MBN1800F33F

Silicon N-channel IGBT 3300V F version

FEATURES

- Soft switching behavior, low switching loss & low conduction loss :
  Soft low-injection punch-through
  Advanced Trench High conductivity IGBT.
- Low driving power due to low input capacitance with trench MOS gate.
- Low noise recovery: Ultra soft fast recovery diode.
- High Current rate Package.
- Low Rth(j-c) & low stray inductance.
- RoHS
- High thermal fatigue durability: (delta Tc=70K, N>30,000cycles)

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBN1800F33F
Collector Emitter Voltage		V_{CES}	V	3,300
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1,800
	1ms	I_{CRM}		3,600
Forward Current	DC	I_F	A	1,800
	1ms	I_{FRM}		3,600
Junction Temperature		T_j	°C	-50 ~ +150
Storage Temperature		T_{stg}	°C	-55 ~ +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 $1.8\pm0.2/15^{+0}_{-3}$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	-	-	0.6	V_{CE}=3,300V, V_{GE}=0V, Tj=25°C
				-	40	100	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_{CEsat}	V	2.5	2.85	3.5	I_C=1800A, V_{GE}=15V, Tj=150°C
Gate Emitter Threshold Voltage		$V_{GE(th)}$	V	5.5	6.5	7.5	V_{CE}=10V, I_C=1800mA, Tj=25°C
Input Capacitance		C_{ies}	nF	-	132	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Internal Gate Resistance		r_g	Ω	-	1.3	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, Tj=25°C
Switching Times	Rise Time	t_r	μs	-	0.3	-	V_{CC}=1,800V, Ic=1800A
	Turn On Time	t_{on}		-	1.1	-	Ls=80nH
	Fall Time	t_f		-	1.8	-	R_G(on/off)=4.7Ω/5.6Ω (3)
	Turn Off Time	t_{off}		-	4.0	-	V_{GE}=±15V, Tj=150°C
Peak Forward Voltage Drop		V_F	V	2.2	2.6	2.9	IF=1800A, V_{GE}=0V, Tj=150°C
Reverse Recovery Time		t_{rr}	μs	-	0.7	-	V_{CC}=1,800V, IF=1800A, Ls =80nH Tj=150°C
Turn On Loss		E_{on}	J/P	-	3.7	-	V_{CC}=1,800V, Ic=1800A, Ls =80nH
Turn Off Loss		E_{off}	J/P	-	3.3	-	R_G(on/off)=4.7Ω/5.6Ω (3)
Reverse Recovery Loss		E_{rr}	J/P	-	2.4	-	V_{GE}=±15V, Tj=150°C
Stray inductance module		L_{SCE}	nH	-	7	-	
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.0067	Junction to case
	FWD	Rth(j-c)		-	-	0.012	
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.005	-	Case to fin
I^2t value		I^2t	kA^2s	1000	-	-	$T_{j,start}$=150°C, 10ms, V_R=0V, half-sinewave

