

MBN1000FH65G2

Target Specification

Silicon N-channel IGBT 6500V G2 version

FEATURES

- * Low dv/dt noise, low switching loss & low conduction loss
Soft low-injection punch-through
Novel Side-gate High conductivity IGBT
- * Ultra low driving power due to low input capacitance
- * High dv/dt controllability by low mirror capacitance
- * Low noise recovery: Ultra soft and fast recovery diode
- * High Current rate Package
- * Low Rth(j-c) & low stray inductance
- * RoHS

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Item	Symbol	Unit	MBN1000FH65G2	
Collector Emitter Voltage	T _j =150°C	V _{CEs}	V	6,500
	T _j =25°C			6,500
	T _j =-50°C			5,900
Gate Emitter Voltage	V _{GES}	V	±20	
Collector Current	DC	I _C	A	1,000
	1ms	I _{CRM}		2,000
Forward Current	DC	I _F	A	1,000
	1ms	I _{FRM}		2,000
Junction Temperature	T _j	°C	-50 ~ +150	
Storage Temperature	T _{stg}	°C	-50 ~ +150	
Isolation Voltage	V _{ISO}	V _{RMS}	10,200(AC 1 minute)	
Screw Torque	Terminals (M4/M8)	-	N·m	2/10 (1)
	Mounting (M6)	-		6 (2)

Notes: (1) Recommended Value $1.8 \pm 0.2/9 \pm 1$ 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	-	-	TBD	V _{CE} =6,500V, V _{GE} =0V, T _j =25°C	
			-	80	TBD	V _{CE} =6,500V, V _{GE} =0V, T _j =150°C	
Gate Emitter Leakage Current	I _{GES}	nA	-500	-	+500	V _{GE} =±20V, V _{CE} =0V, T _j =25°C	
Collector Emitter Saturation Voltage	V _{CEsat}	V	-	3.9	-	I _C =1,000A, V _{GE} =15V, T _j =125°C	
			-	4.1	TBD	I _C =1,000A, V _{GE} =15V, T _j =150°C	
Gate Emitter Threshold Voltage	V _{GE(th)}	V	TBD	6.9	TBD	V _{CE} =10V, I _C =1,000mA, T _j =25°C	
Input Capacitance	C _{ies}	nF	-	80	-	V _{CE} =10V, V _{GE} =0V, f=100kHz, T _j =25°C	
Internal Gate Resistance	r _g	Ω	-	6.6	-	V _{CE} =10V, V _{GE} =0V, f=100kHz, T _j =25°C	
Turn On Delay Time	t _{d(on)}	μs	-	1.3	-	V _{CC} =3,600V, I _C =1,000A	
Rise Time	t _r		-	0.3	-	V _{GE} =±15V, R _{G(on/off)} =3.3Ω/33Ω (3)	
Turn Off Delay Time	t _{d(off)}		-	4.3	-	L _s =150nH, T _j =150°C	
Fall Time	t _f		-	2.5	-		
Peak Forward Voltage Drop	V _F	V	-	4.1	-	I _F =1,000A, V _{GE} =0V T _j =125°C	
		V	-	4.1	TBD	I _F =1,000A, V _{GE} =0V T _j =150°C	
Reverse Recovery Time	t _{rr}	μs	-	2.9	-	V _{CC} =3,600V, I _F =1,000A, L _s =150nH T _j =150°C	
Turn On Loss	E _{on}	J/P	-	6.0	-	V _{CC} =3,600V, I _C =1,000A	
Turn Off Loss	E _{off}	J/P	-	7.2	-	V _{GE} =±15V, R _{G(on/off)} =3.3Ω/33Ω (3)	
Reverse Recovery Loss	E _{rr}	J/P	-	5.0	-	L _s =150nH, T _j =150°C	
Partial discharge extinction voltage	V _e	V _{RMS}	5,100	-	-	f=50Hz, Q _{PD} ≤10pC(acc. to IEC 61287)	
Stray inductance module	L _{SCE}	nH	-	10	-	-	
Thermal Impedance	IGBT	R _{th(j-c)}	K/W	-	-	0.0085	Junction to case
	FWD	R _{th(j-c)}		-	-	0.0136	
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.005	-	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.

