

# MBN1800F33F-C

Target 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 (T<sub>C</sub>=25°C)

Item	Symbol	Unit	MBN1800F33F-C
Collector Emitter Voltage	V <sub>CES</sub>	V	3,300
Gate Emitter Voltage	V <sub>GES</sub>	V	±20
Collector Current	DC	I <sub>C</sub>	1,800
	1ms	I <sub>Cp</sub>	3,600
Forward Current	DC	I <sub>F</sub>	1,800
	1ms	I <sub>FM</sub>	3,600
Junction Temperature	T <sub>j</sub>	°C	-40 ~ +150
Storage Temperature	T <sub>stg</sub>	°C	-40 ~ +150
Isolation Voltage	V <sub>ISO</sub>	V <sub>RMS</sub>	6,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	2/15 (1)
	Mounting (M6)	-	6 (2)

Notes: (1) Recommended Value 1.8±0.2/15<sup>+0</sup>.3N·m

(2) Recommended Value 5.5±0.5N·m

## ELECTRICAL CHARACTERISTICS

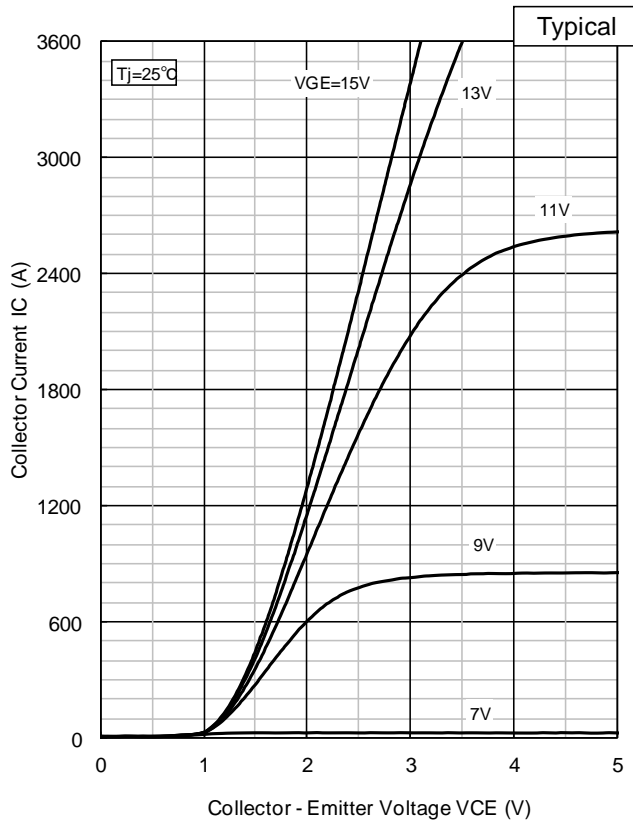
Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Collector Emitter Cut-Off Current	I <sub>CES</sub>	mA	-	-	18	V <sub>CE</sub> =3,300V, V <sub>GE</sub> =0V, T <sub>j</sub> =25°C
			-	38	-	V <sub>CE</sub> =3,300V, V <sub>GE</sub> =0V, T <sub>j</sub> =150°C
Gate Emitter Leakage Current	I <sub>GES</sub>	nA	-500	-	+500	V <sub>GE</sub> =±20V, V <sub>CE</sub> =0V, T <sub>j</sub> =25°C
Collector Emitter Saturation Voltage	V <sub>CE(sat)</sub>	V	-	2.85	-	I <sub>C</sub> =1,800A, V <sub>GE</sub> =15V, T <sub>j</sub> =150°C
Gate Emitter Threshold Voltage	V <sub>GE(TO)</sub>	V	-	6.5	-	V <sub>CE</sub> =10V, I <sub>C</sub> =1,800mA, T <sub>j</sub> =25°C
