

MBN1200F33F

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 $R_{th(j-c)}$ & low stray inductance.
- * RoHS
- * High thermal fatigue durability: ($\Delta T_c=70K$, $N>30,000$ cycles)

ABSOLUTE MAXIMUM RATINGS ($T_c=25^\circ C$)

Item	Symbol	Unit	MBN1200F33F
Collector Emitter Voltage	V_{CES}	V	3,300
Gate Emitter Voltage	V_{GES}	V	± 20
Collector Current	DC	I_C	1,200
	1ms	I_{CRM}	2,400
Forward Current	DC	I_F	1,200
	1ms	I_{FRM}	2,400
Junction Temperature	$T_{vj,op}$	$^\circ C$	-50 ~ +150
Storage Temperature	T_{stg}	$^\circ C$	-55 ~ +150
Isolation Voltage	V_{ISO}	V_{RMS}	6,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	2/15 (1)
	Mounting (M6)	-	6 (2)

Notes: (1) Recommended Value $1.8 \pm 0.2/15^{+0}_{-0.3} N \cdot m$ (2) Recommended Value $5.5 \pm 0.5 N \cdot m$

ELECTRICAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Collector Emitter Cut-Off Current	I_{CES}	mA	-	-	0.4	$V_{CE}=3,300V, V_{GE}=0V, T_{vj}=25^\circ C$	
Gate Emitter Leakage Current	I_{GES}	nA	-500	-	+500	$V_{CE}=3,300V, V_{GE}=0V, T_{vj}=150^\circ C$	
Collector Emitter Saturation Voltage	V_{CEsat}	V	2.5	2.85	3.5	$I_C=1,200A, V_{GE}=15V, T_{vj}=150^\circ C$	
Gate Emitter Threshold Voltage	$V_{GE(th)}$	V	5.5	6.5	7.5	$V_{CE}=10V, I_C=1,200mA, T_{vj}=25^\circ C$	
Input Capacitance	C_{ies}	nF	-	88	-	$V_{CE}=10V, V_{GE}=0V, f=100kHz, T_{vj}=25^\circ C$	
Internal Gate Resistance	$R_{G(int)}$	Ω	-	1.9	-	$V_{CE}=10V, V_{GE}=0V, f=100kHz, T_{vj}=25^\circ C$	
Turn On Delay Time	$t_{d(on)}$	μs	0.7	1.0	1.3	$V_{CC}=1,800V, I_C=1,200A$	
Rise Time	t_r		0.1	0.2	0.3	$L_S=100nH$	
Turn Off Delay Time	$t_{d(off)}$		1.7	2.7	3.3	$R_G(on/off)=6.8\Omega/8.2\Omega$ (3)	
Fall Time	t_f		1.0	1.8	2.6	$V_{GE}=\pm 15V, T_{vj}=150^\circ C$	
Peak Forward Voltage Drop	V_F	V	2.2	2.6	2.9	$I_F=1,200A, V_{GE}=0V, T_{vj}=150^\circ C$	
Reverse Recovery Time	t_{rr}	μs	0.2	0.7	1.1	$V_{CC}=1,800V, I_F=1,200A, L_S=100nH$ $T_{vj}=150^\circ C$	
Turn On Loss	E_{on}	J/P	-	2.6	3.4	$V_{CC}=1,800V, I_C=1,200A, L_S=100nH$	
Turn Off Loss	E_{off}	J/P	-	2.2	2.7	$R_G(on/off)=6.8\Omega/8.2\Omega$ (3)	
Reverse Recovery Loss	E_{rr}	J/P	-	1.7	2.2	$V_{GE}=\pm 15V, T_{vj}=150^\circ C$	
Short Circuit Pulse Width	t_{sc}	μs	10	-	-	$V_{CC}=2,000V, L_S=100nH$ $R_G(on/off)=6.8/8.2\Omega, V_{GE}=\pm 15V, T_{vj}=150^\circ C$	
Stray inductance module	L_{SCE}	nH	-	10	-		
Thermal Impedance	IGBT	$R_{th(j-c)}$	K/W	-	-	0.010	Junction to case
	FWD	$R_{th(f-c)}$		-	-	0.017	
Contact Thermal Impedance	$R_{th(c-f)}$	K/W	-	0.008	-	Case to fin	

