MBN1200F33F-C

Preliminary Specification

3300V Silicon N-channel IGBT F version with SiC Diode

FEATURES

- Soft switching & low conduction loss IGBT :
  Soft low-injection punch-through
  High conductivity IGBT with advanced trench MOS gate.
- Low driving power due to low input capacitance.
- Ultra low recovery loss with SiC diode.
- High Current rate Package.
- Low stray inductance.
- RoHS

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBN1200F33F-C
Collector Emitter Voltage		V_{CES}	V	3,300
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1,200
	1ms	I_{Cp}		2,400
Forward Current	DC	I_F	A	1,200
	1ms	I_{FM}		2,400
Junction Temperature		T_j	°C	-40 ~ +150
Storage Temperature		T_{stg}	°C	-40 ~ +150
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	V_{CE}=3,300V, V_{GE}=0V, Tj=25°C
				-	25	-	V_{CE}=3,300V, V_{GE}=0V, Tj=150°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	-	2.85	-	I_C=1200A, V_{GE}=15V, Tj=150°C
Gate Emitter Threshold Voltage		$V_{GE(TO)}$	V	-	6.5	-	V_{CE}=10V, I_C=1200mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	88	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		Rg(int)	Ω	-	1.9	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	μs	-	0.2	-	V_{CC}=1,800V, Ic=1200A
	Turn On Time	t_{on}		-	1.1	-	Ls=100nH
	Fall Time	t_f		-	2.0	-	R_G(on/off)=6.8/6.8Ω (3)
	Turn Off Time	t_{off}		-	4.2	-	V_{GE}=±15V, Tj=150°C
Peak Forward Voltage Drop		V_{FM}	V	-	4.75	-	IF=1200A, V_{GE}=0V, Tj=150°C
Reverse Recovery Time		t_{rr}	μs	-	0.1	-	V_{CC}=1,800V, IF=1200A, Ls=100nH Tj=150°C
Turn On Loss		E_{on}	J/P	-	1.4	-	V_{CC}=1,800V, Ic(IF)=1200A, Ls=100nH
Turn Off Loss		E_{off}	J/P	-	2.2	-	R_G(on/off)=6.8/6.8Ω (3)
Reverse Recovery Loss		E_{rr}	J/P	-	(0.1)	-	V_{GE}=±15V, Tj=150°C
Stray inductance module		L_{SCE}	nH	-	10	-	
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.010	Junction to case
	FWD	Rth(j-c)		-	-	(0.017)	
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.
* ELECTRICAL CHARACTERISTIC values according to IEC 60747–2 and IEC 60747–9