Input Capacitance	C <sub>ies</sub>	nF	-	132	-	V <sub>CE</sub> =10V, V <sub>GE</sub> =0V, f=100kHz, T <sub>j</sub> =25°C
Internal Gate Resistance	R <sub>g(int)</sub>	Ω	-	1.3	-	V <sub>CE</sub> =10V, V <sub>GE</sub> =0V, f=100kHz, T <sub>j</sub> =25°C
Switching Times	Rise Time	t <sub>r</sub>	-	TBD	-	V <sub>CC</sub> =1,800V, I <sub>C</sub> =1,800A
	Turn On Time	t <sub>on</sub>	-	TBD	-	L <sub>S</sub> =80nH
	Fall Time	t <sub>f</sub>	-	TBD	-	R <sub>G(on/off)</sub> =4.7/5.6Ω (3)
	Turn Off Time	t <sub>off</sub>	-	TBD	-	V <sub>GE</sub> =±15V, T <sub>j</sub> =150°C
Peak Forward Voltage Drop	V <sub>FM</sub>	V	-	4.75	-	I <sub>F</sub> =1,800A, V <sub>GE</sub> =0V, T <sub>j</sub> =150°C
Reverse Recovery Time	t <sub>rr</sub>	μs	-	TBD	-	V <sub>CC</sub> =1,800V, I <sub>F</sub> =1,800A, L <sub>S</sub> =80nH T <sub>j</sub> =150°C
Turn On Loss	E <sub>on</sub>	J/P	-	2.1	-	V <sub>CC</sub> =1,800V, I <sub>C</sub> (I <sub>F</sub> )=1,800A, L <sub>S</sub> =80nH
Turn Off Loss	E <sub>off</sub>	J/P	-	3.3	-	R <sub>G(on/off)</sub> =4.7/5.6Ω (3)
Reverse Recovery Loss	E <sub>rr</sub>	J/P	-	(0.15)	-	V <sub>GE</sub> =±15V, T <sub>j</sub> =150°C
Stray inductance module	L <sub>SCE</sub>	nH	-	7	-	
Thermal Impedance	IGBT	R <sub>th(j-c)</sub>	-	-	0.0067	Junction to case
	FWD	R <sub>th(j-c)</sub>	-	-	(0.012)	
Contact Thermal Impedance	R <sub>th(c-f)</sub>	K/W	-	0.006	-	Case to fin