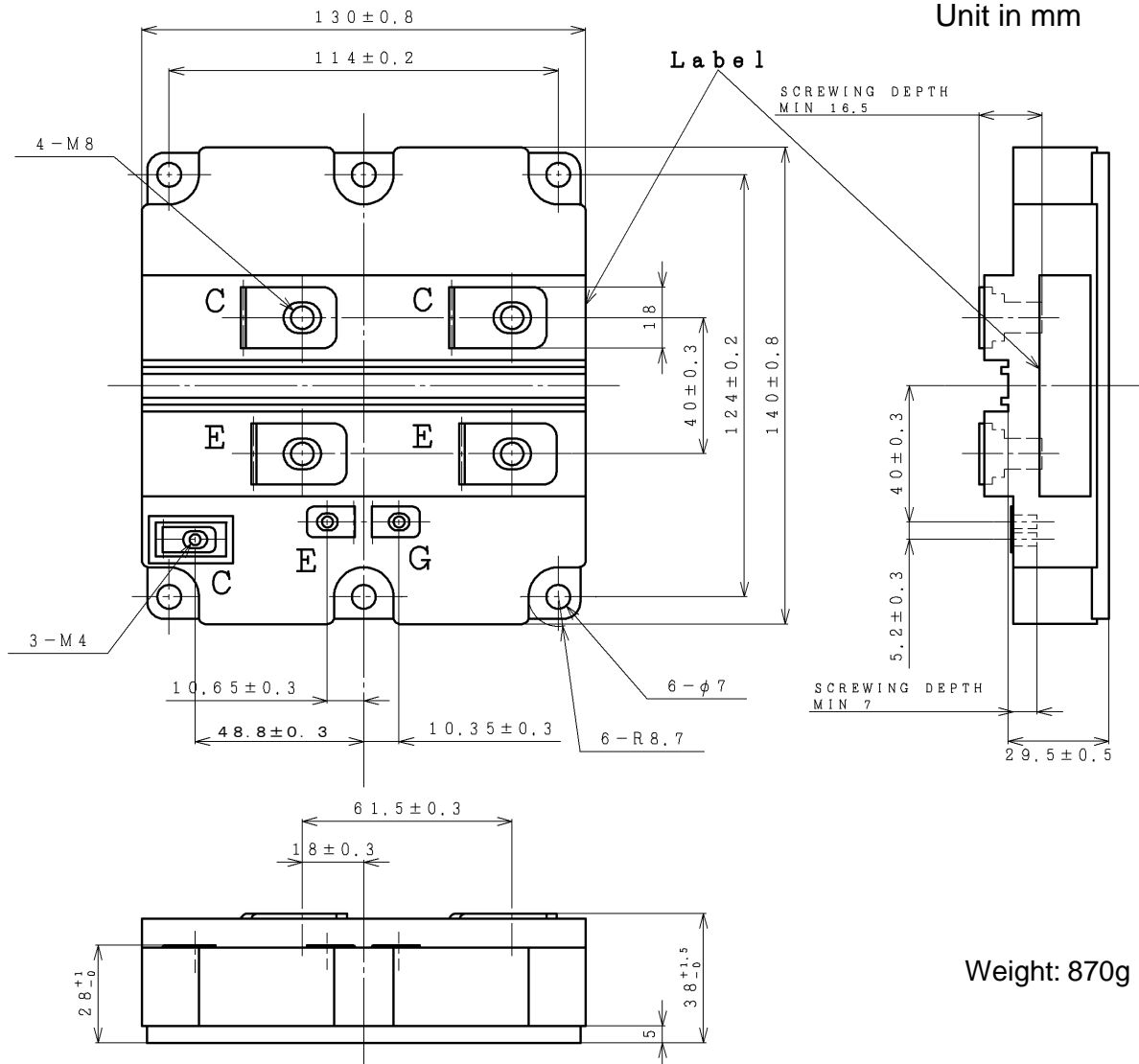
Notes: (3) R_G value is a test condition value for evaluation, not recommended value.

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 items shown in above table are according to IEC 60747-2 and IEC 60747-9.