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 IEC 60747–9

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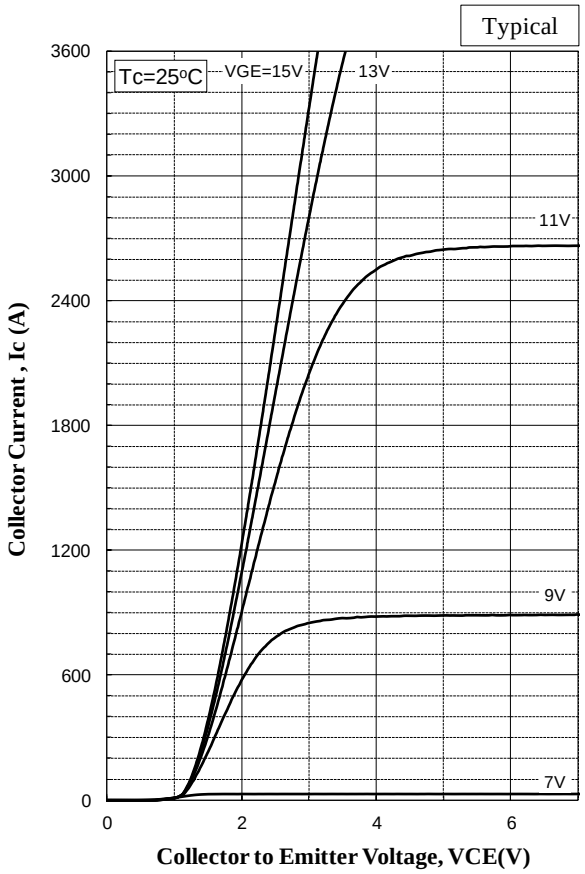
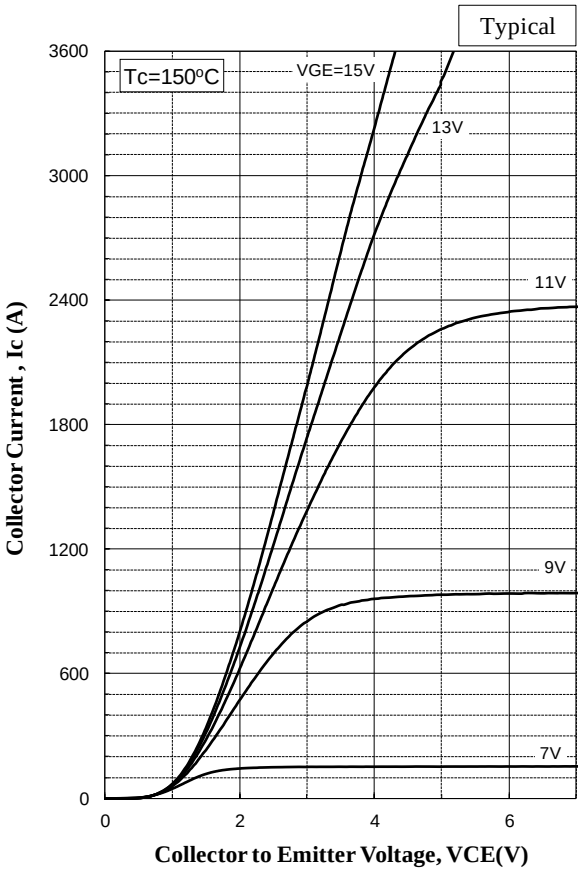
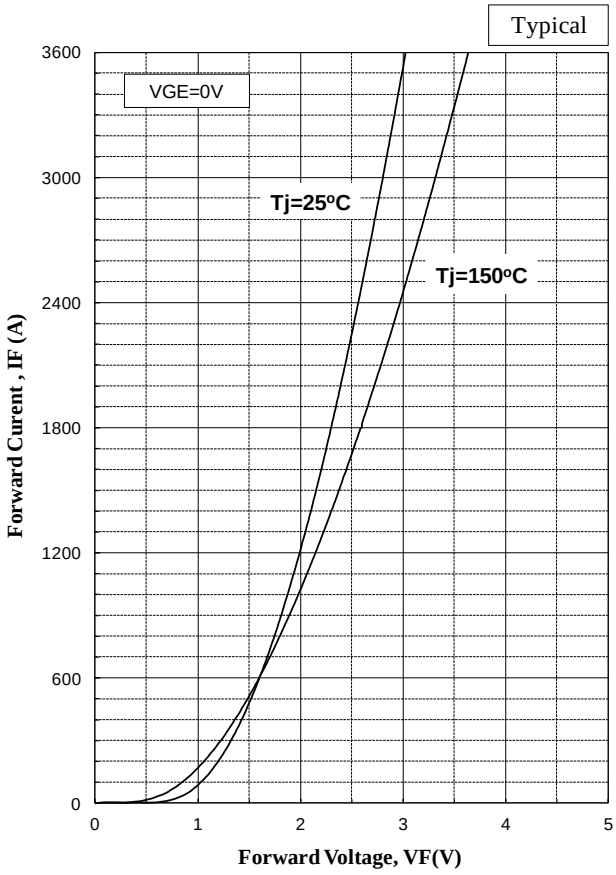
STATIC CHARACTERISTICS