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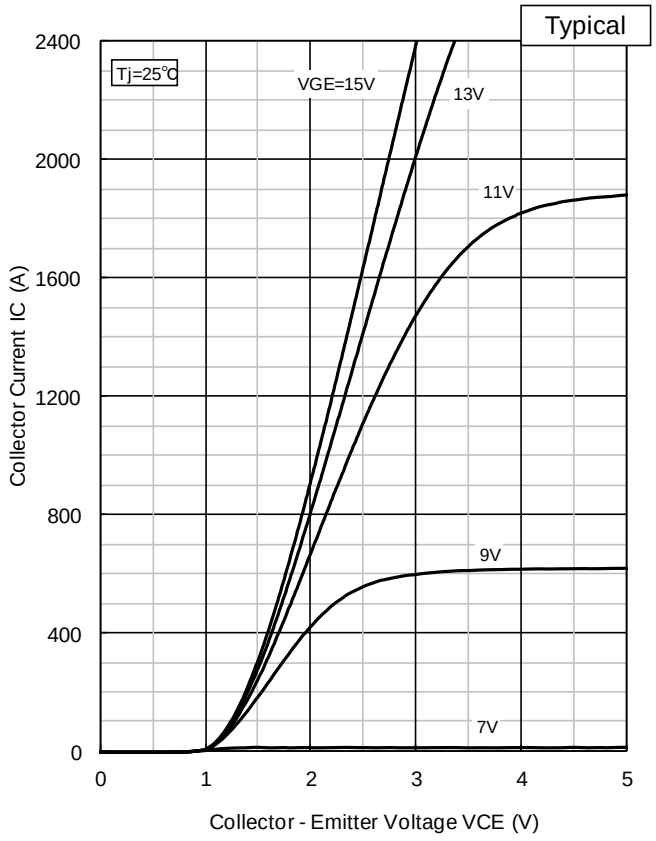
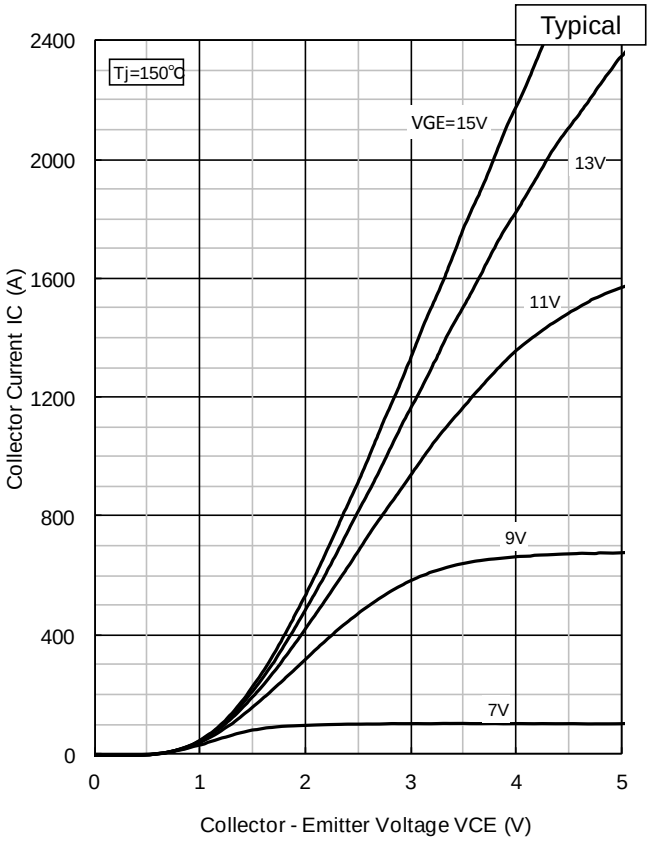
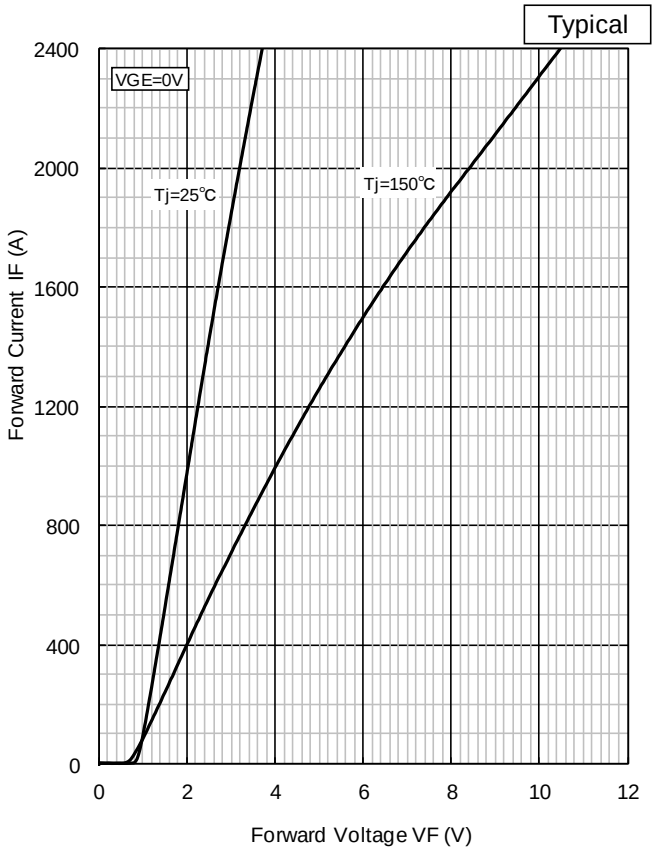


IC vs. VCE (Tj=25°C)



IC vs. VCE(Tj=150°C)



