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 Tc=70K, N>30,000cycles)
  AlSiC base-plate/AlN substrate

ABSOLUTE MAXIMUM RATINGS (Tc=25°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	A	800
	1ms	I_{Cp}		1,600
Forward Current	DC	I_F	A	800
	1ms	I_{FM}		1,600
Junction Temperature		T_j	°C	-40 ~ +125
Storage Temperature		T_{stg}	°C	-40 ~ +125
Isolation Voltage		V_{ISO}	V_{RMS}	6,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	N·m	2/15 (1)
	Mounting (M6)	-		6 (2)

Notes: (1) Recommended Value 1.8±0.2/15$^{+0}_{-3}$N·m (2) Recommended Value 5.5±0.5N·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, Tj=25°C
				-	14	40	V_{CE}=3,300V, 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	4.2	I_C=800A, V_{GE}=15V, Tj=125°C
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	4.5	6.0	7.0	V_{CE}=10V, I_C=800mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	70	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		Rg(int)	Ω	-	2.0	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	µs	1.1	2.1	3.1	V_{CC}=1,650V, Ic=800A
	Turn On Time	t_{on}		1.7	2.5	3.3	L=120nH
	Fall Time	t_f		1.3	2.2	3.1	R_G=5.6Ω (3)
	Turn Off Time	t_{off}		2.7	4.2	5.7	V_{GE}=±15V, Tj=125°C
Peak Forward Voltage Drop		V_{FM}	V	2.0	2.5	3.0	IF=800A, V_{GE}=0V, Tj=125°C
Reverse Recovery Time		t_{rr}	µs	0.2	0.7	1.2	V_{CC}=1,650V, IF=800A, L=120nH Tj=125°C
Turn On Loss		$E_{on(10\%)}$	J/P	-	1.2	1.6	V_{CC}=1,650V, Ic=800A, L=120nH
Turn Off Loss		$E_{off(10\%)}$	J/P	-	1.3	1.7	R_G=5.6Ω (3)
Reverse Recovery Loss		$E_{rr(10\%)}$	J/P	-	1.0	1.5	V_{GE}=±15V, Tj=125°C
Stray inductance in module		L_{SCE}	nH	-	18	-	Collector-main to Emitter-main
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.013	Junction to case
	FWD	Rth(j-c)		-	-	0.026	
Contact Thermal Impedance		Rth(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.

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MBN800E33E

DEFINITION OF TEST CIRCUIT

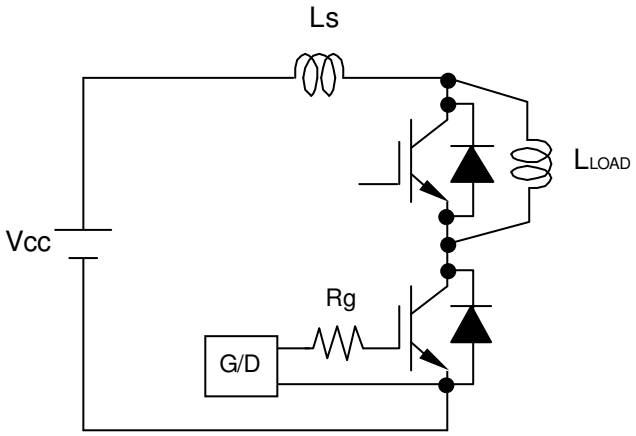
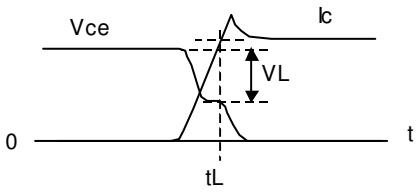
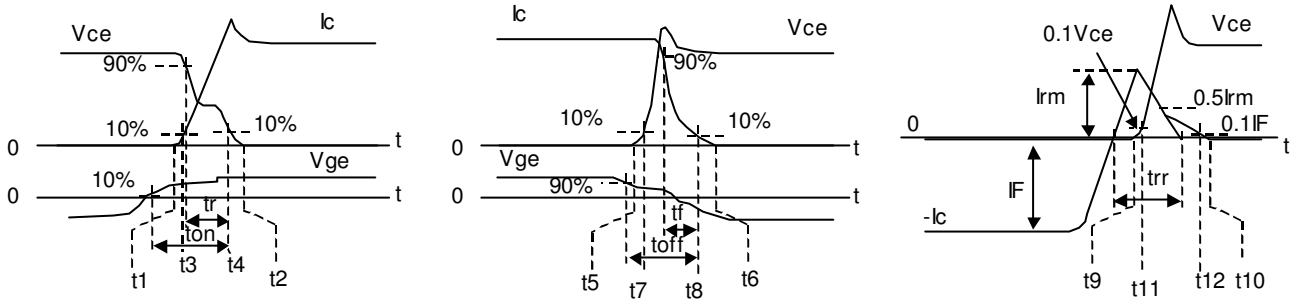


