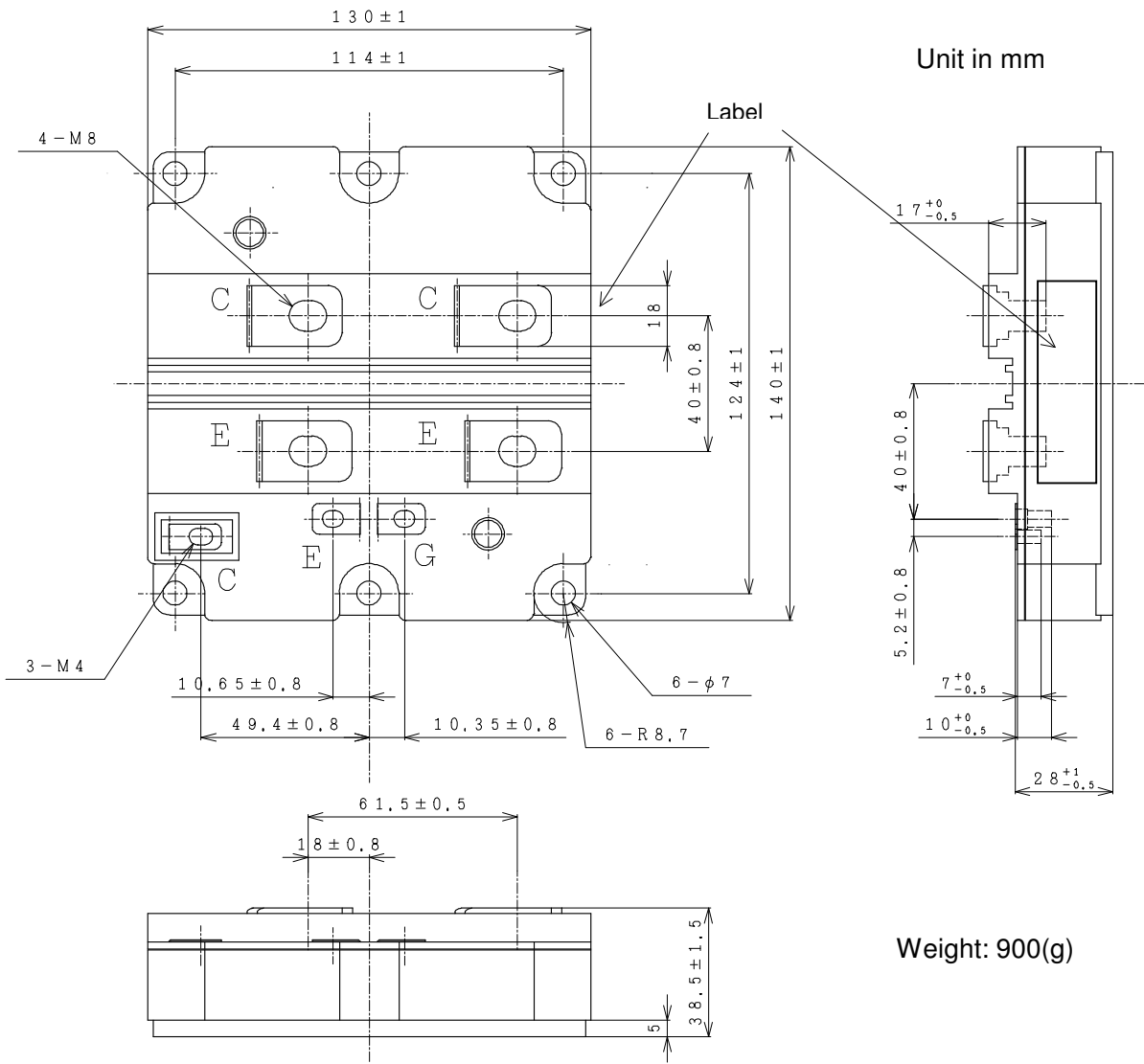
4. TRANSIENT THERMAL IMPEDANCE

Maximum



Transient Thermal Impedance Curve

5. OUTLINE DRAWINGS



Weight: 900(g)

Fig.4 Outline Drawings

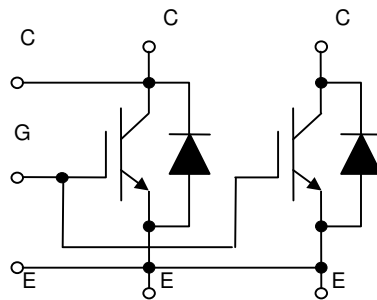


Fig.5 Circuit diagram

6. Negative environmental impact material

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

Material	Contained part
Lead (Pb) and its compounds	Solder
Arsenic and its compounds	Si chip

HITACHI POWER SEMICONDUCTORS

Notices

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