IF vs. VF

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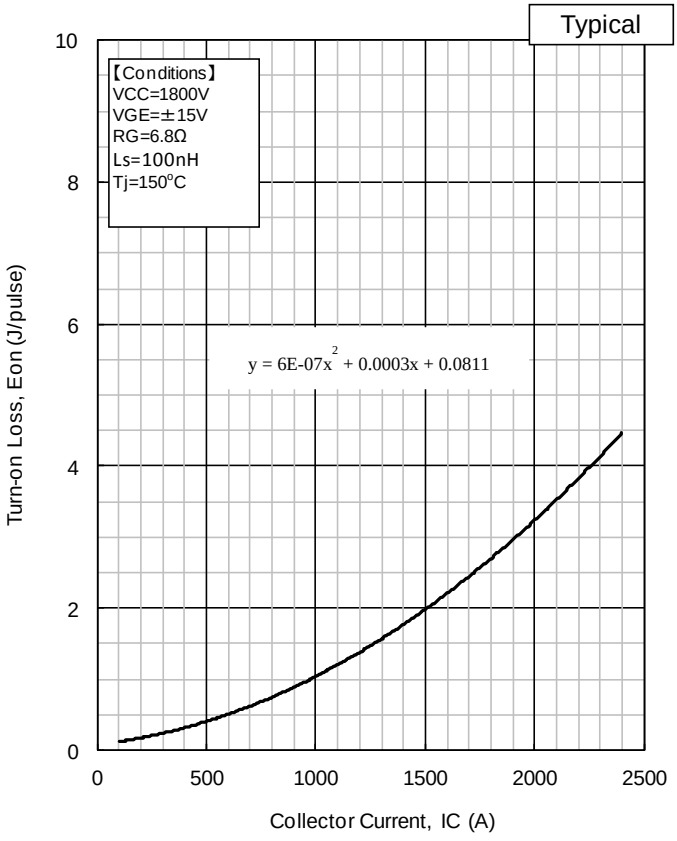
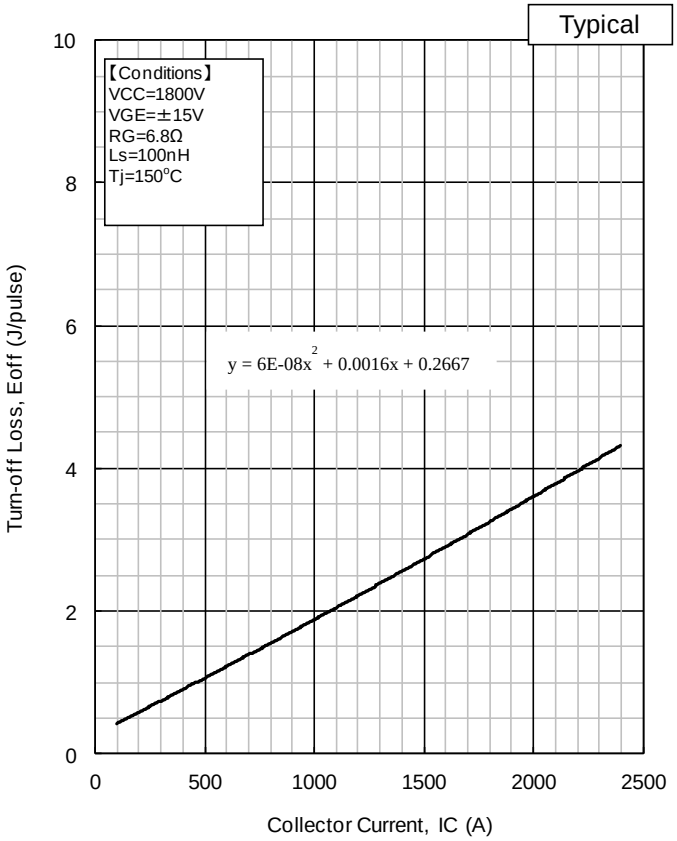
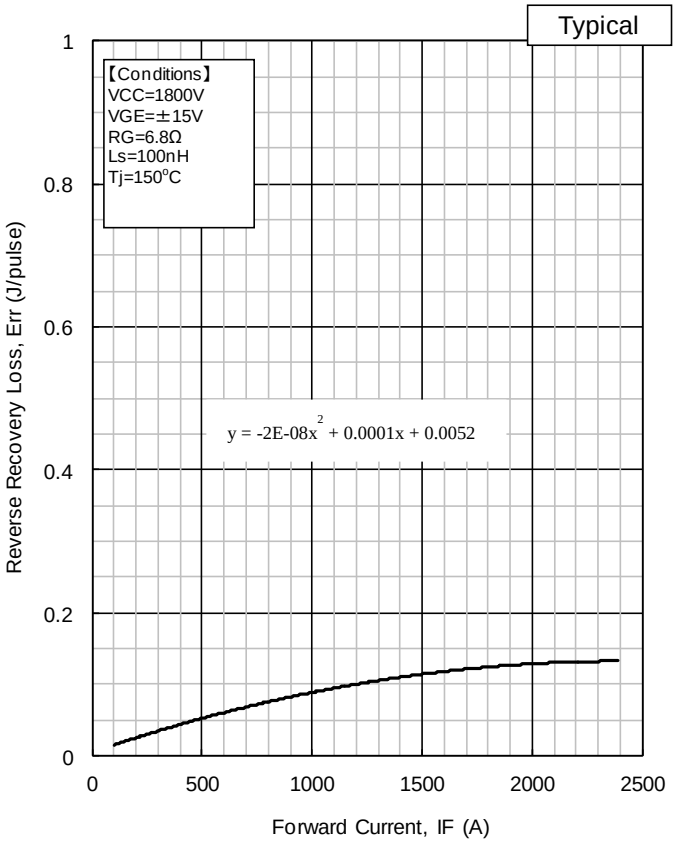