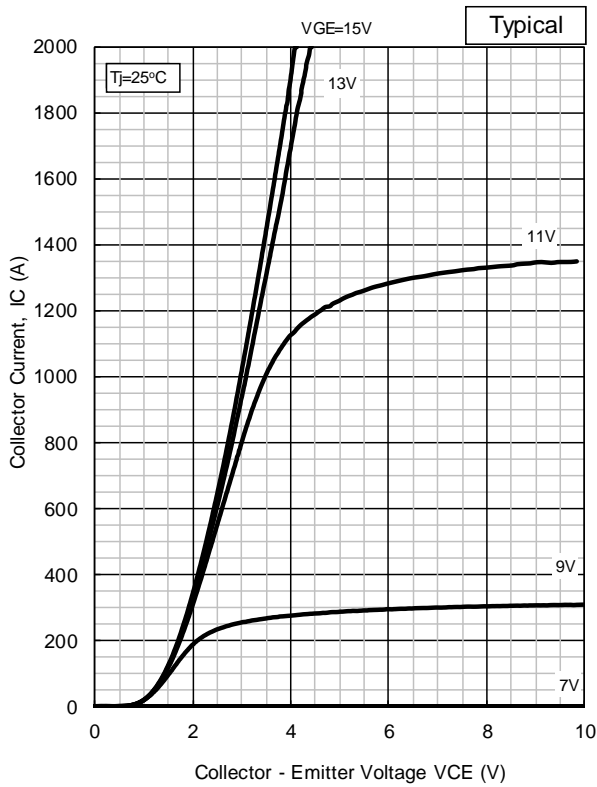
* For actual application, please confirm this spec sheet is the newest revision.

* ELECTRICAL CHARACTERISTIC values shown in above table are according to IEC 60747-2 and IEC 60747-9.