Notes: (3) R<sub>G</sub> value is a test condition value for evaluation, not recommended value.Please, determine the suitable R<sub>G</sub> value by measuring switching behaviors.

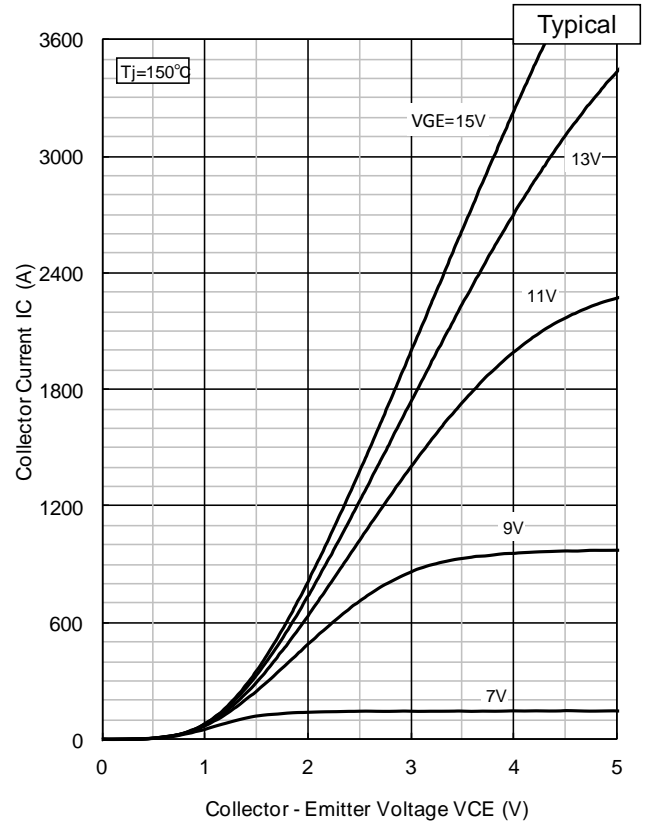
- \* Please contact our representatives at order.
- \* For improvement, specifications are subject to change without notice.
- \* For actual application, please confirm this spec sheet is the newest revision.
- \* ELECTRICAL CHARACTERISTIC values based on IEC 60747-2 and IEC 60747-9