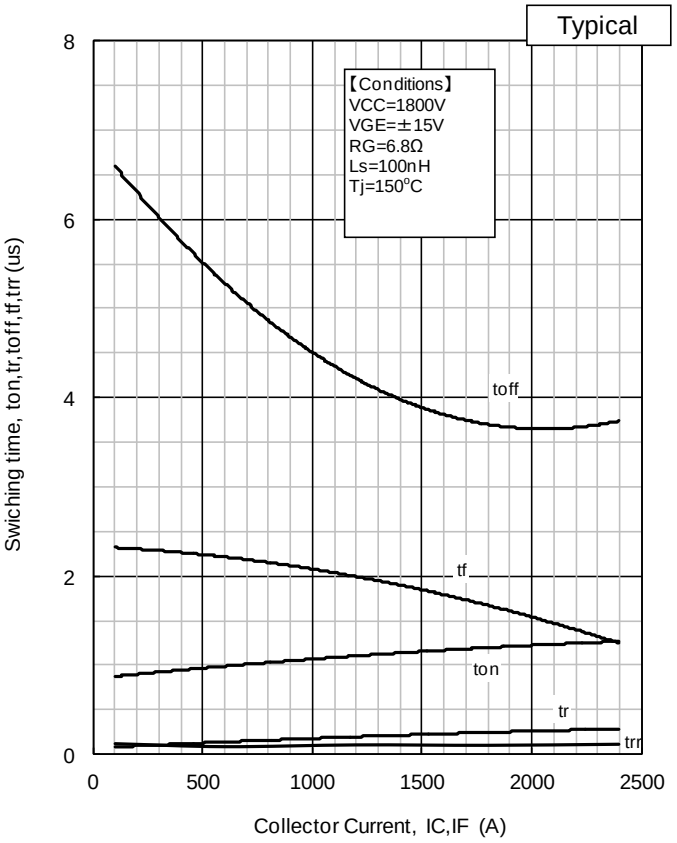
Turn-on loss vs. Collector current



Turn-off loss vs. Collector current



Recovery loss vs. Forward current



Switching time vs. Collector current