Fig.1 Switching test circuit



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

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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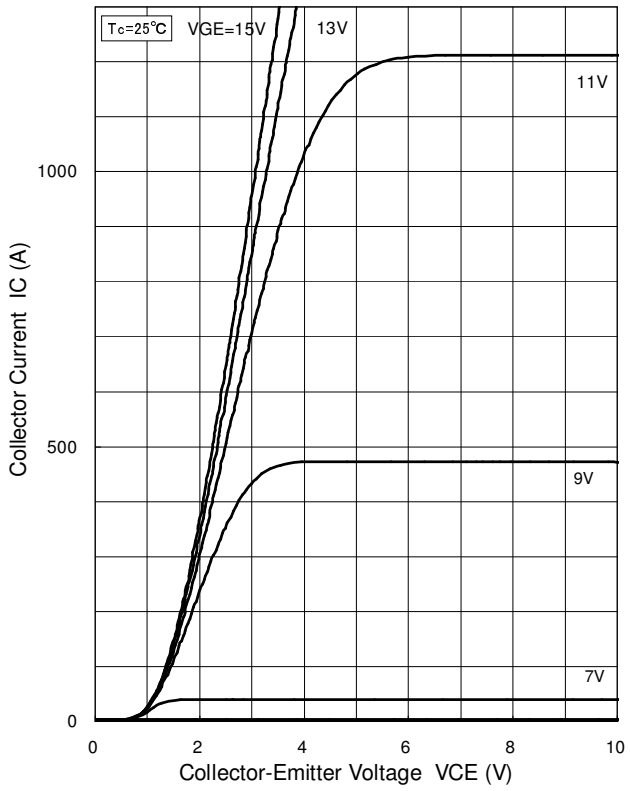
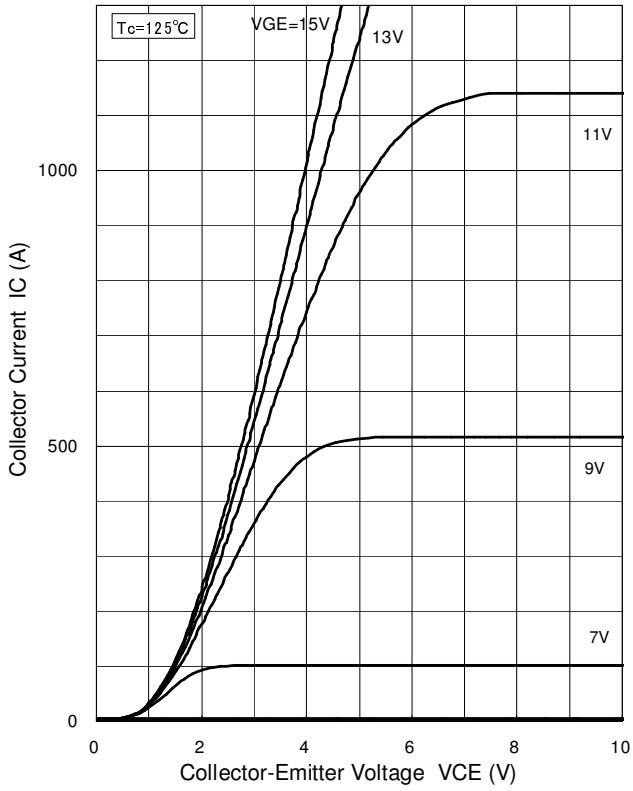
STATIC CHARACTERISTICS