# MBN1800F33F-C

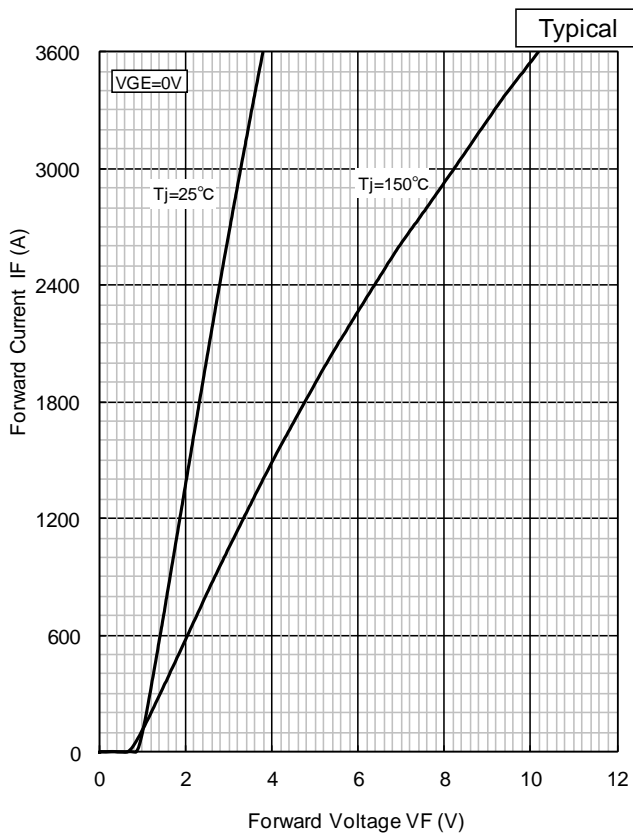
## Target Specification



**$I_C$  vs.  $V_{CE}$  ( $T_j=25^\circ\text{C}$ )**



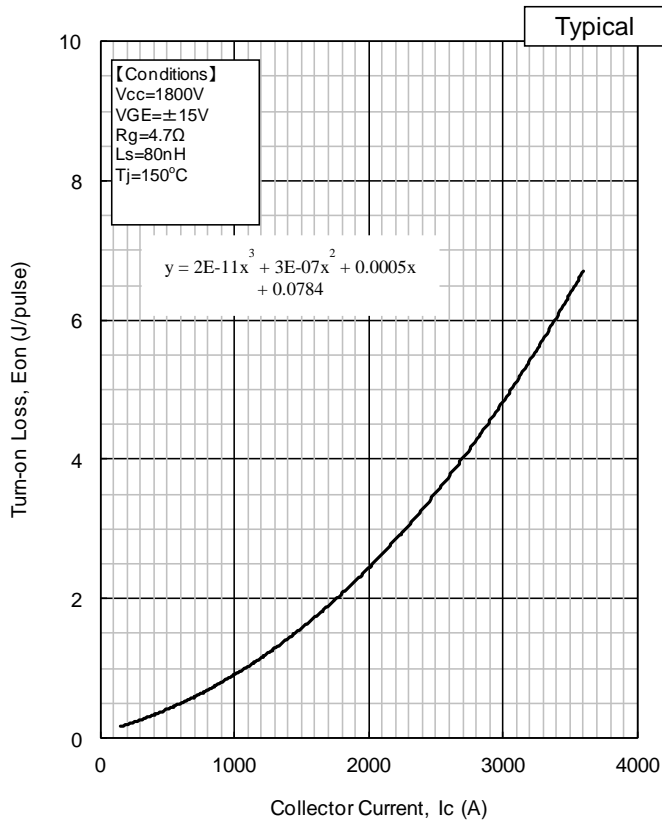
**$I_C$  vs.  $V_{CE}$  ( $T_j=150^\circ\text{C}$ )**