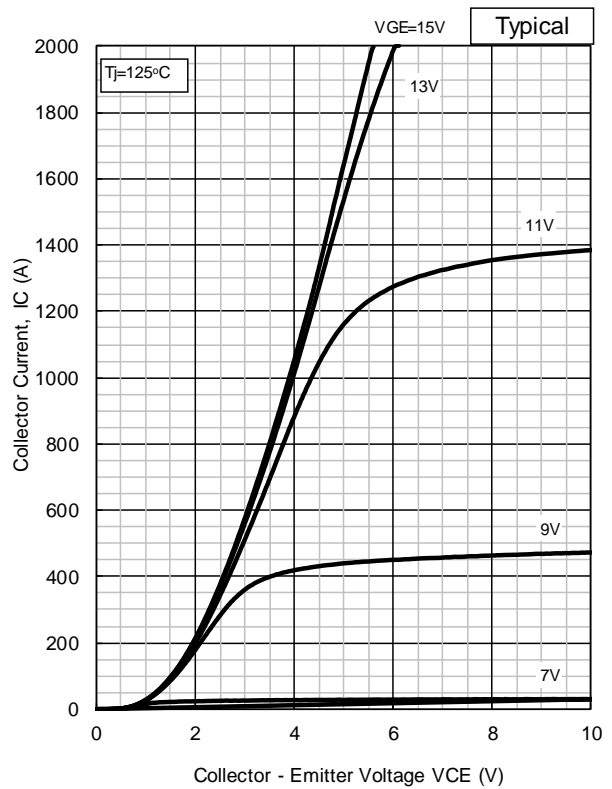
MBN1000FH65G2

Target Specification

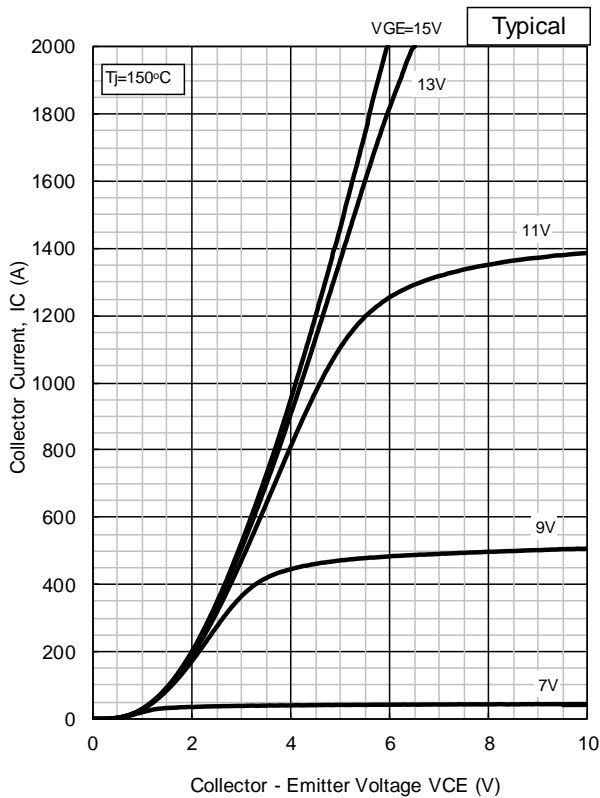
STATIC CHARACTERISTICS



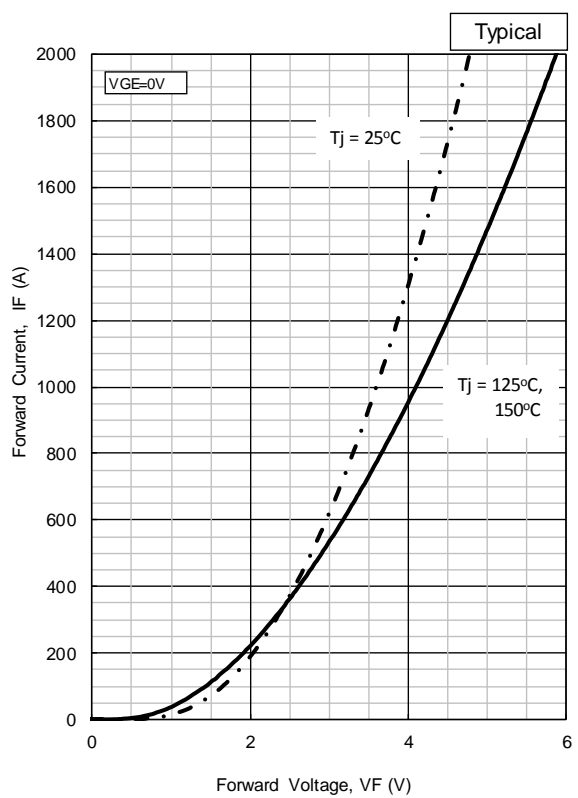
IC vs. VCE ($T_j=25^\circ\text{C}$)



IC vs. VCE ($T_j=125^\circ\text{C}$)



IC vs. VCE ($T_j=150^\circ\text{C}$)

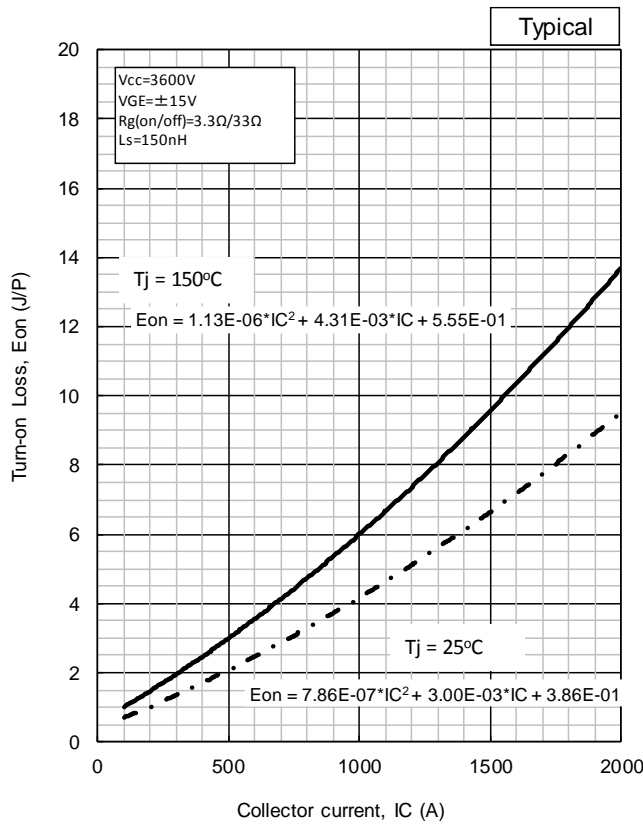


IF vs. VF ($T_j=25^\circ\text{C}, 125^\circ\text{C}, 150^\circ\text{C}$)