Collector Current vs.Collector to Emitter Voltage



Collector Current vs.Collector to Emitter Voltage



Forward Voltage of free-wheeling diode

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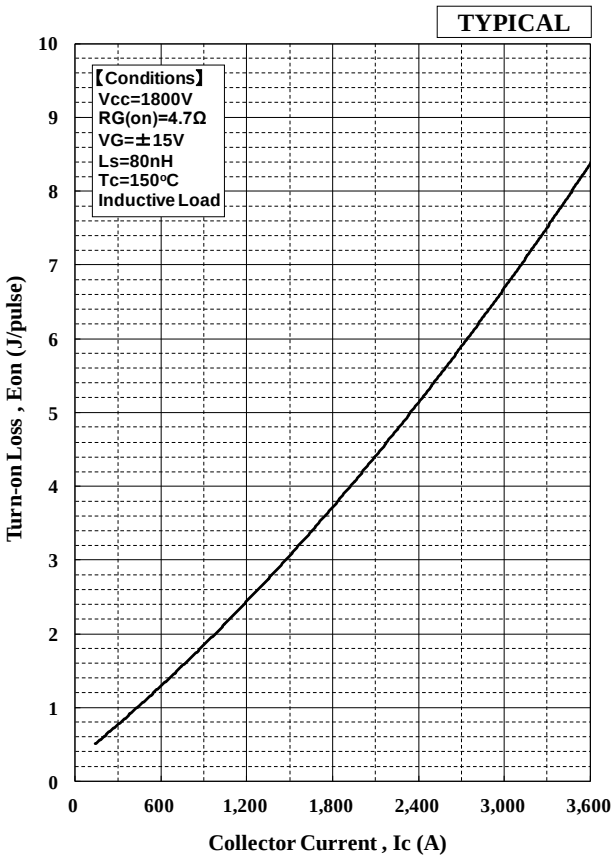
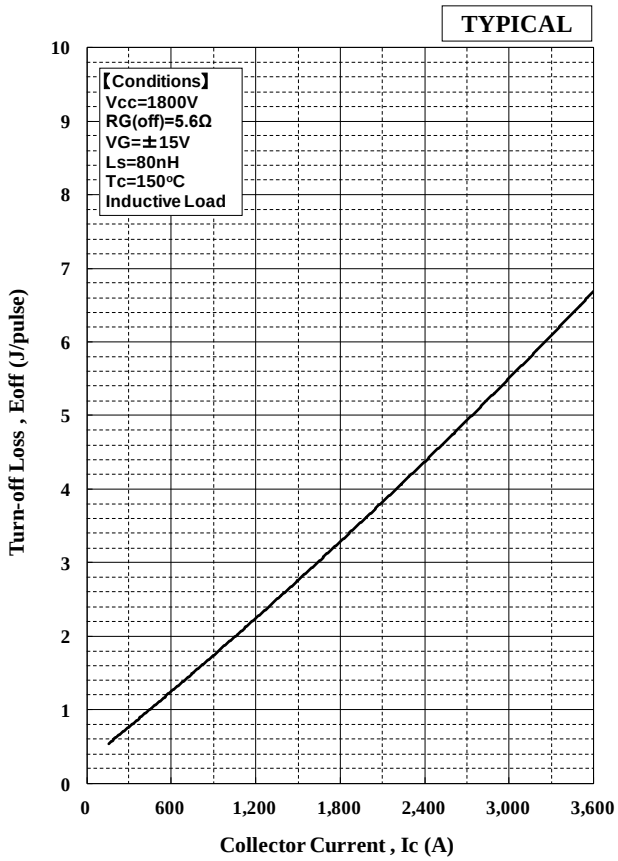
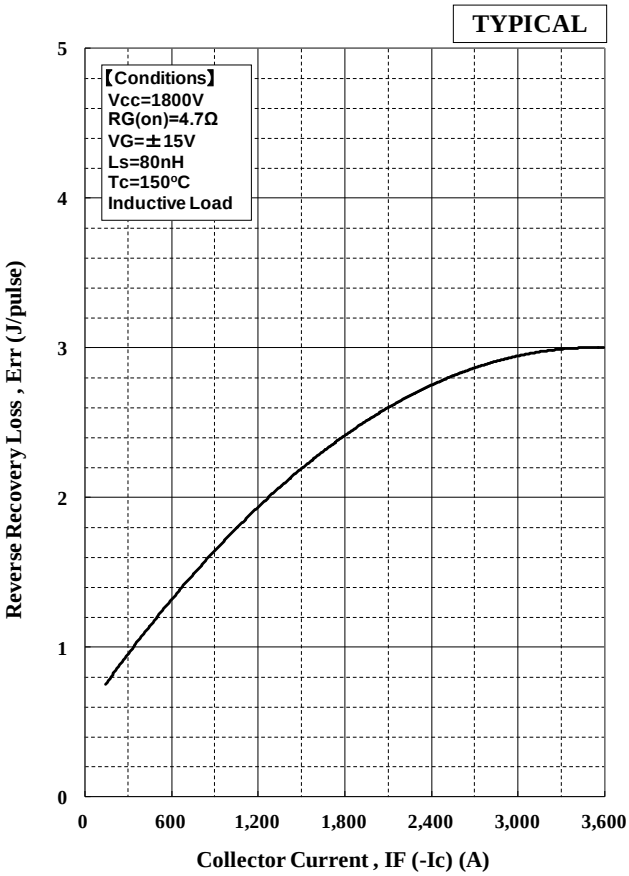
DYNAMIC CHARACTERISTICS