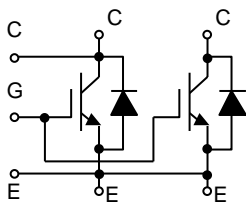
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OUTLINE DRAWING

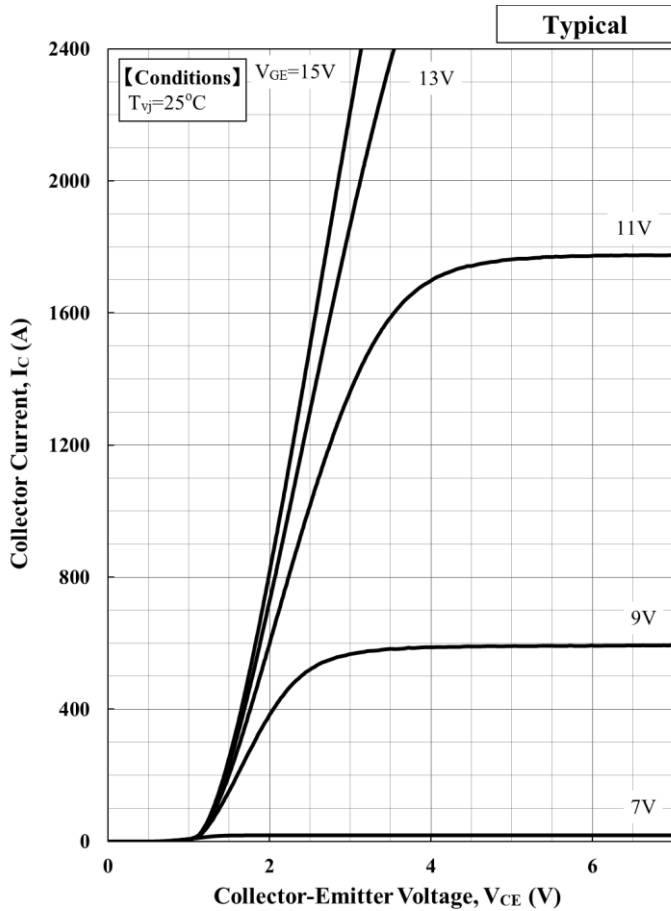


Weight: 870g

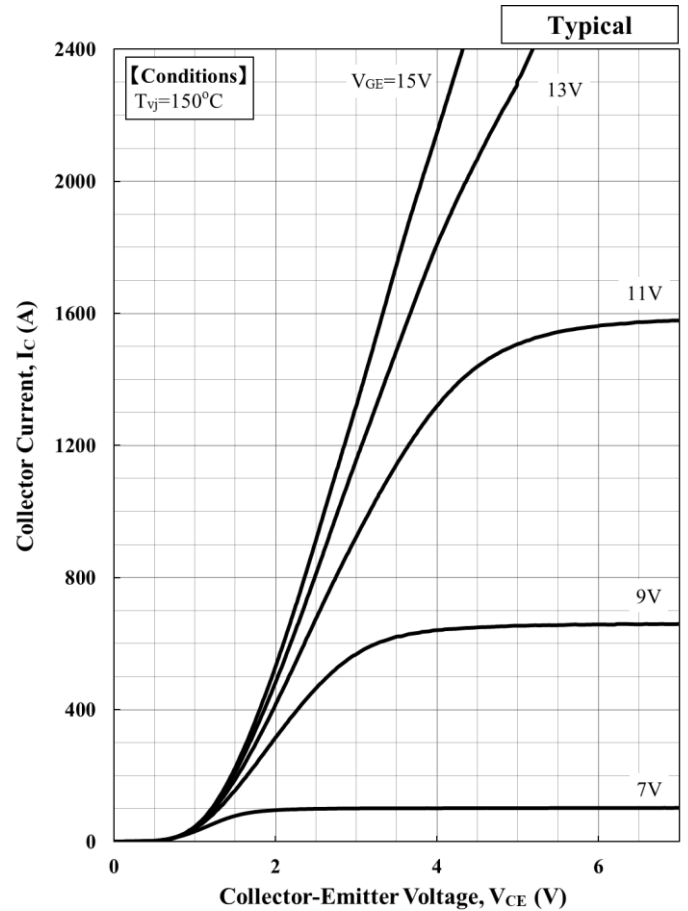