TYPICAL



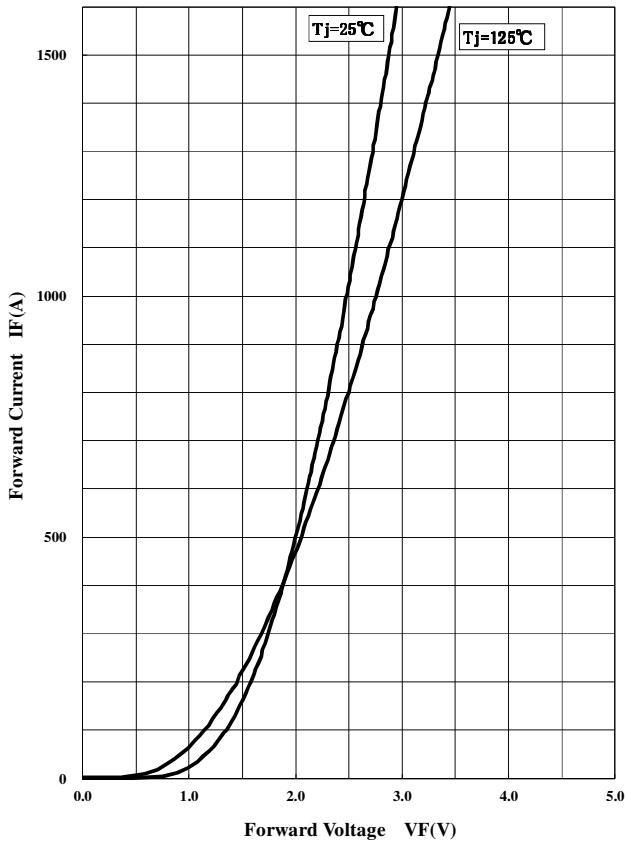
Collector Current vs. Collector to Emitter Voltage