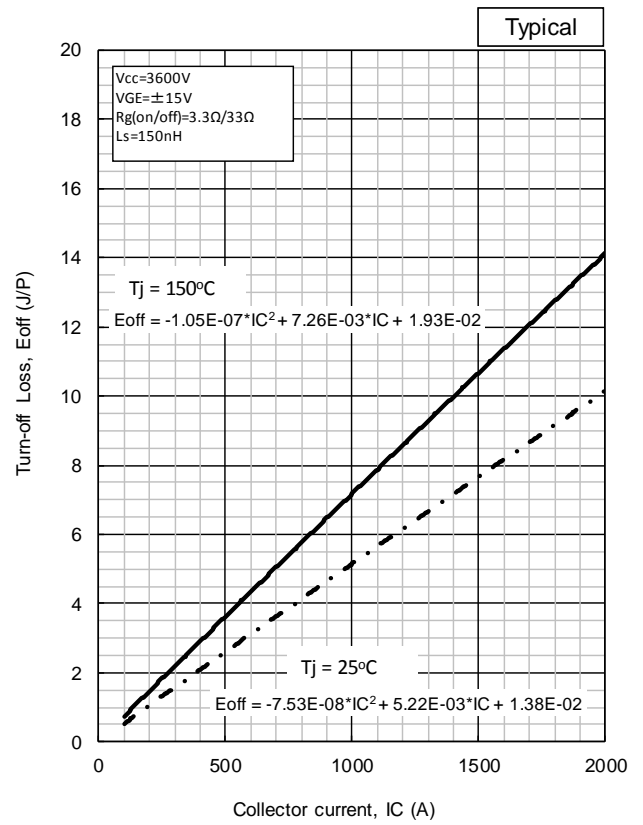
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Target Specification