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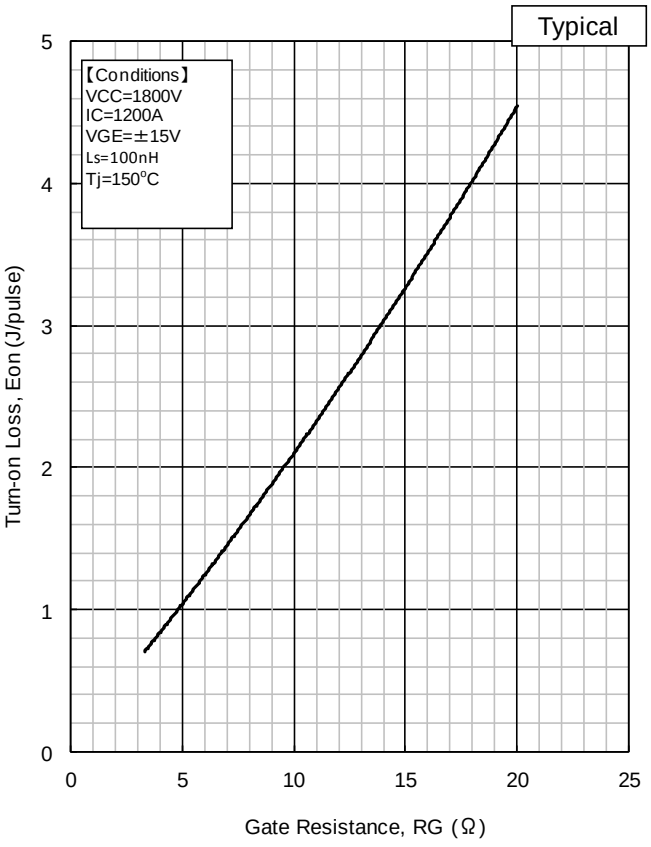
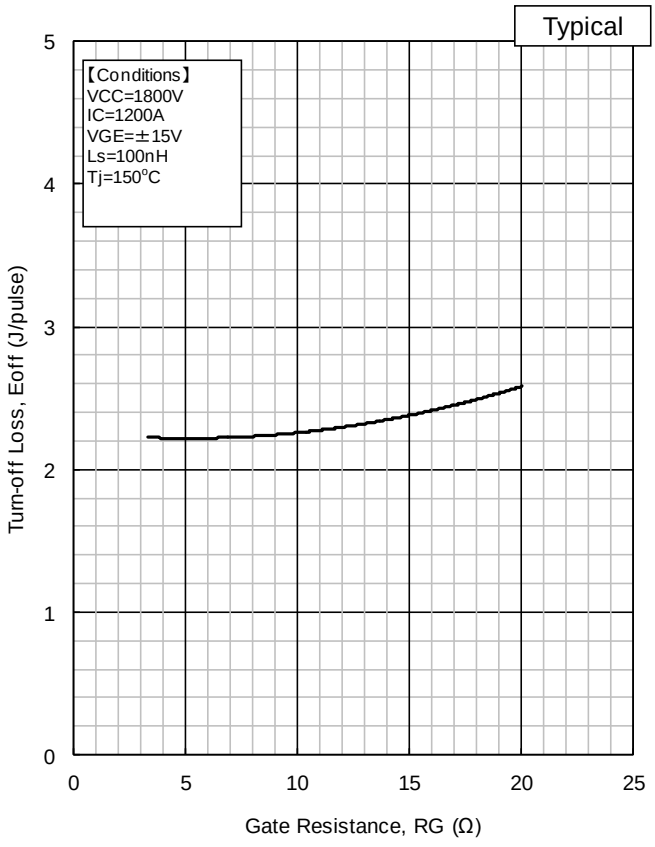
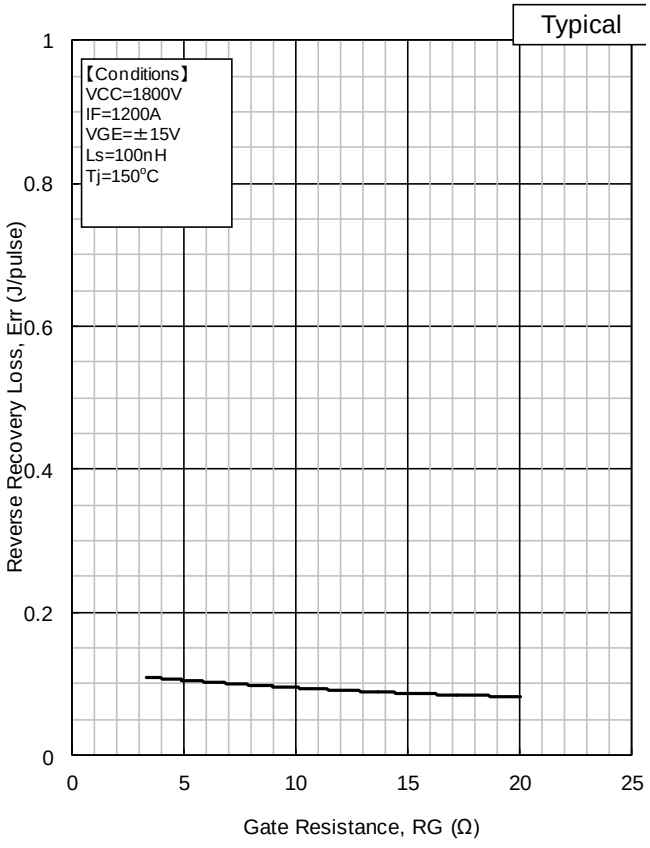