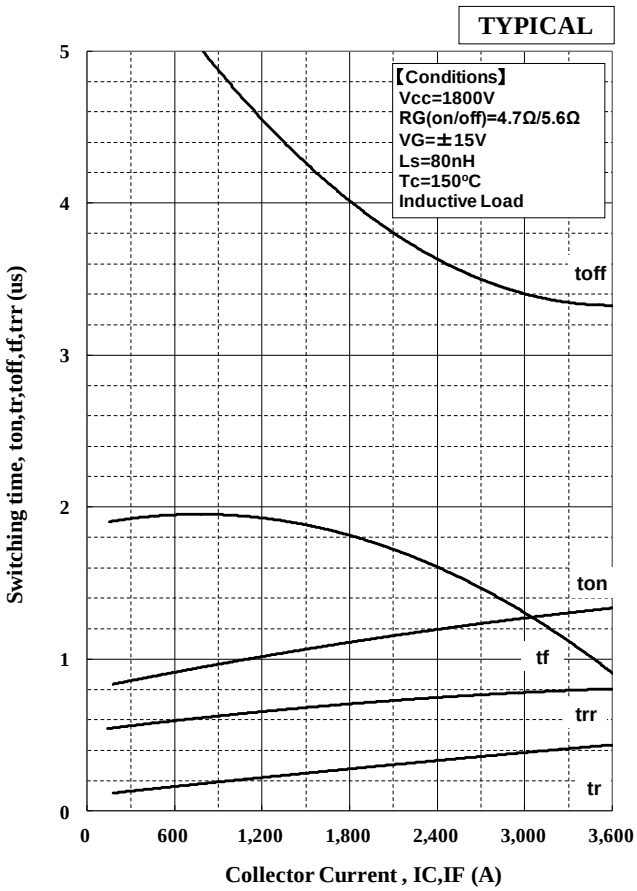
Turn-on Loss vs.Collector Current



Turn-off Loss vs.Collector Current



Recovery Loss vs.Collector Current



Switching time vs.Collector Current

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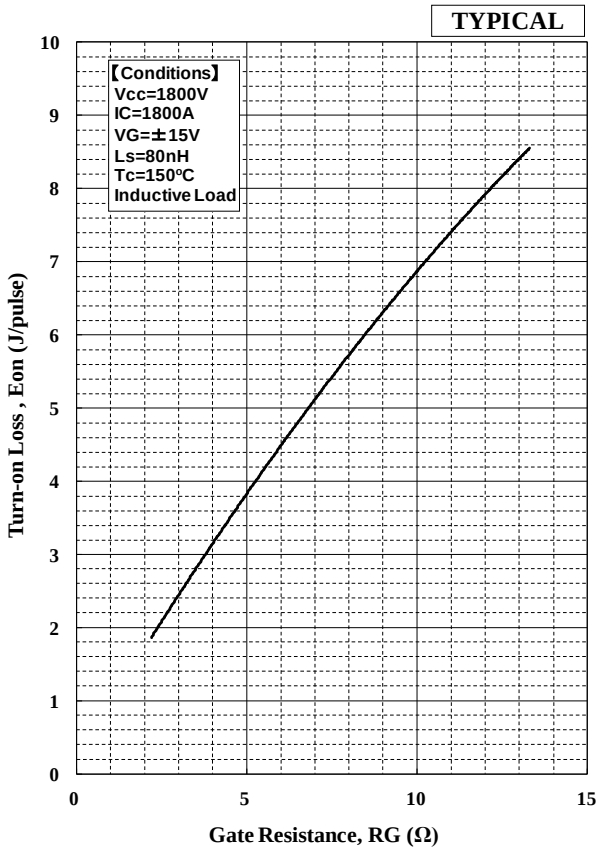
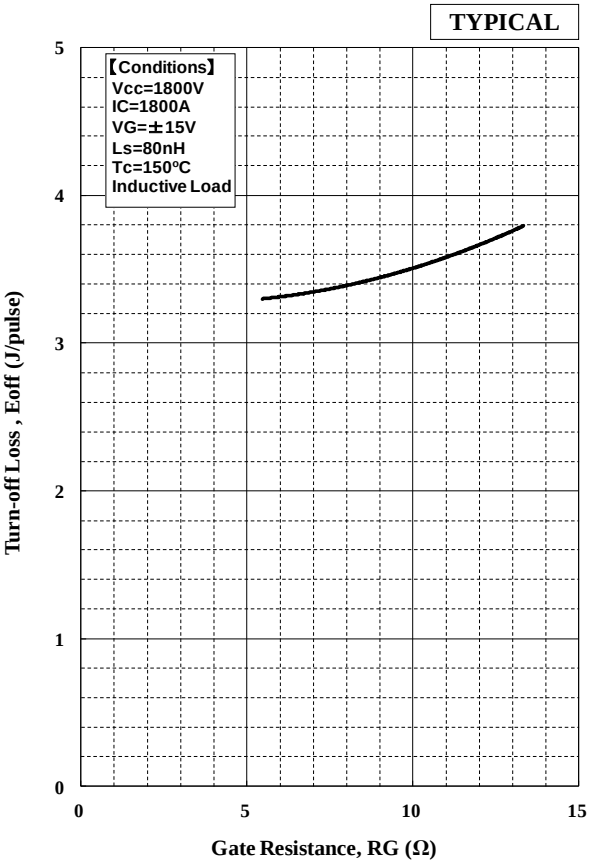