TYPICAL



Collector Current vs. Collector to Emitter Voltage

TYPICAL



Forward Voltage of free-wheeling diode

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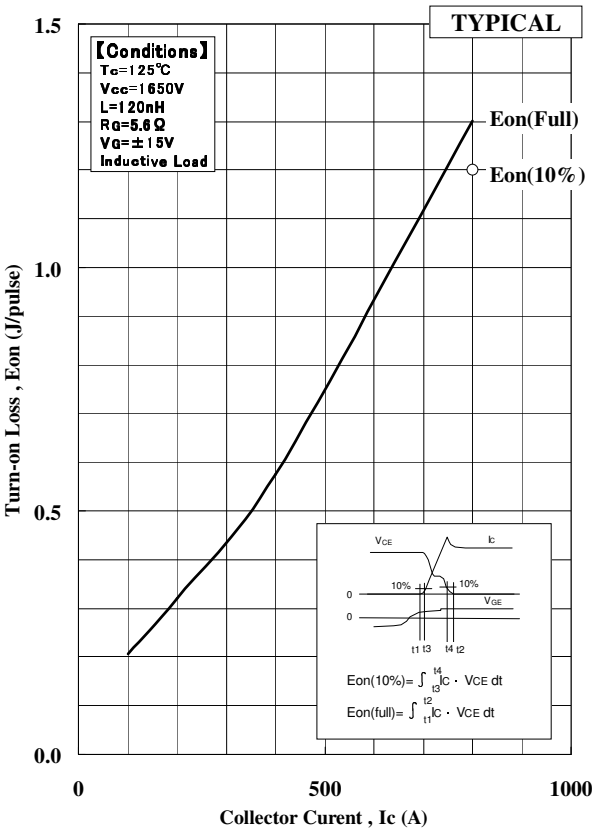
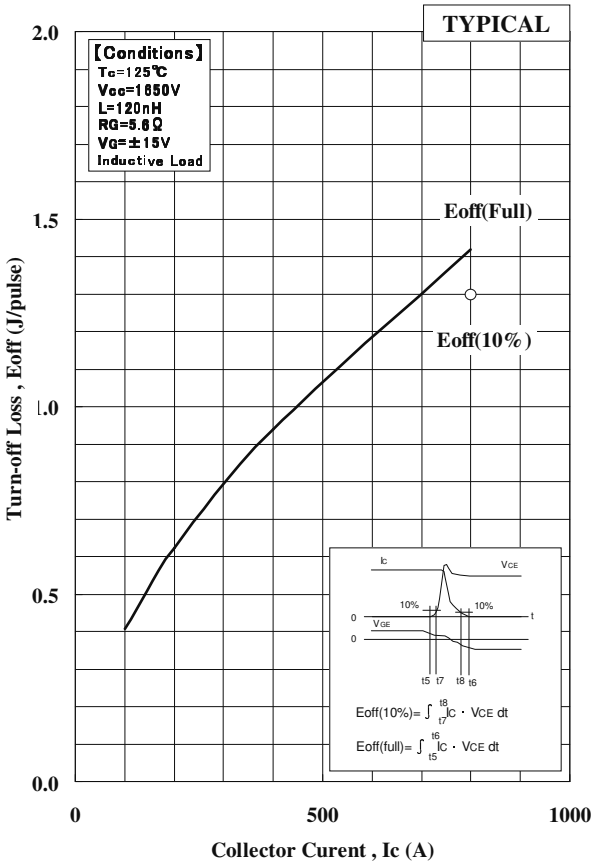
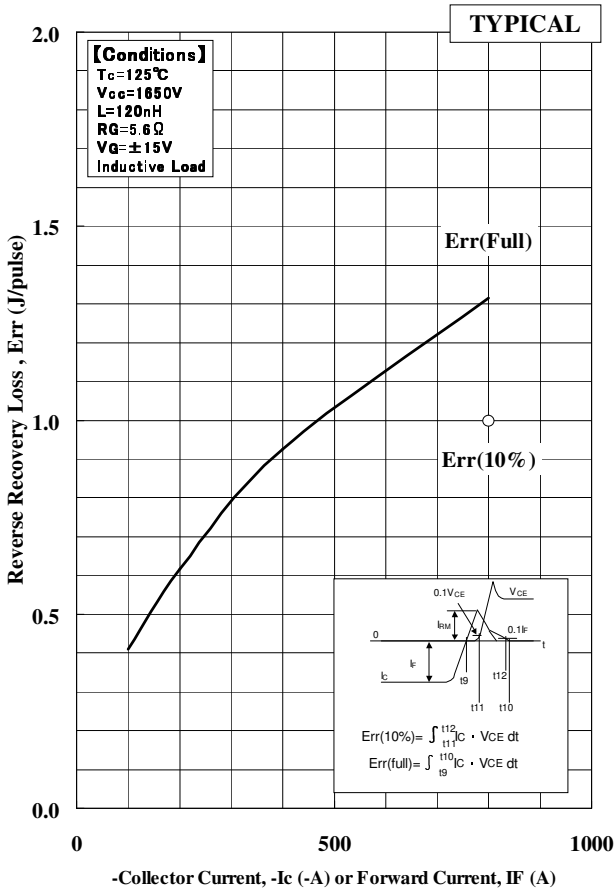
DYNAMIC CHARACTERISTICS