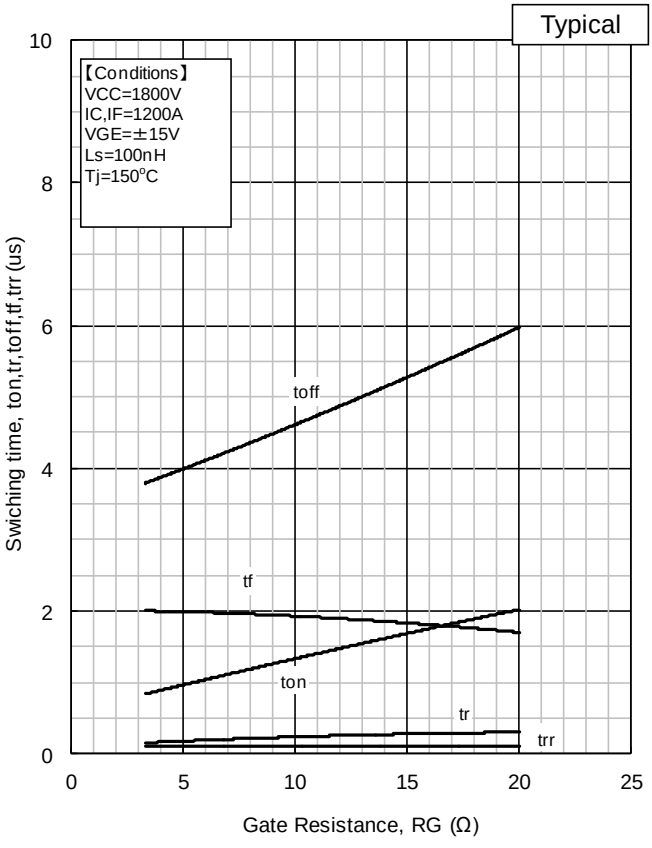
Turn-on loss vs. Gate Resistance



Turn-off loss vs. Gate Resistance



Recovery loss vs. Gate Resistance



Switching time vs. Gate Resistance