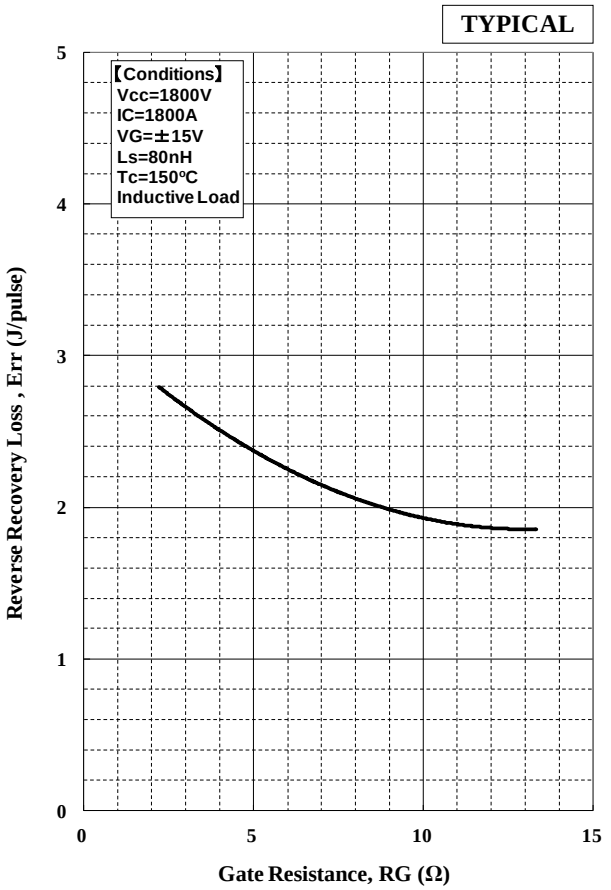


Turn-on Loss vs.Gate Resistance



Turn-off Loss vs.Gate Resistance



Recovery Loss vs.Gate Resistance

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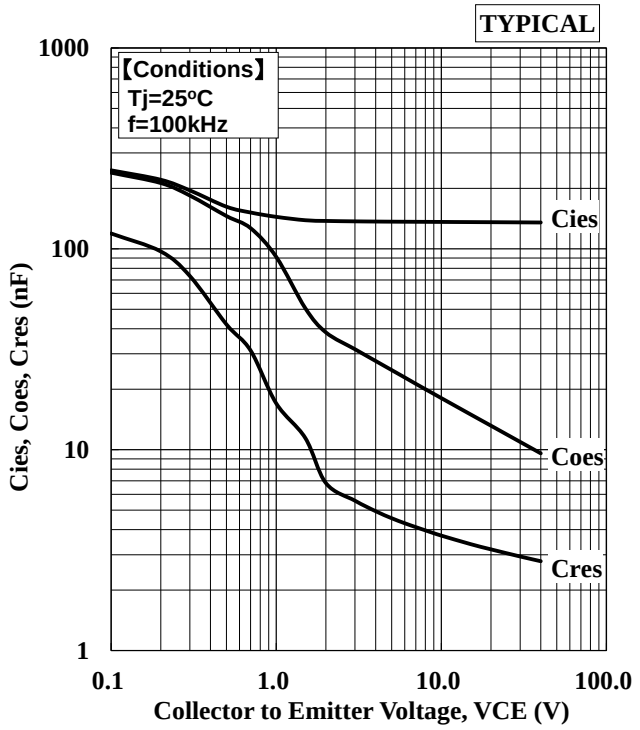
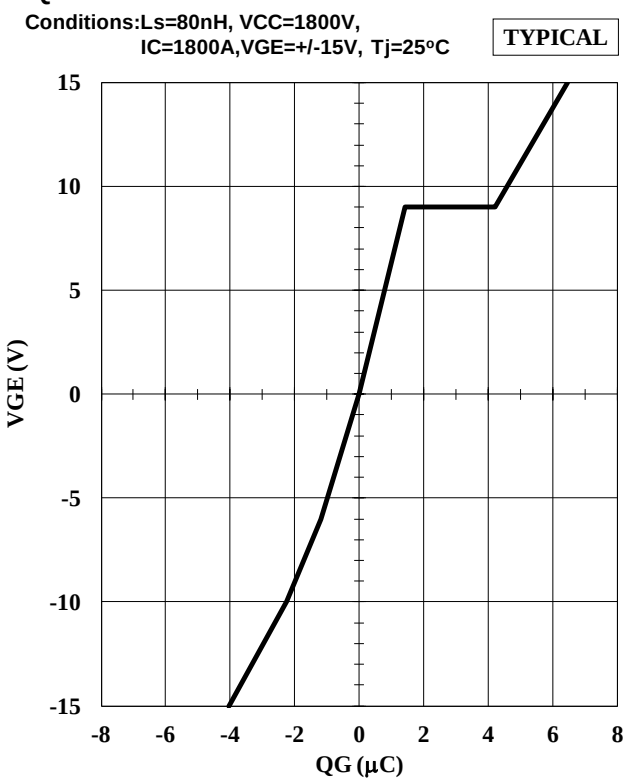
Capacitance vs. Collector to Emitter Voltage