CIRCUIT DIAGRAM



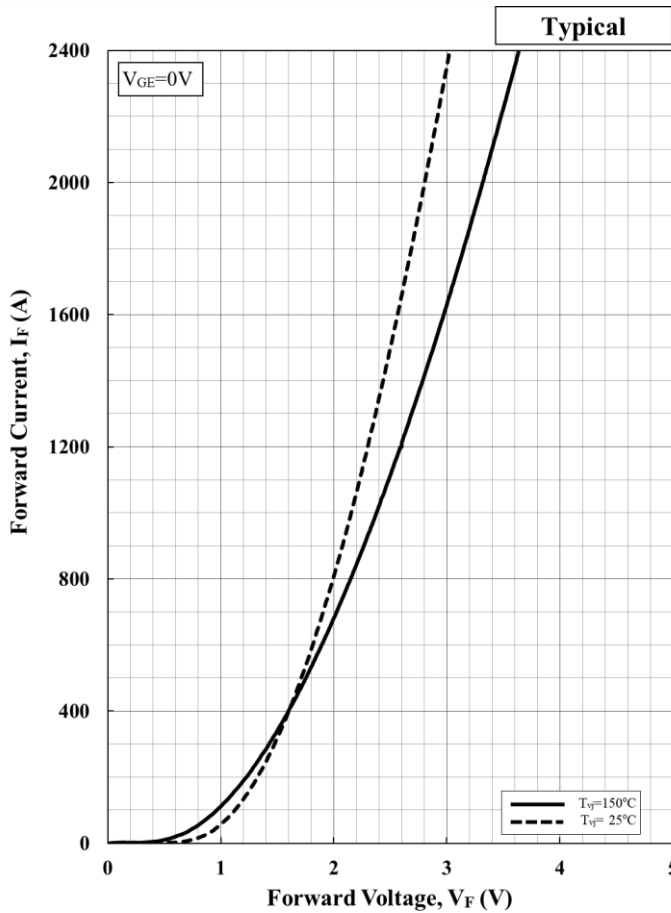
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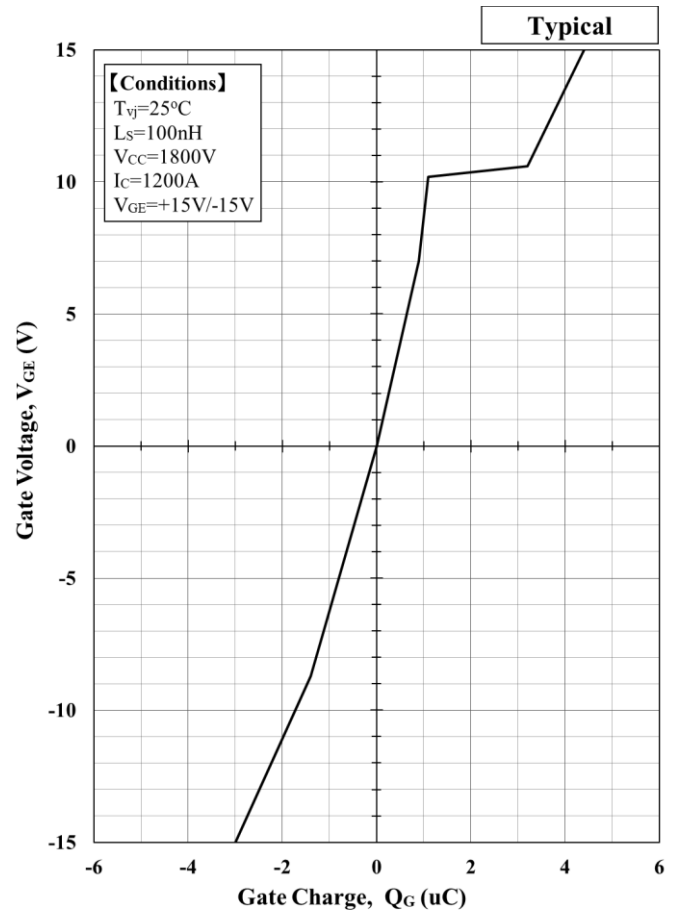
Collector Current vs. Collector Emitter Voltage