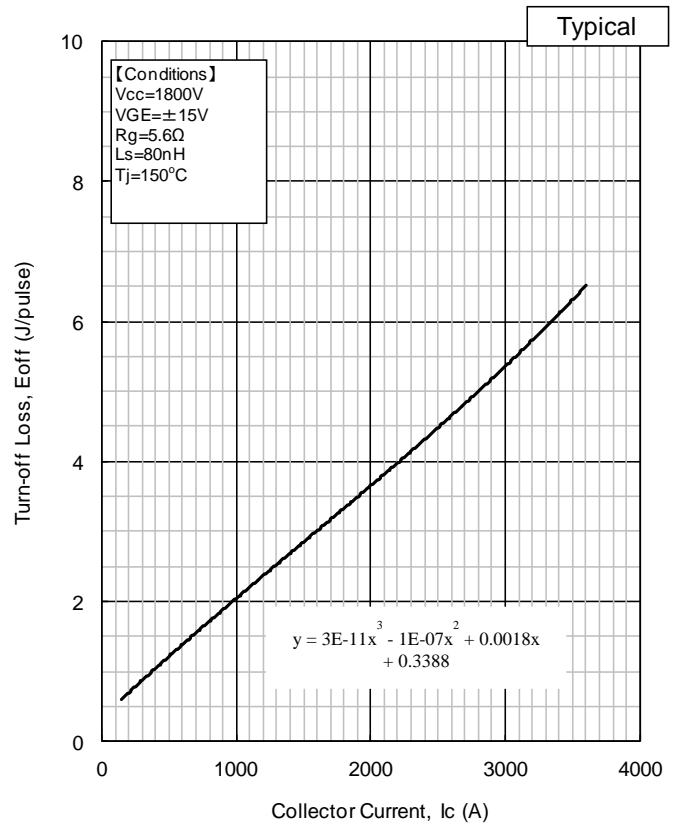
**$I_F$  vs.  $V_F$**

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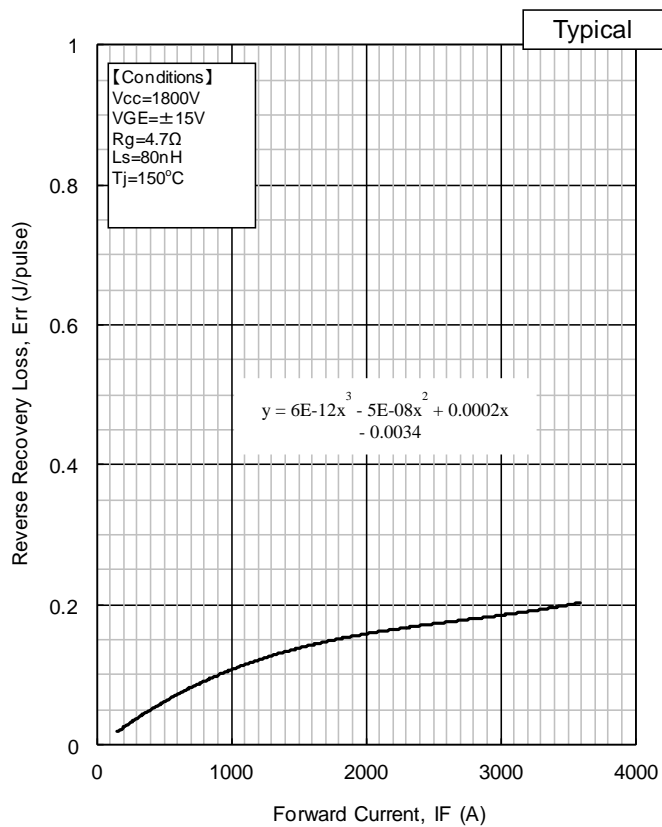
## Target Specification