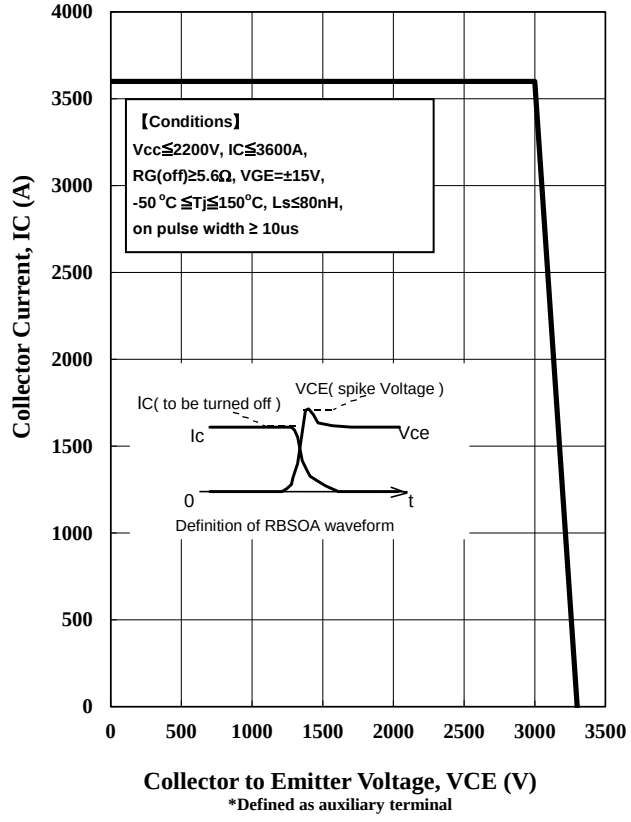
Capacitance vs. Collector to Emitter Voltage

QG-VGE CURVE

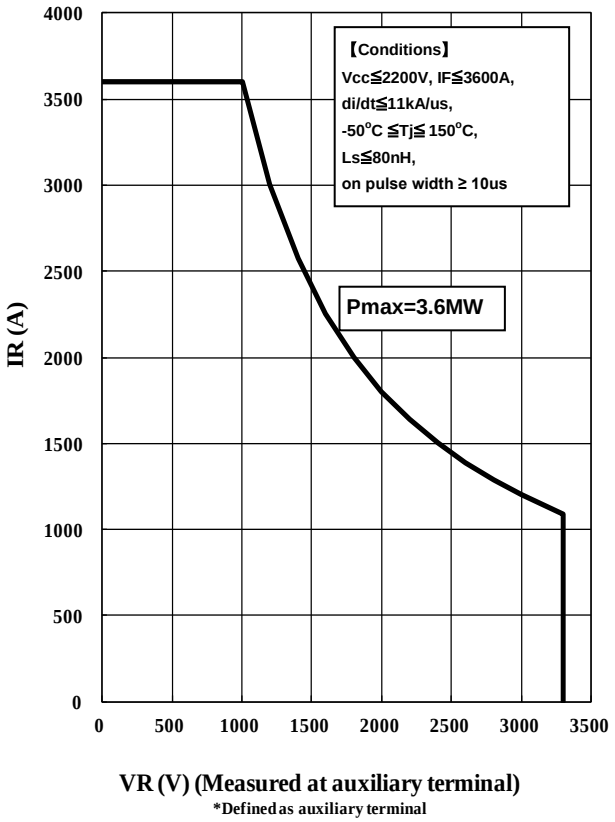


QG-VGE curve

Safe Operating Area



Reverse bias safe operation area(RBSOA)