Collector Current vs. Collector Emitter Voltage

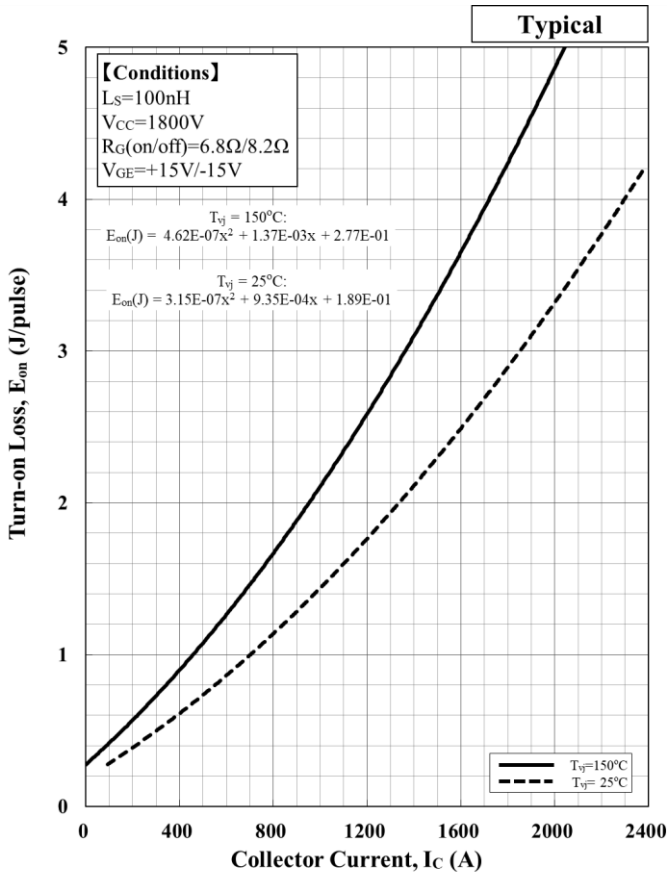


Forward Voltage of free-wheeling diode

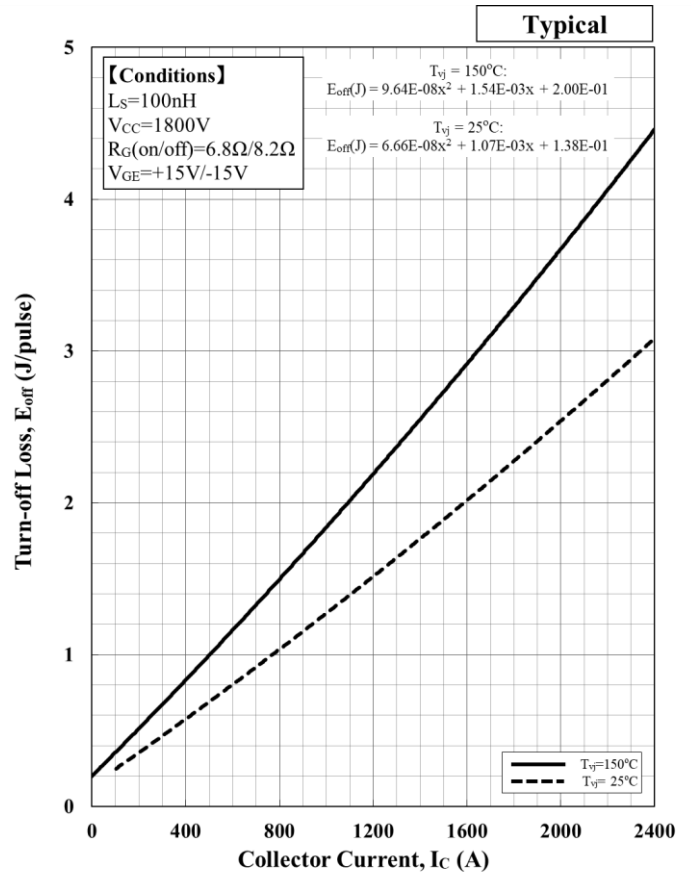


$V_{GE}-Q_G$ curve

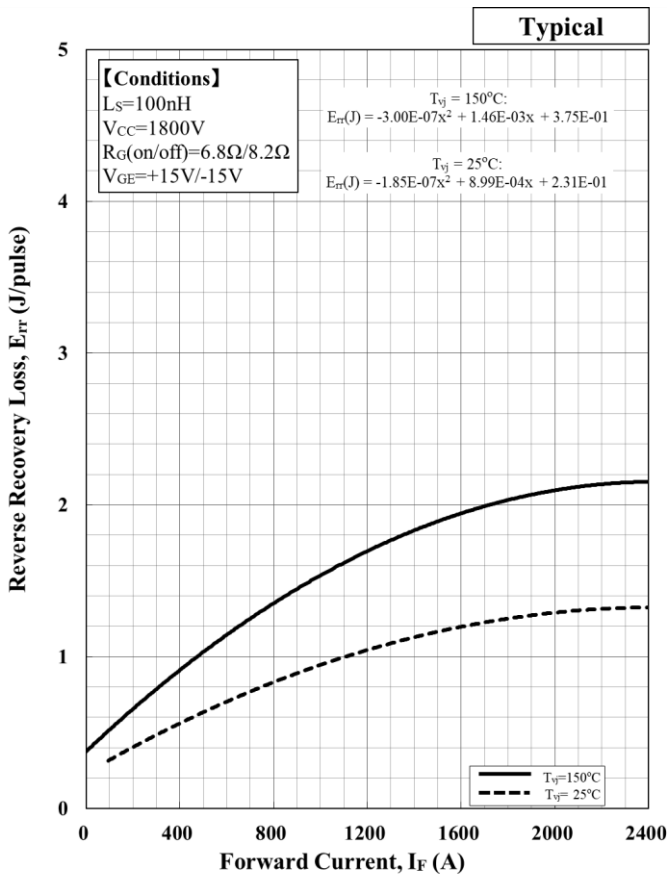
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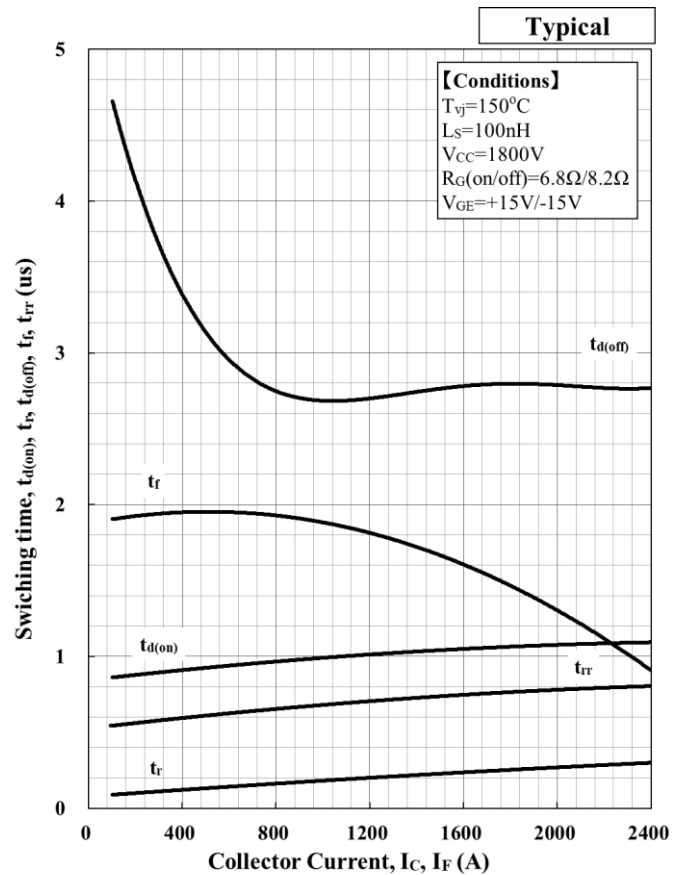
Turn-on loss vs. Collector current