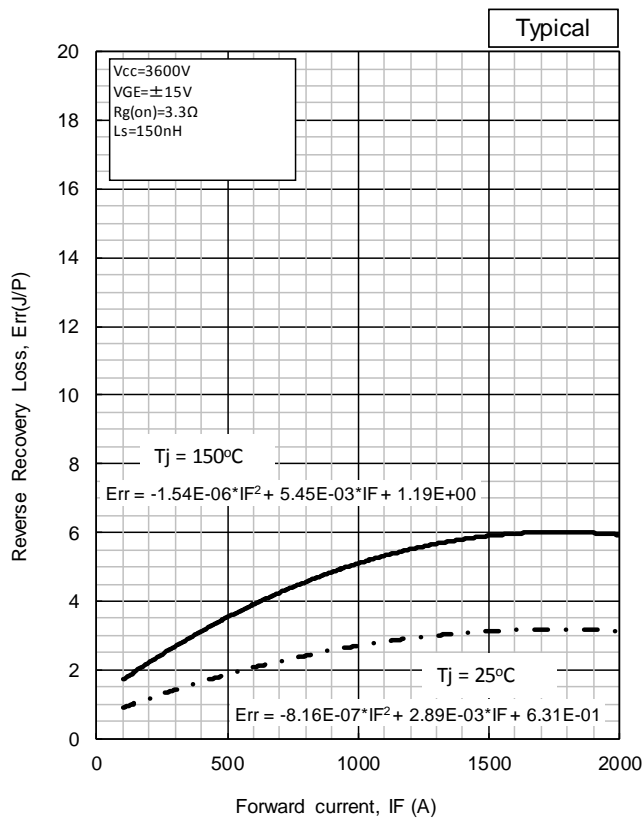
DYNAMIC CHARACTERISTICS



Eon vs. IC



Eoff vs. IC

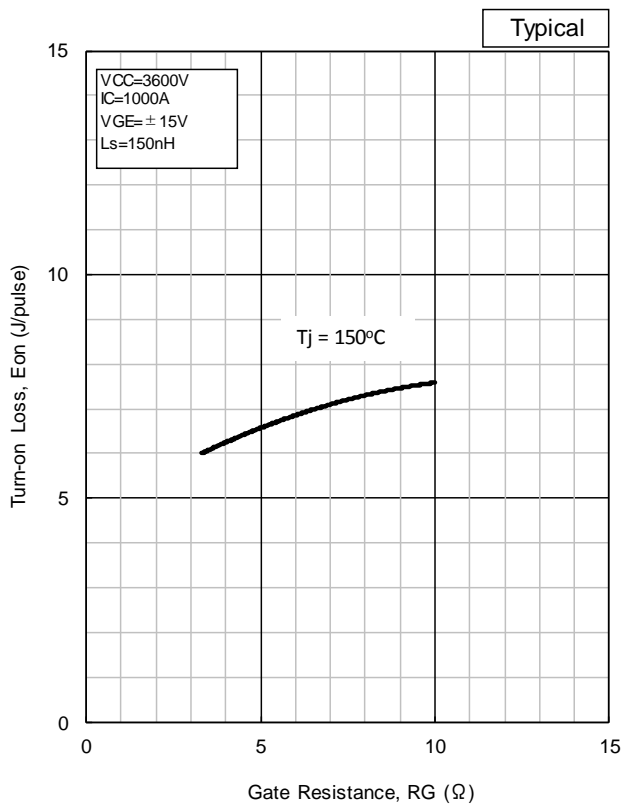


Err vs. IF

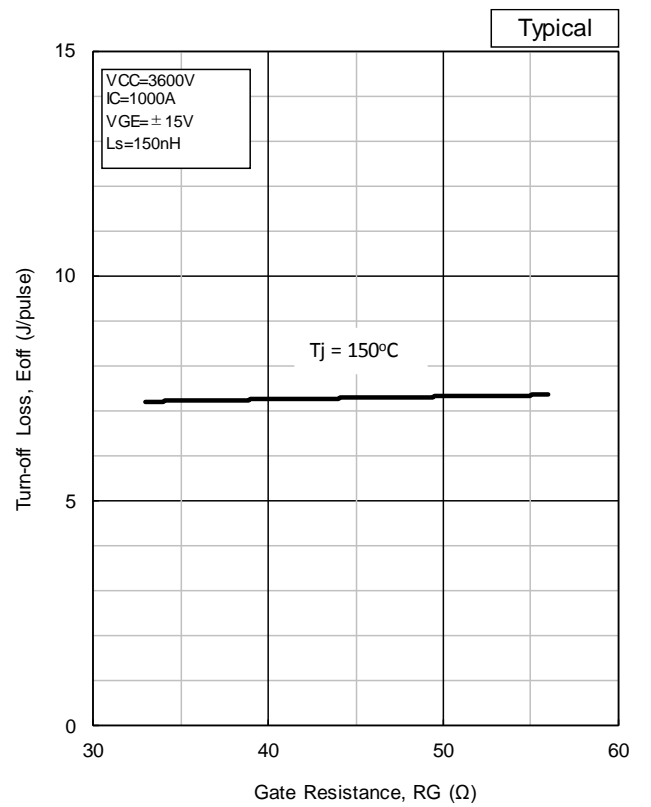
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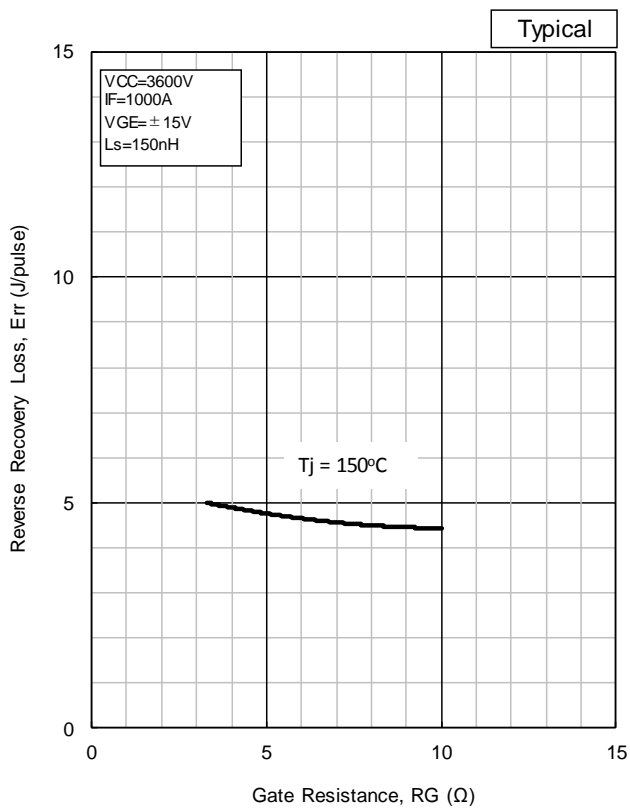
DYNAMIC CHARACTERISTICS