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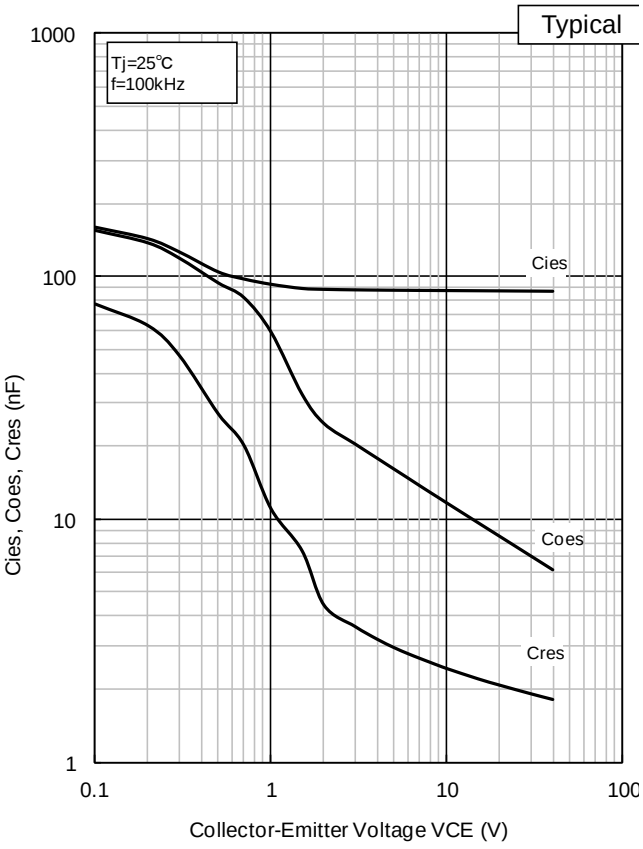
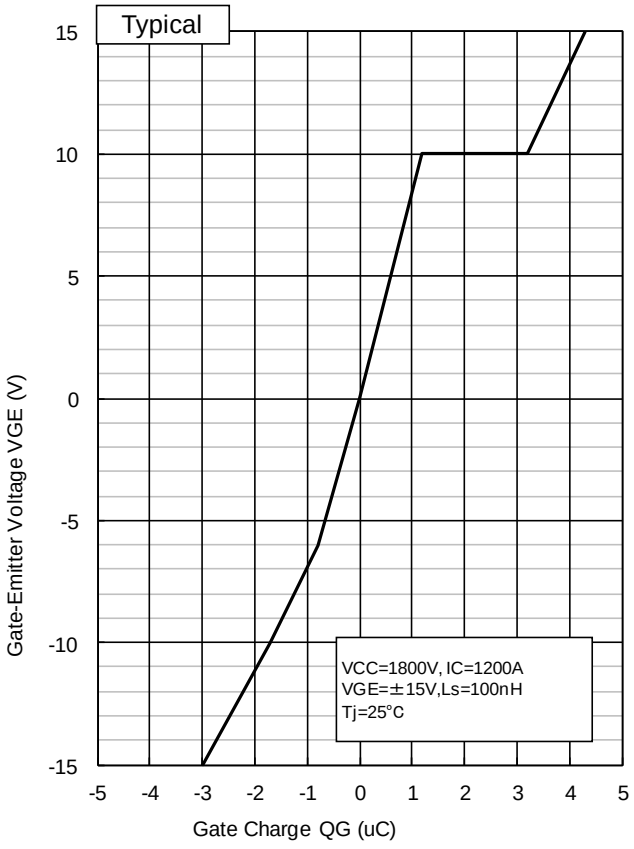
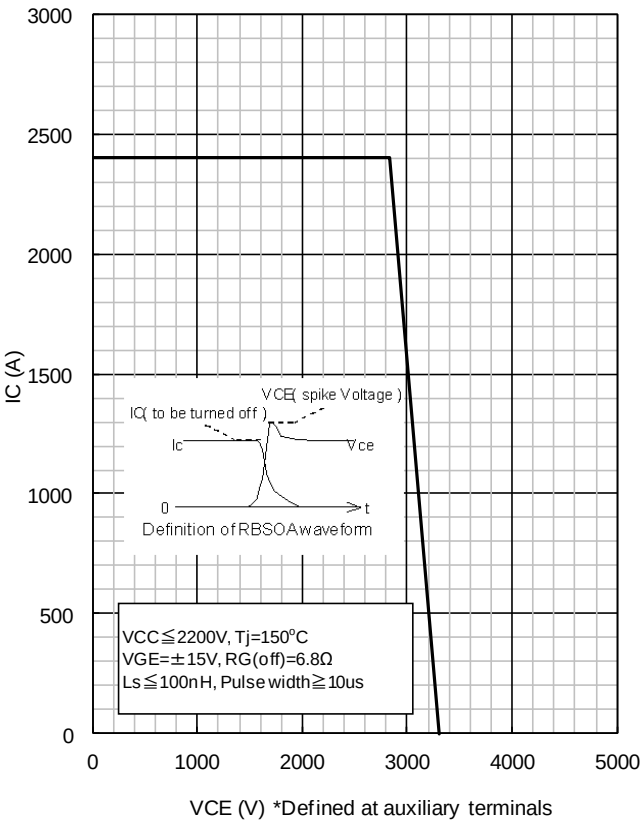