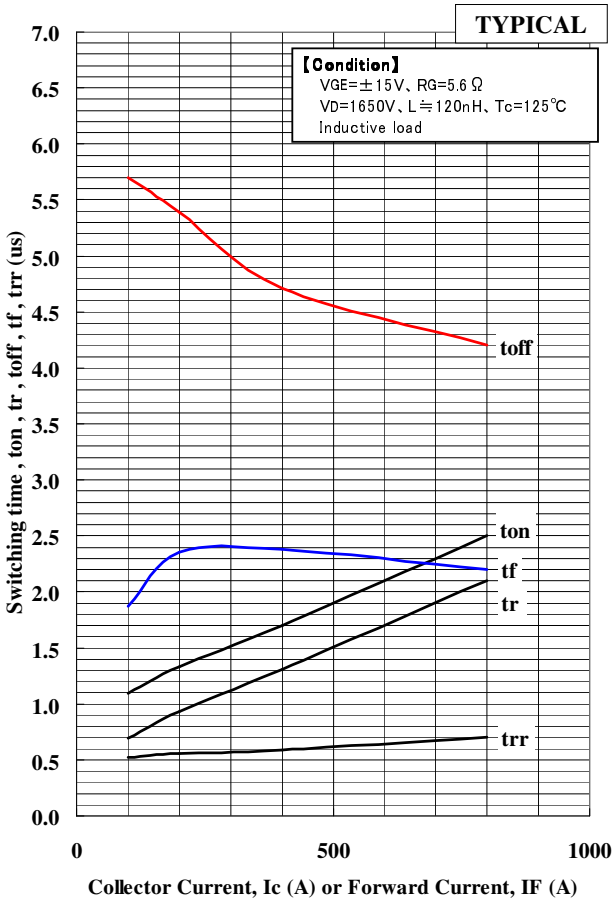
Turn-on Loss vs.Collector Current



Turn-off Loss vs.Collector Current



Recovery Loss vs.Collector Current



Switching time vs. Collector current

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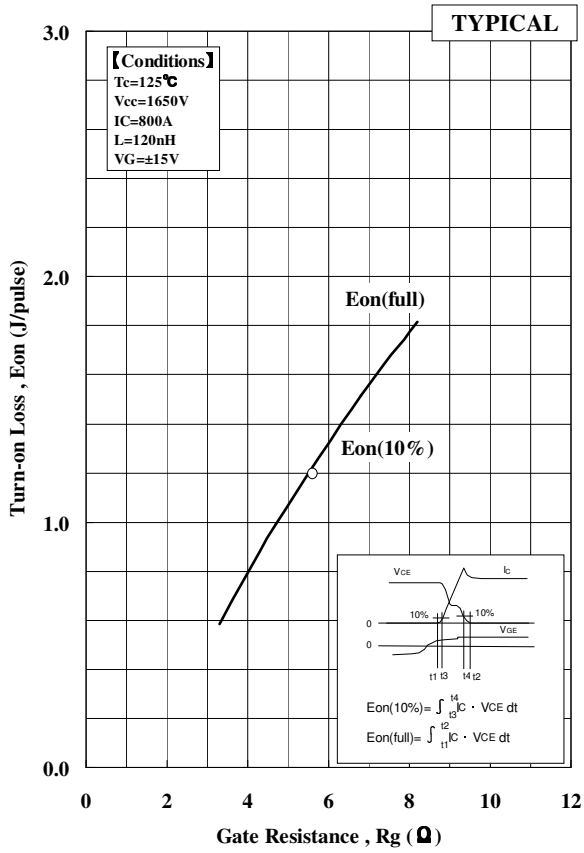
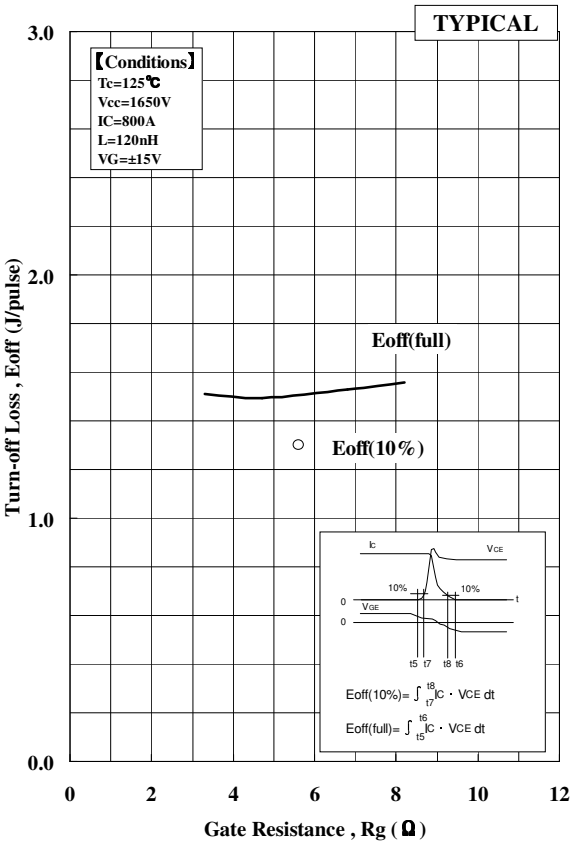
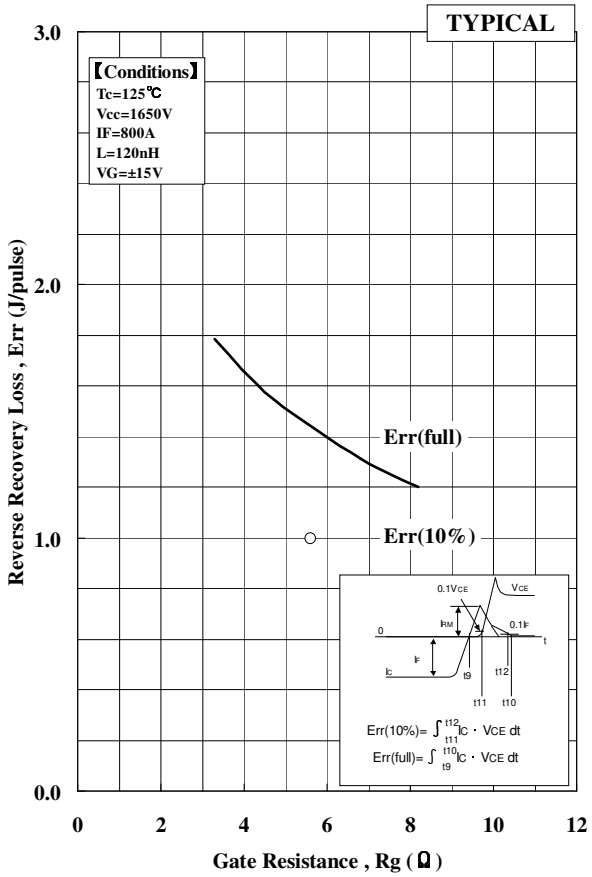


Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance



Recovery Loss vs. Gate Resistance

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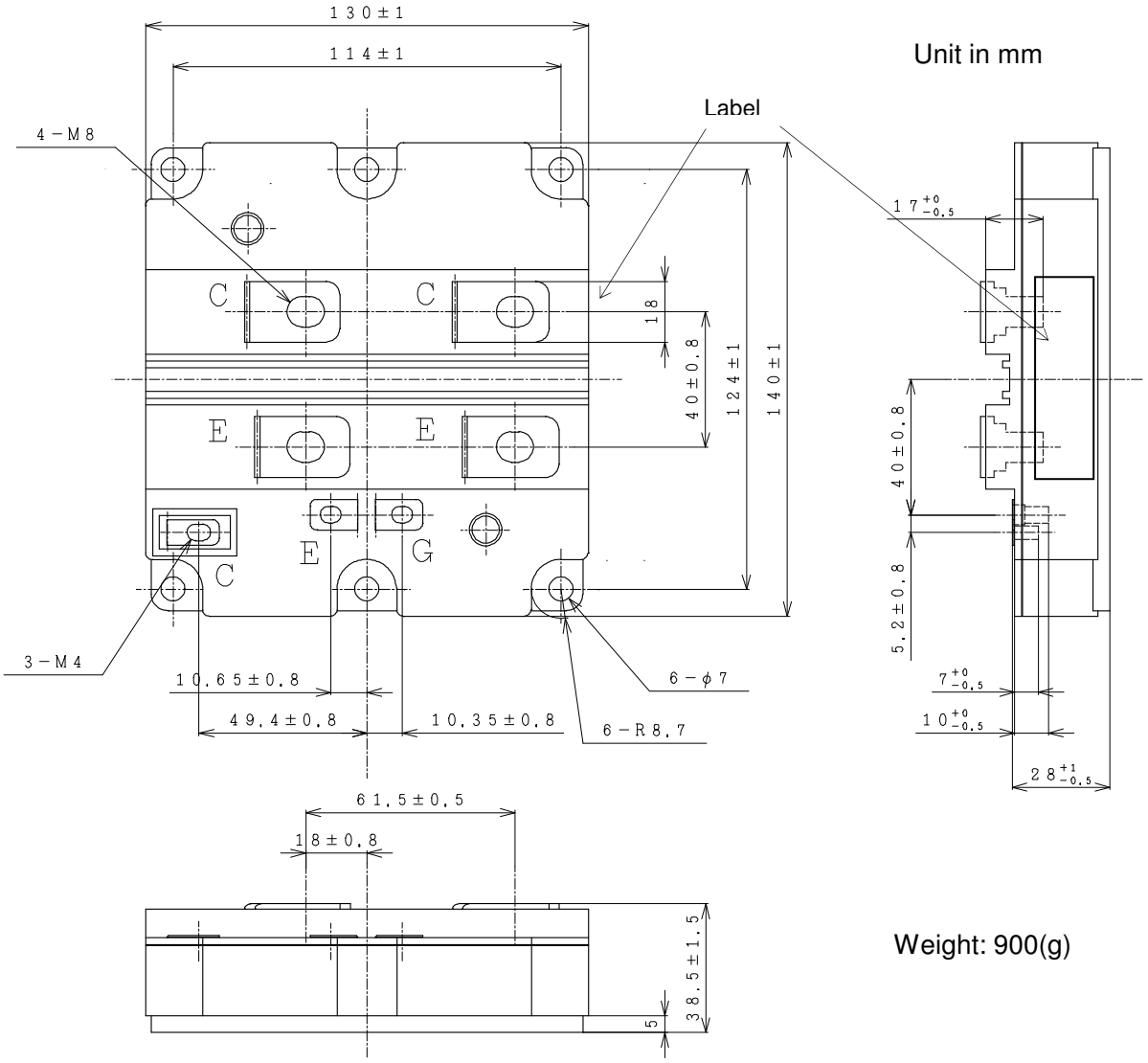
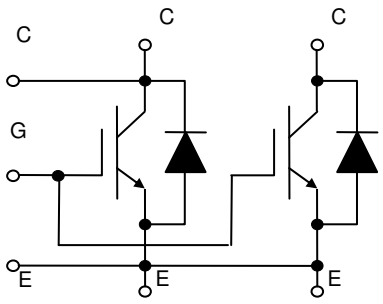
OUTLINE DRAWINGS