Turn-off loss vs. Collector current

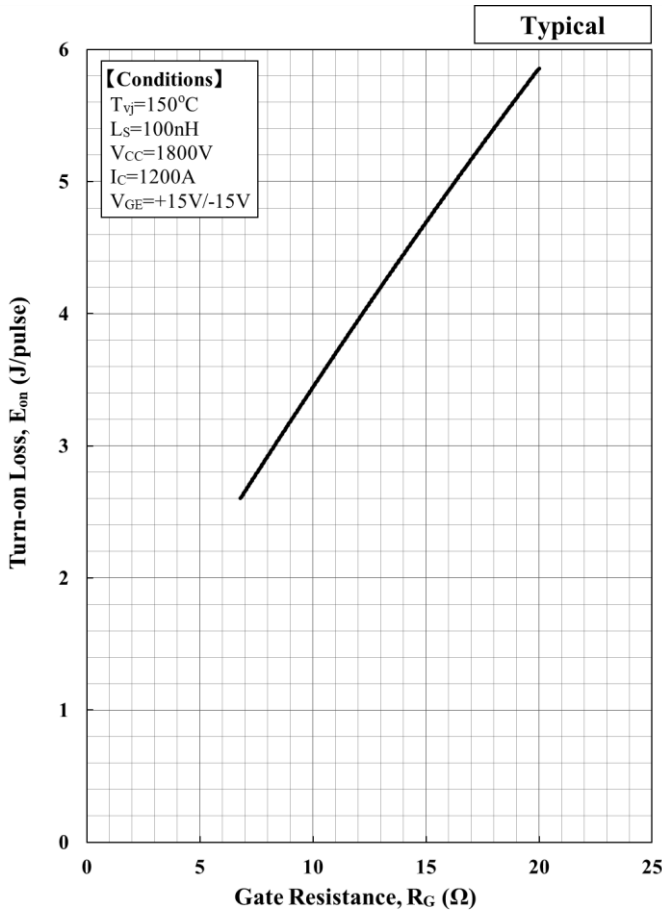


Recovery loss vs. Forward current

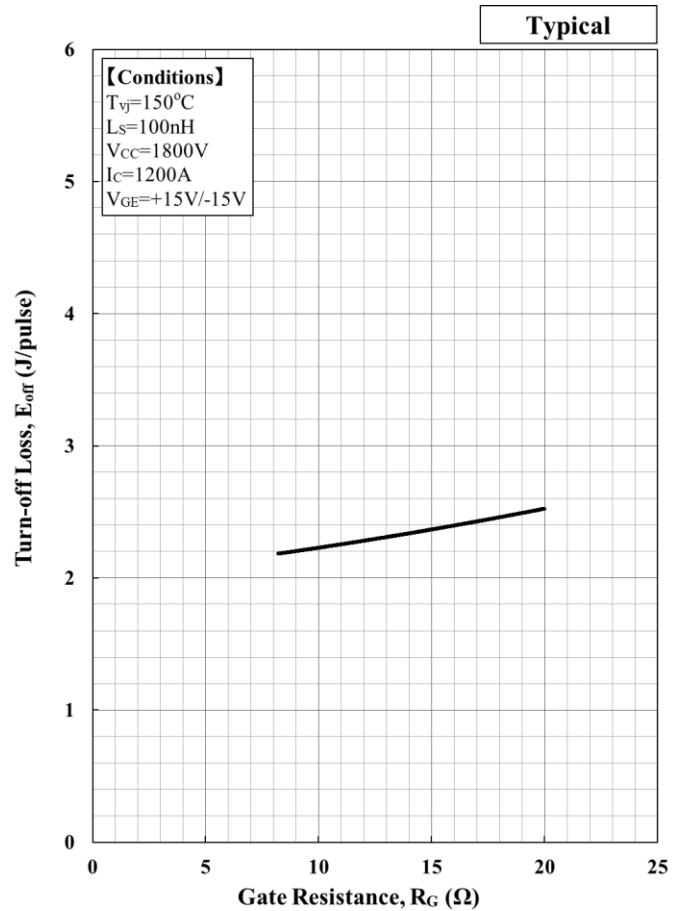


Switching time vs. Collector Current