Reverse recovery safe operation area(RRSOA)

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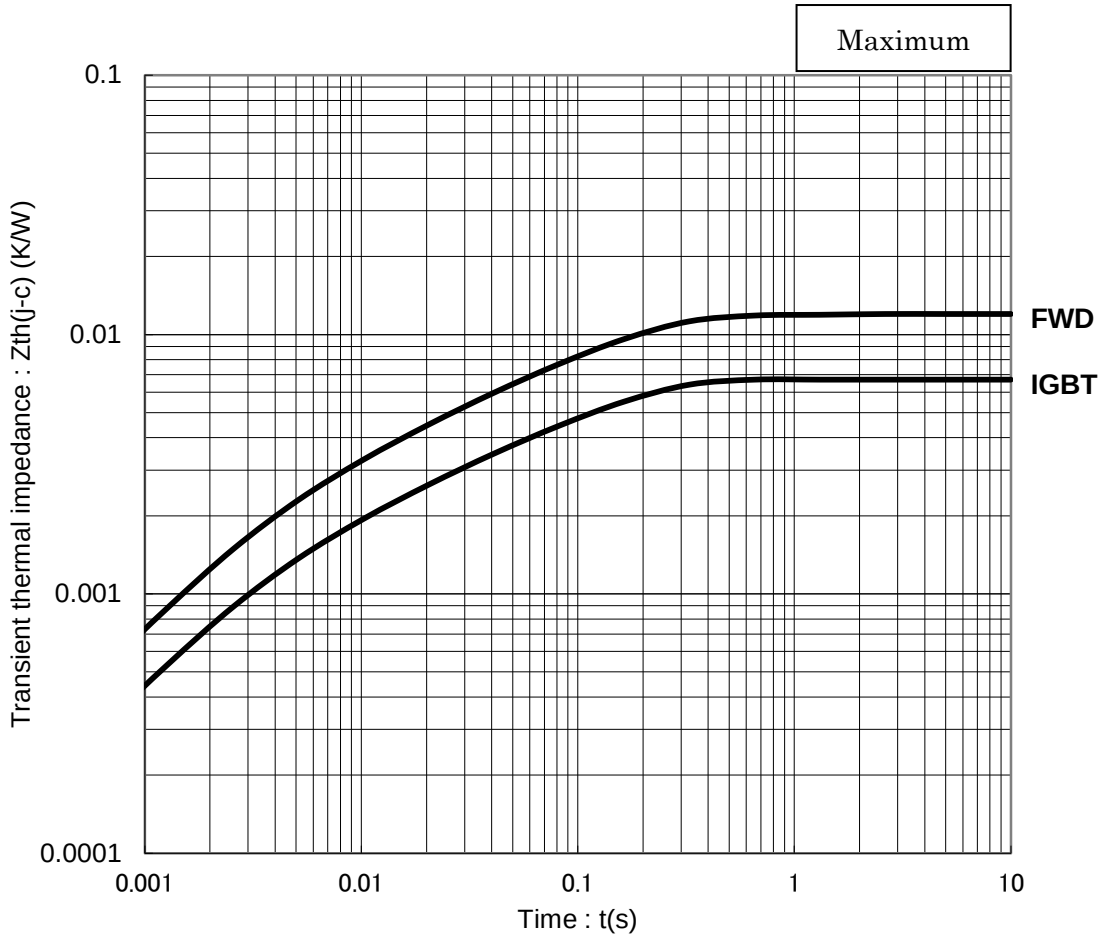
TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

Curve approximation model

(ΣZth[n]*(1-exp(-t/τth[n])))

n	1	2	3	4	Unit
τth[n]	0.003	0.03	0.1	0.3	sec
Zth[n,IGBT]	1.36E-03	7.88E-04	4.11E-03	4.49E-04	K/W
Zth[n,Diode]	2.26E-03	1.62E-03	6.71E-03	1.41E-03	K/W