Eon vs. RG



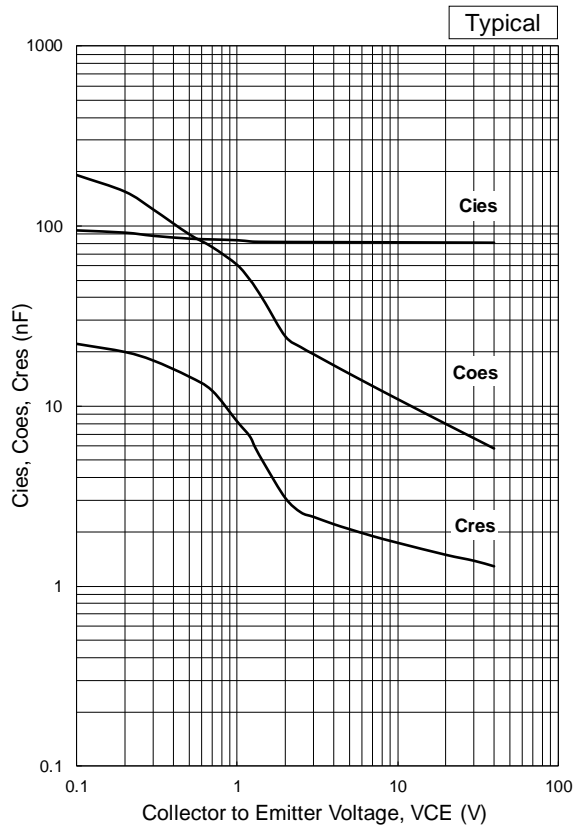
Eoff vs. RG



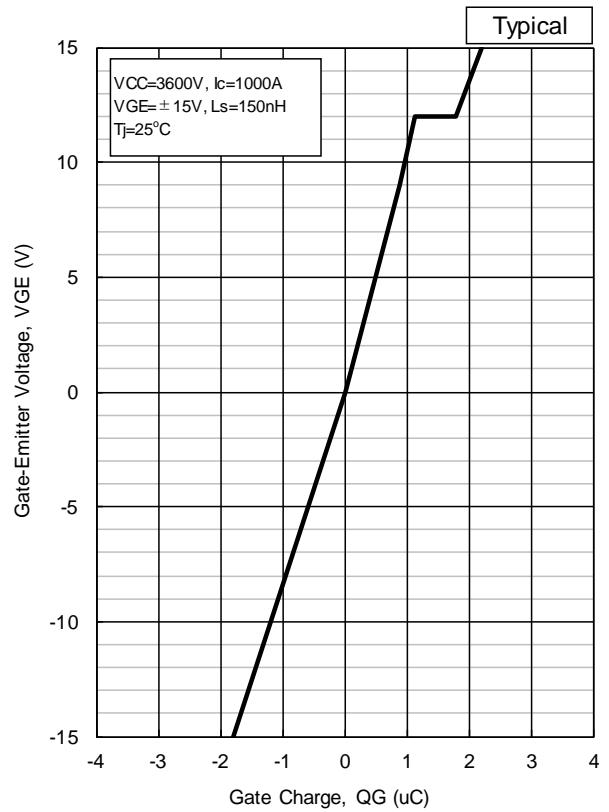
Err vs. RG

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Target Specification

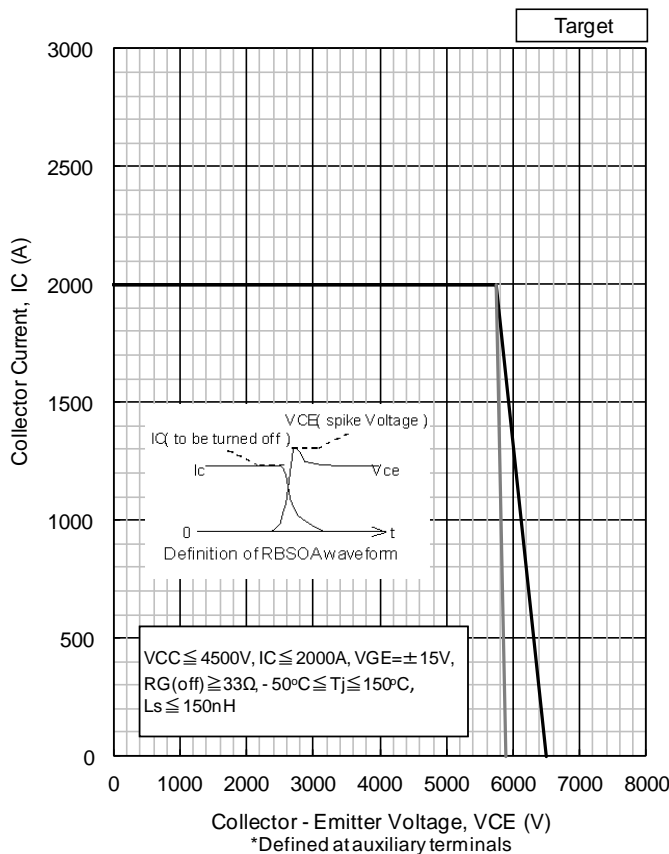


Capacitance vs. VCE