Turn-on loss vs. Collector current



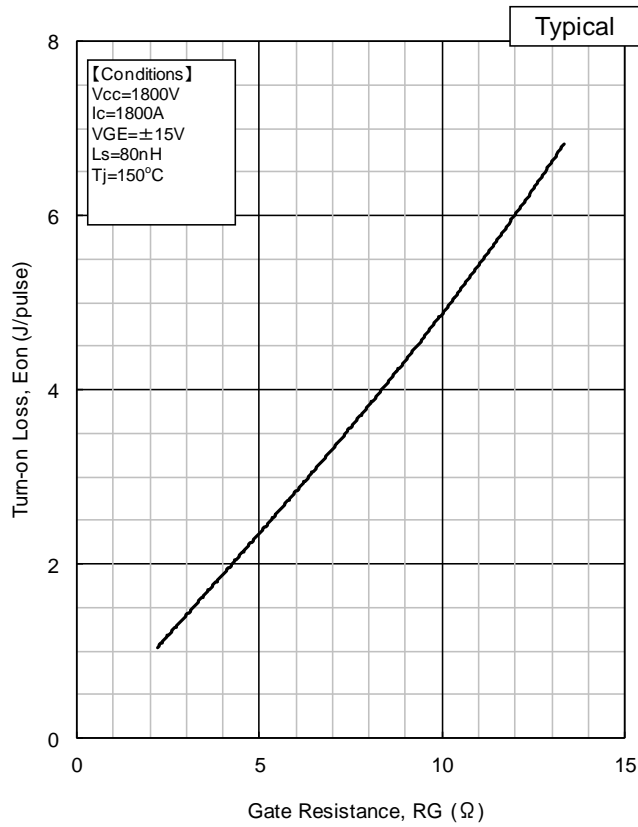
Turn-off loss vs. Collector current



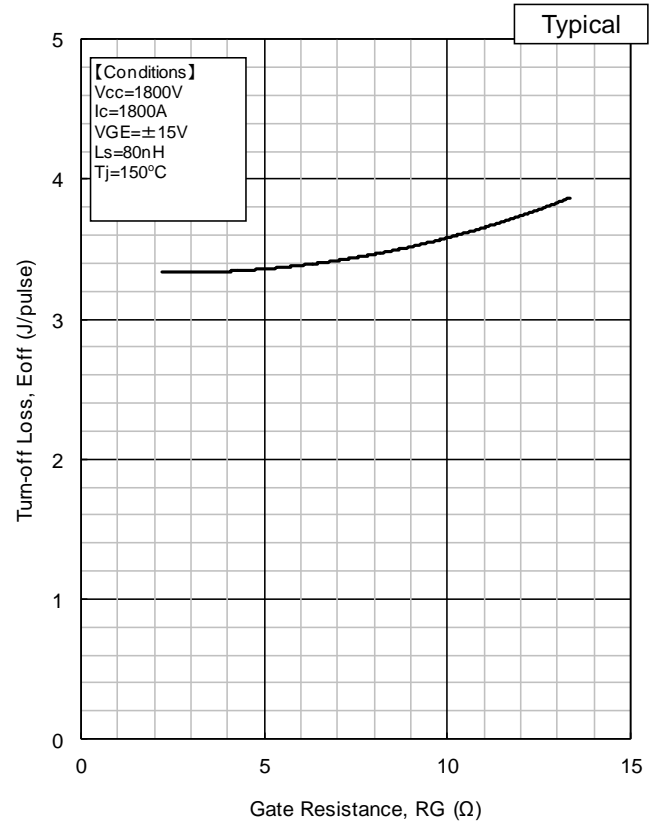
Recovery loss vs. Forward current

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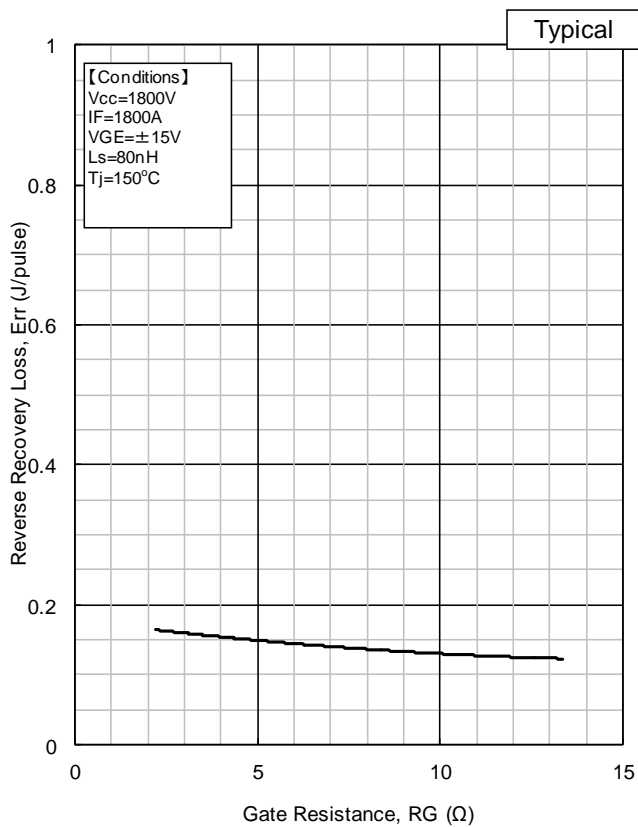
## Target Specification