Weight: 900(g)

CIRCUIT DIAGRAM



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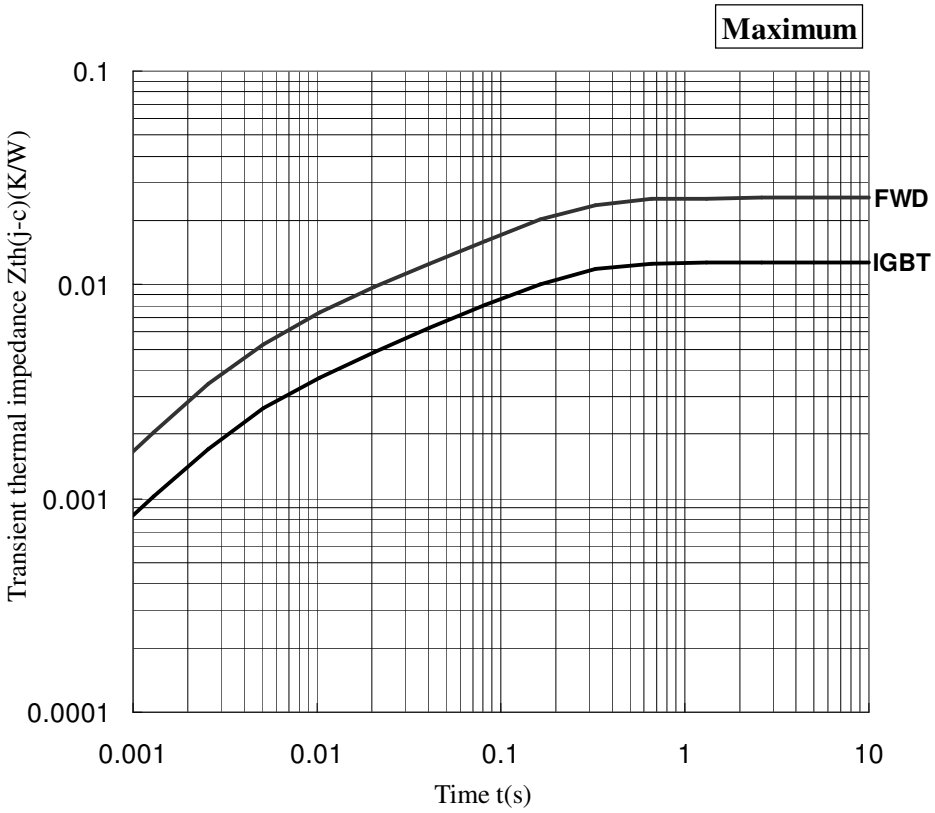
TRANSIENT THERMAL IMPEDANCE