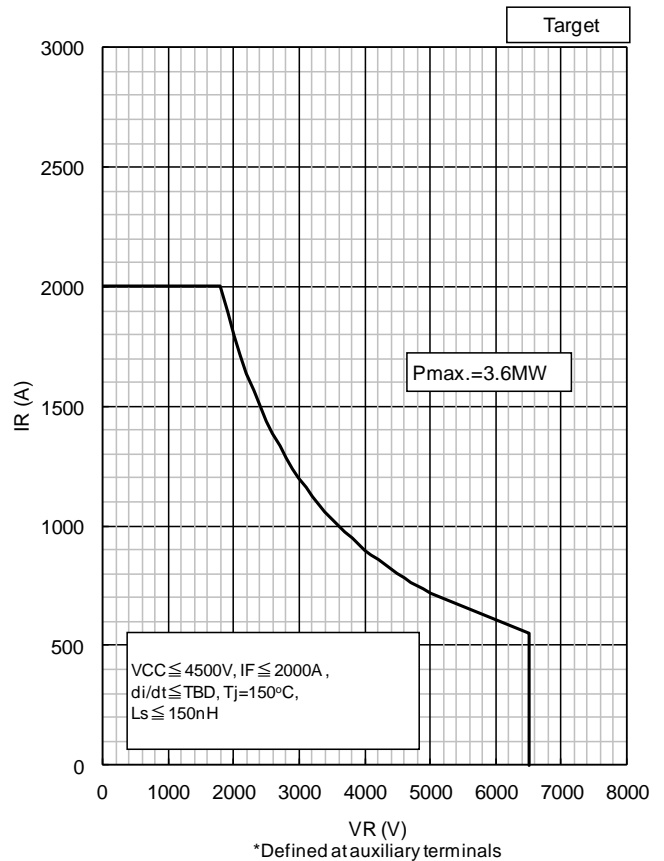


QG - VGE

Safe Operating Area



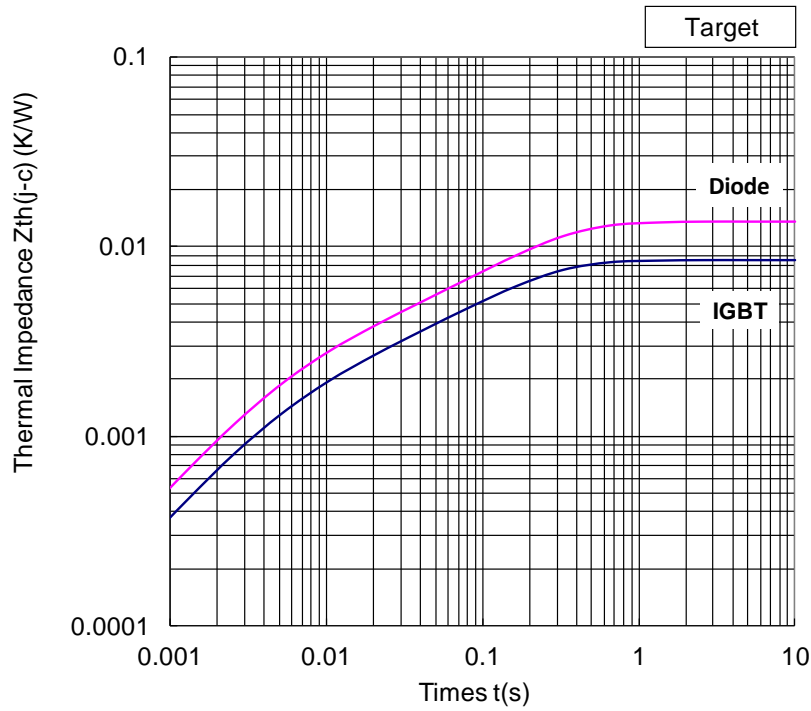
Reverse bias safe operation area(RBSOA)



Reverse recovery safe operation area(RRSOA)

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Transient Thermal Impedance Curve