**Turn-on loss vs. Gate Resistance**



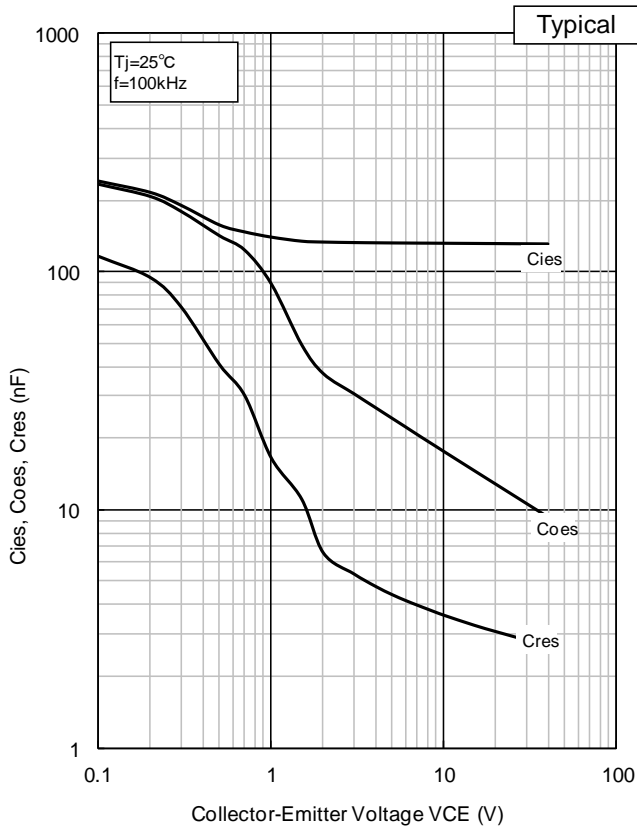
**Turn-off loss vs. Gate Resistance**



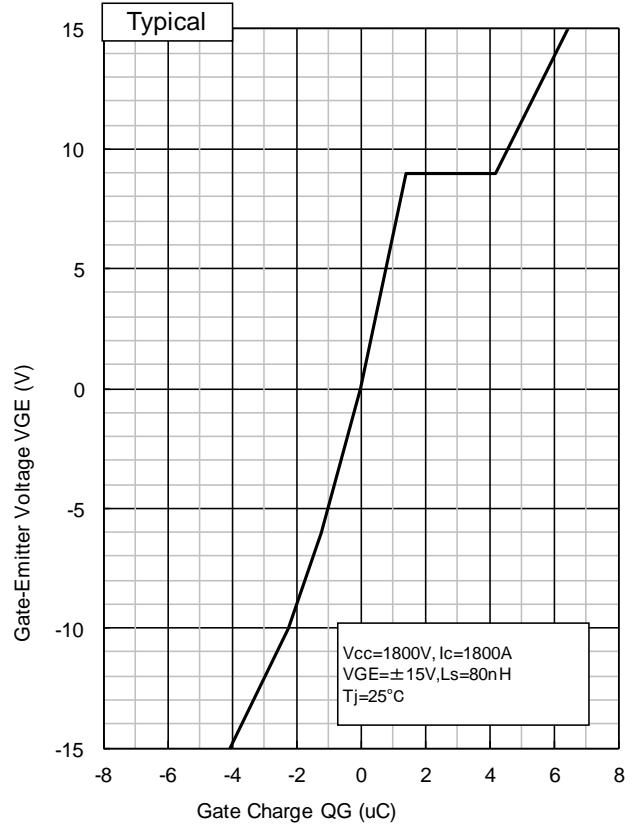
**Recovery loss vs. Gate Resistance**

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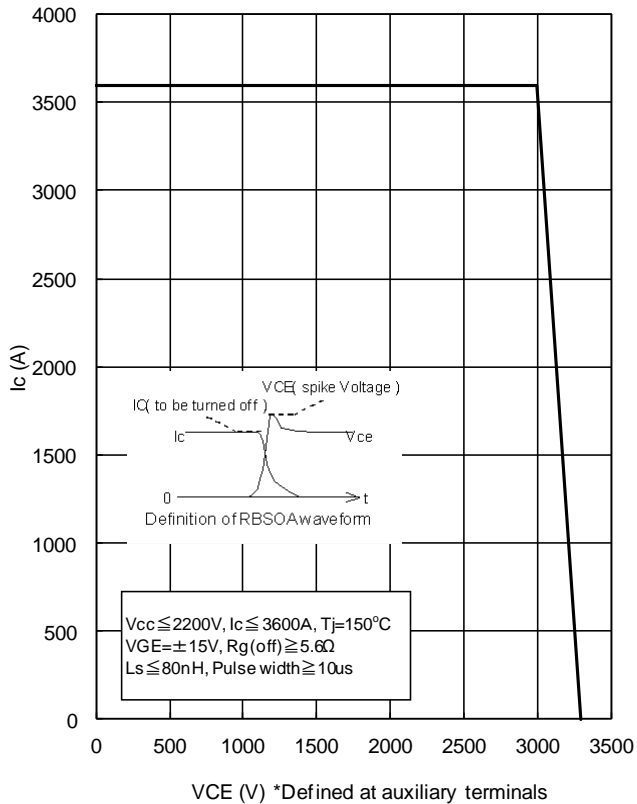
## Target Specification