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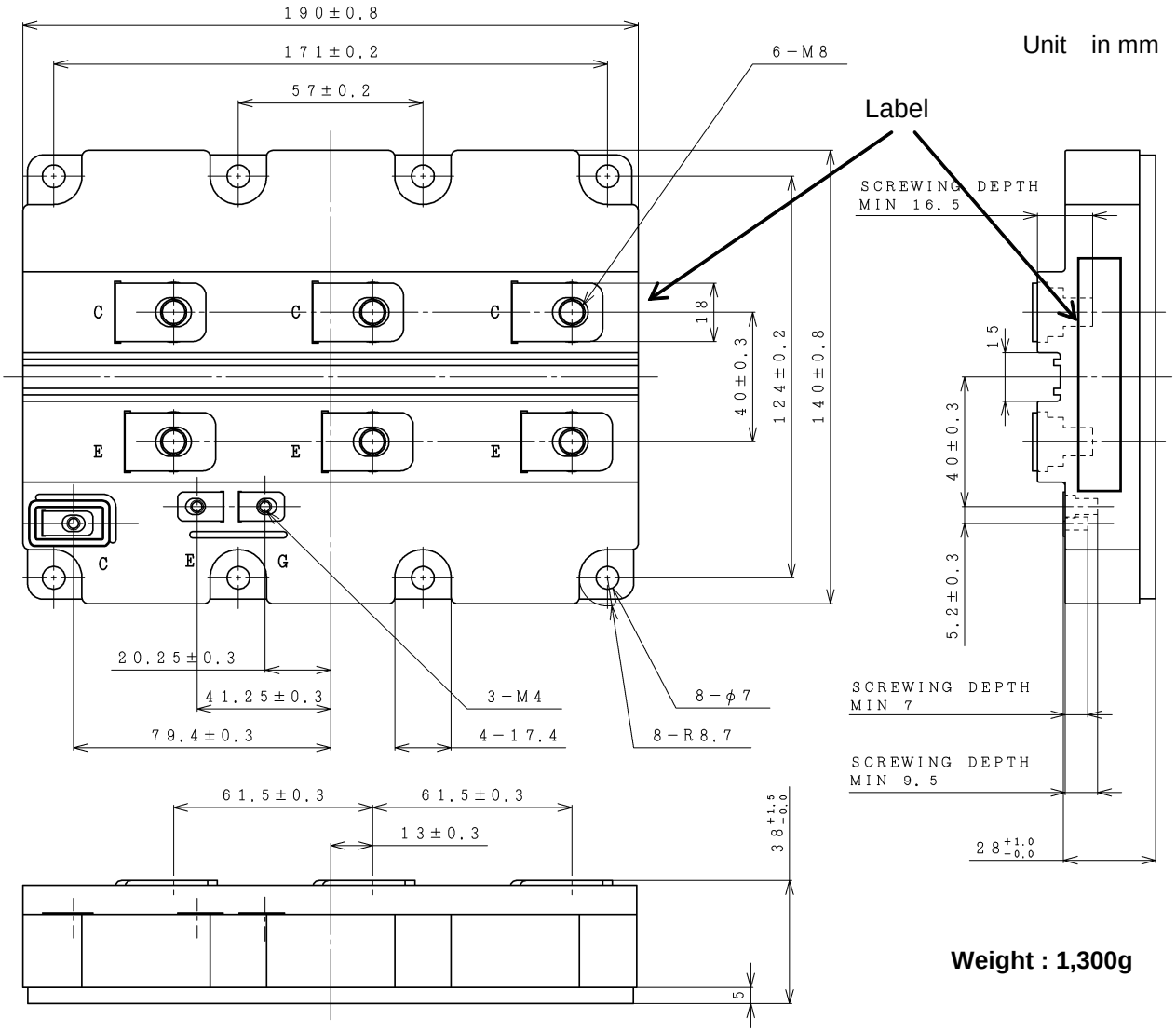
OUTLINE DRAWINGS



Weight : 1,300g

Fig.1 Outline Drawings

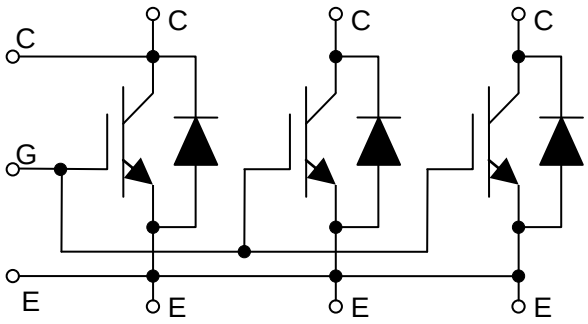


Fig.2 Circuit diagram

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HITACHI POWER SEMICONDUCTORS

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