Curve Approximation Model

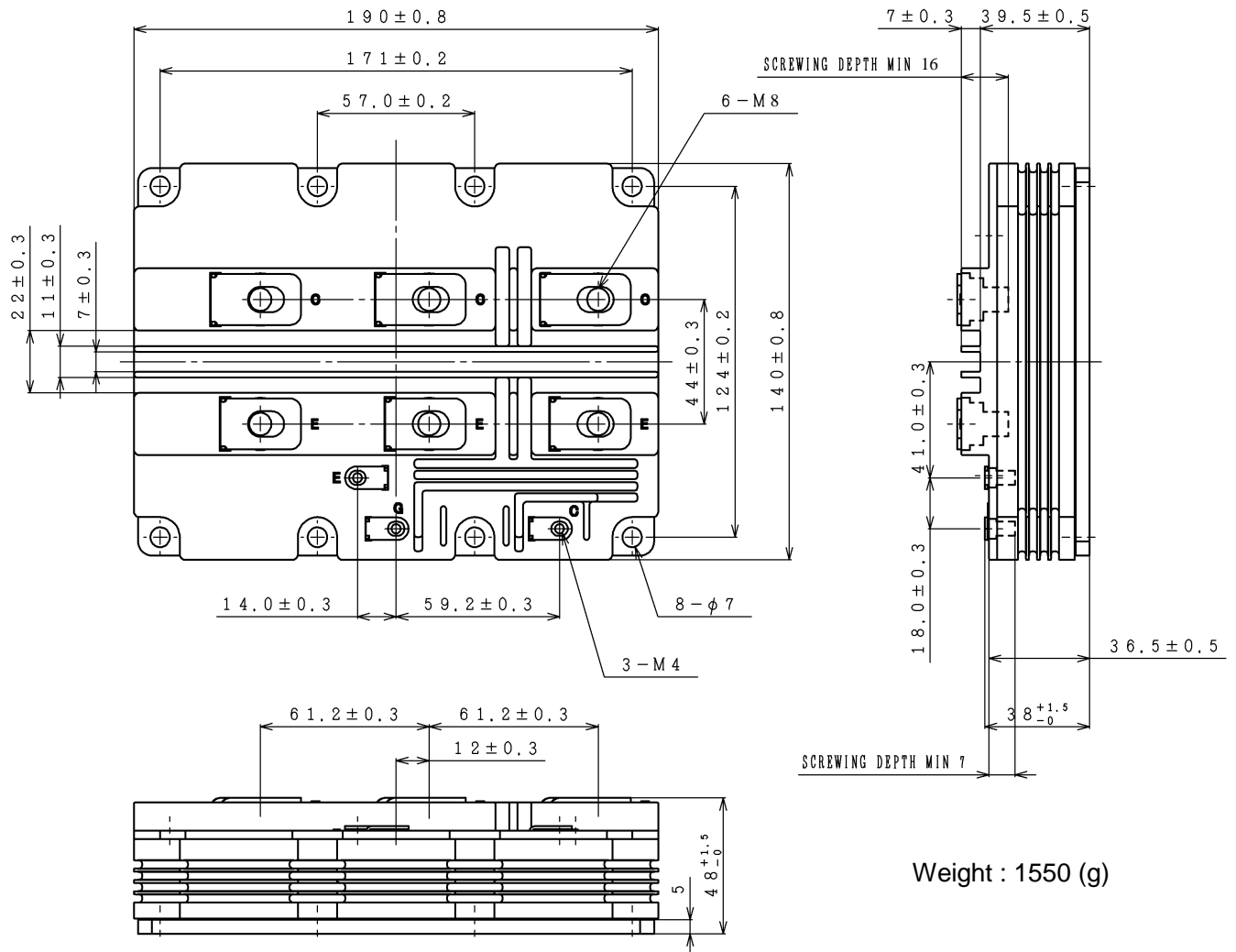
$$\sum r_{th}[n] * (1 - \exp(-t/\tau_{th}[n]))$$

n	1	2	3	4	Unit
$\tau_{th}[n]$	1.83E-01	3.34E-02	6.04E-03	1.67E-03	sec
$r_{th}[n,IGBT]$	5.63E-03	1.39E-03	1.28E-03	2.47E-04	K/W
$r_{th}[n,Diode]$	1.02E-02	8.93E-04	2.17E-03	2.91E-04	K/W

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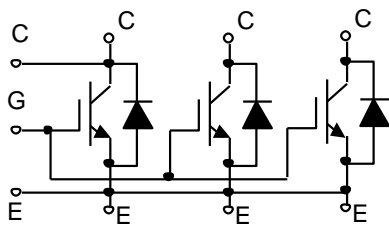
Target Specification

OUTLINE DRAWING (unit in mm)



Weight : 1550 (g)

CIRCUIT DIAGRAM



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Target Specification

HITACHI POWER SEMICONDUCTORS

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