**Cies, Coes, Cres - VCE**



**QG - VGE**



**RBSOA**

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Target Specification

## OUTLINE DRAWINGS

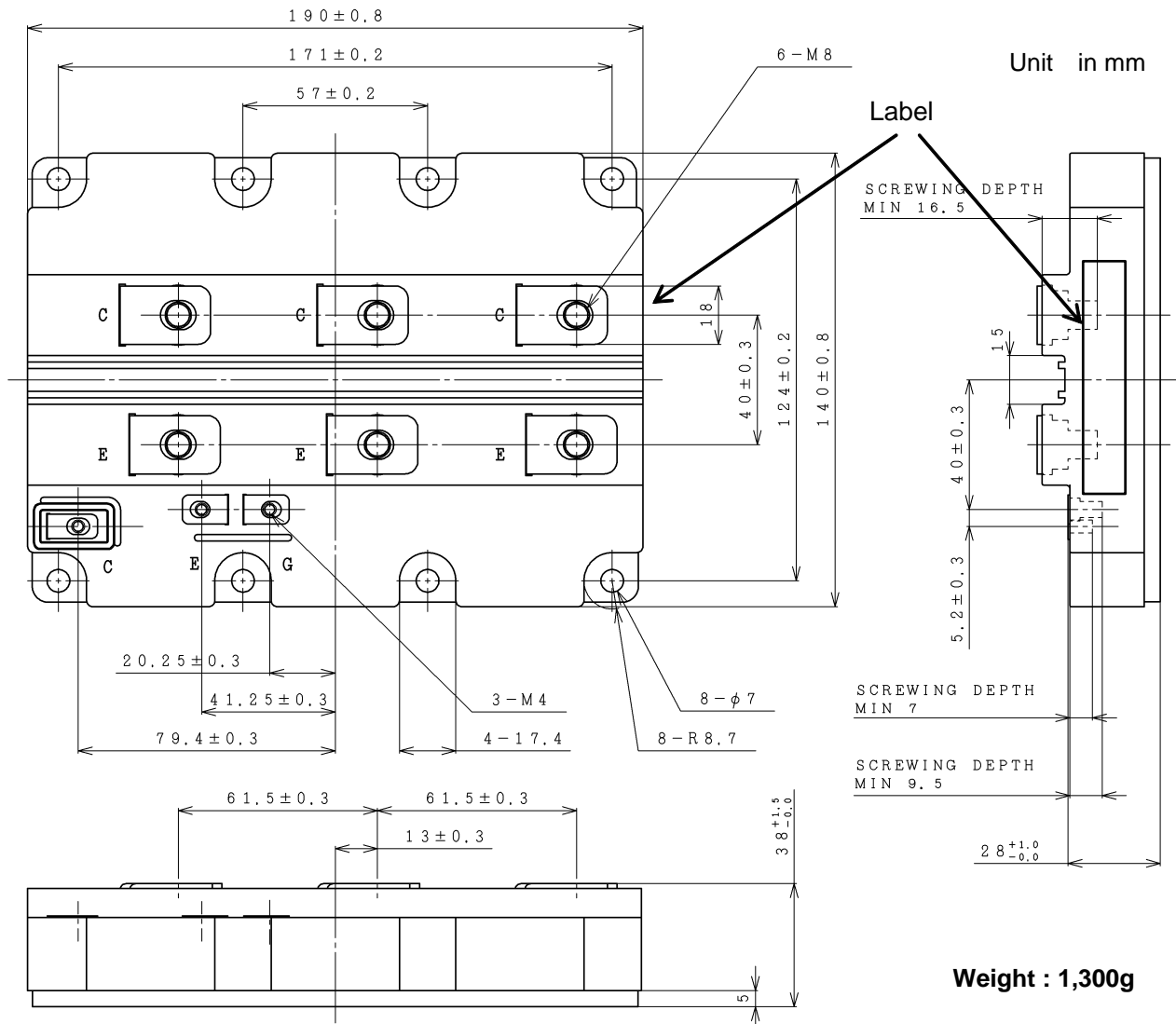


Fig.1 Outline Drawings

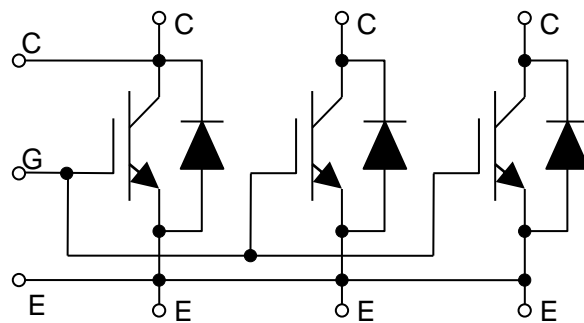


Fig.2 Circuit diagram

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## HITACHI POWER SEMICONDUCTORS

### Notices

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