Cies, Coes, Cres - VCE



QG - VGE



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OUTLINE DRAWINGS

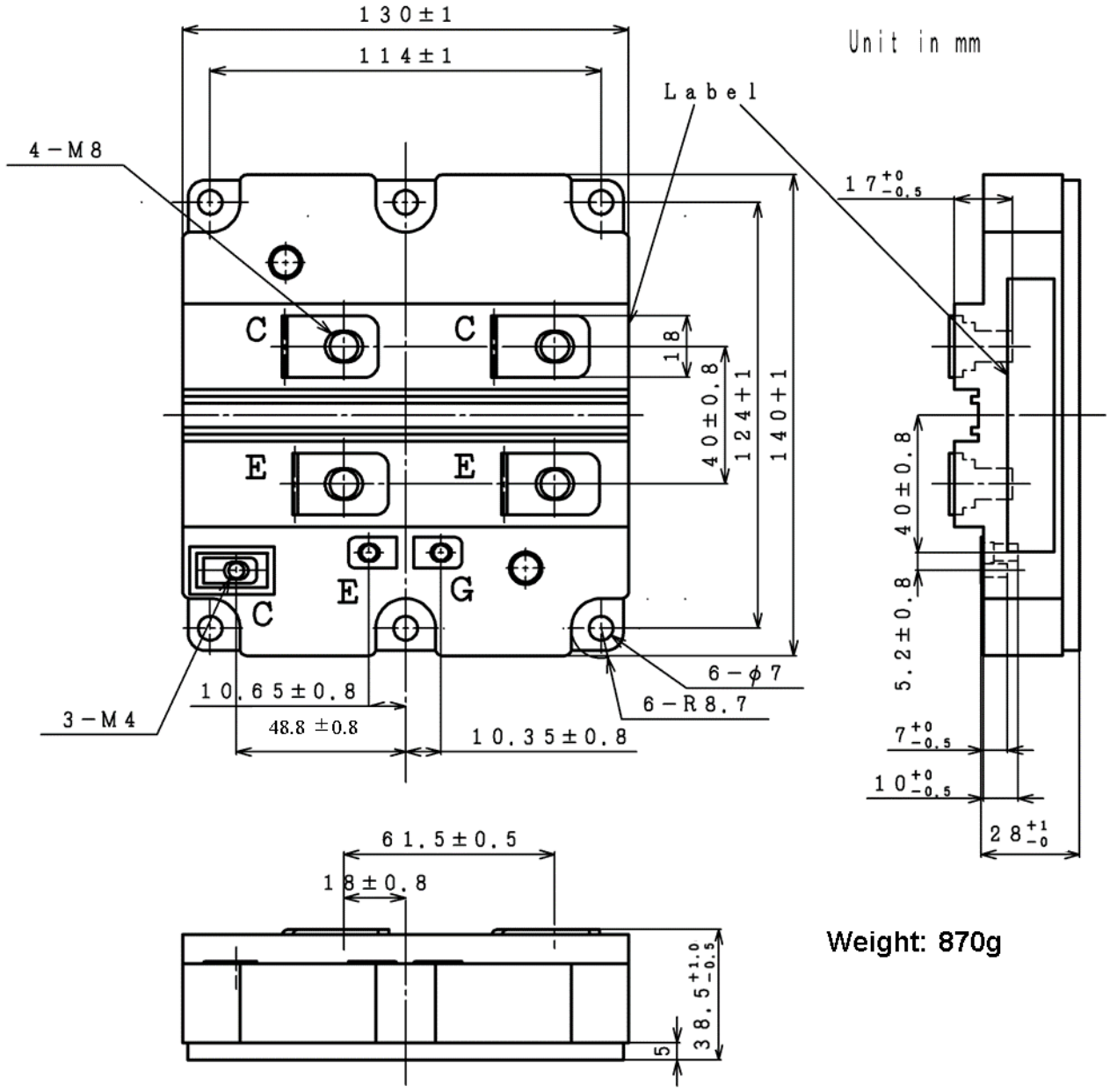

Fig.1 Outline Drawings

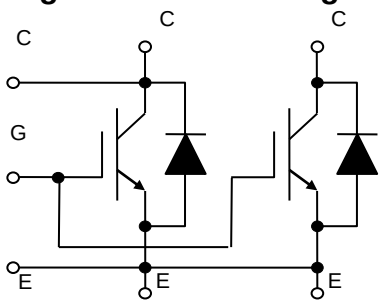

Fig.2 Circuit diagram

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HITACHI POWER SEMICONDUCTORS

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