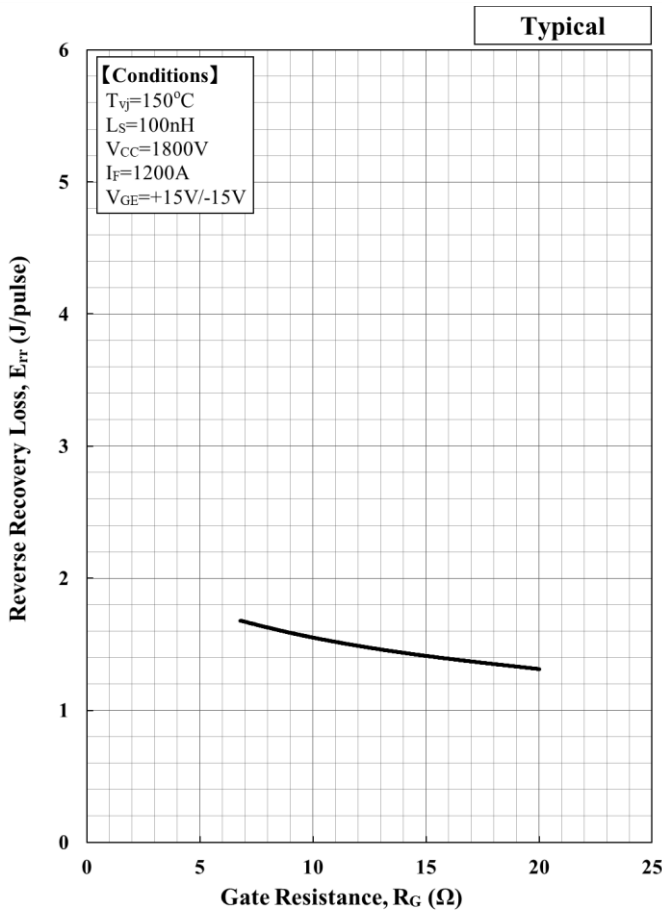
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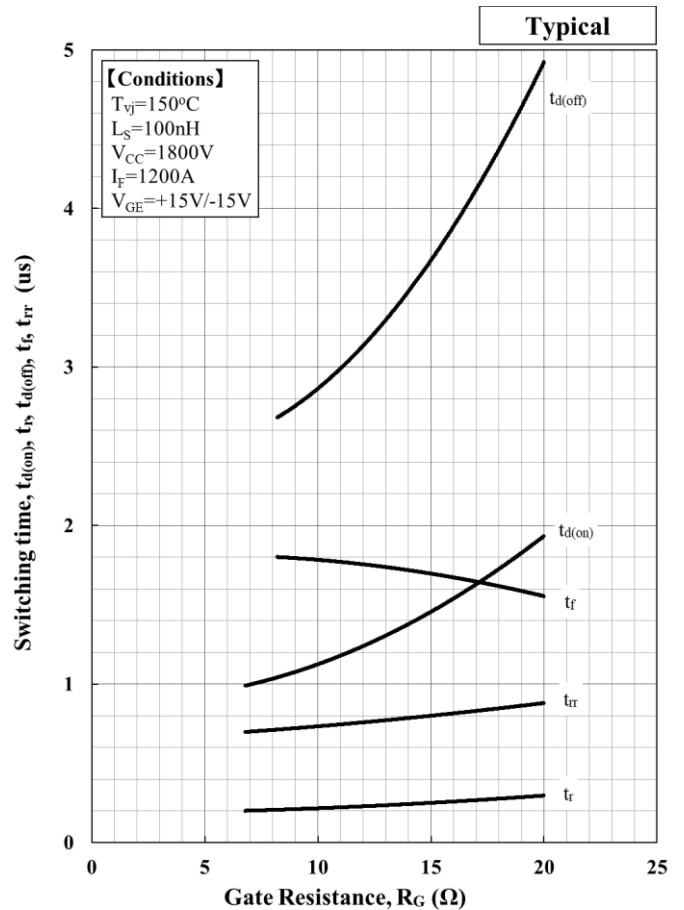
Turn-on loss vs. Gate Resistance