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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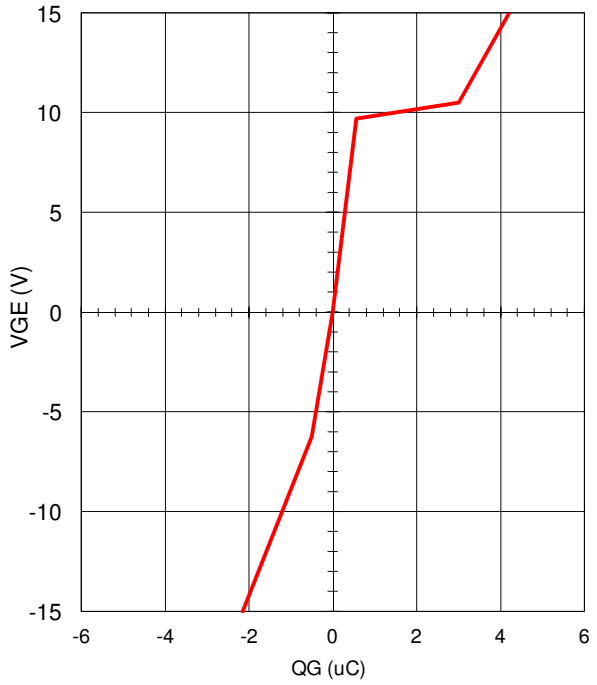
QG-VG CURVE

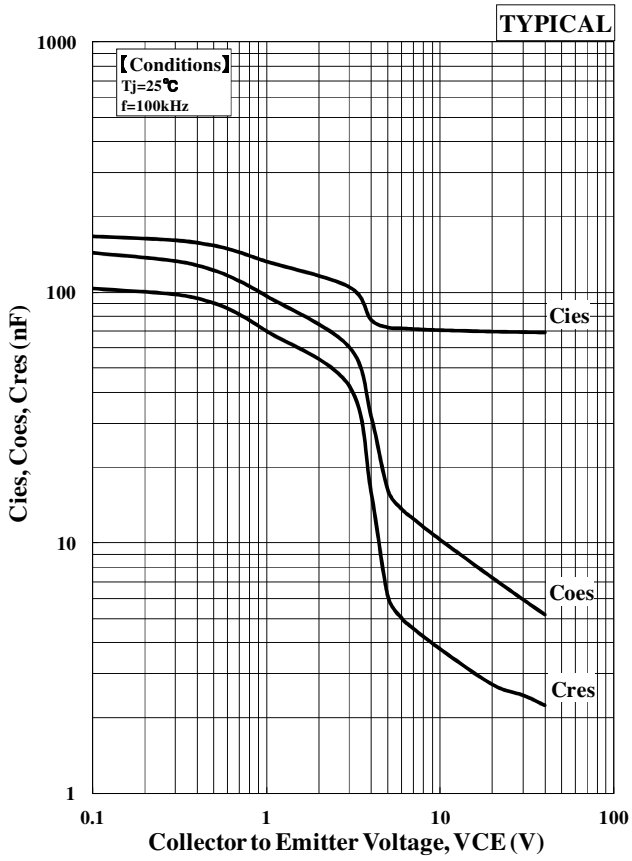
TYPICAL

Conditions:Ls=120nH,VCC=1650V,VGE=+/-15V,
RG(on/off)=68Ω/68Ω,Tj=25°C,



QG-VGE curve

Cies, Coes, Cres curve



Capacitance vs. Collector to Emitter Voltage

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HITACHI POWER SEMICONDUCTORS

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