Turn-off loss vs. Gate Resistance

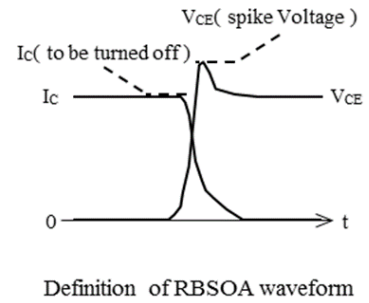
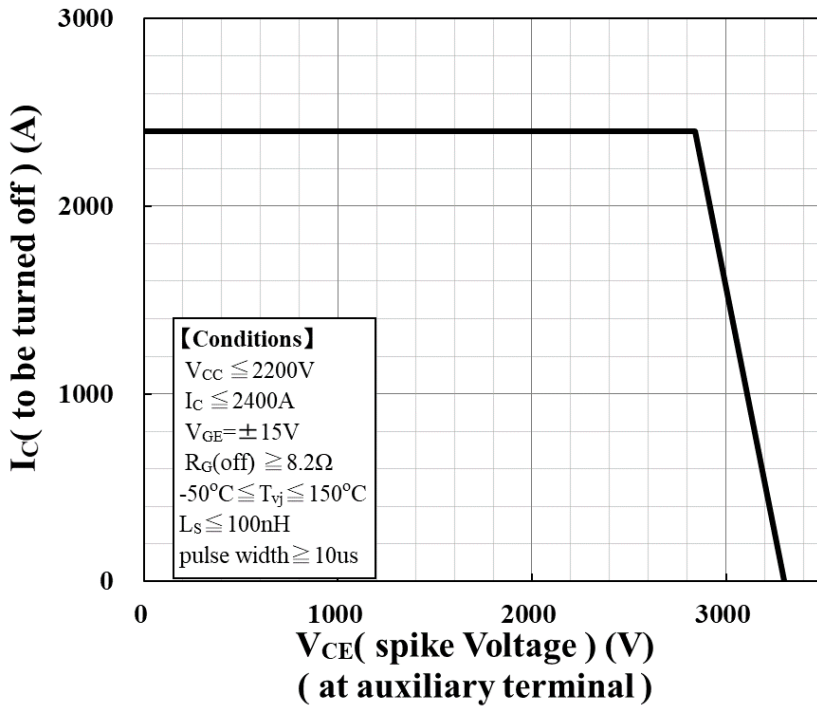


Recovery loss vs. Gate Resistance

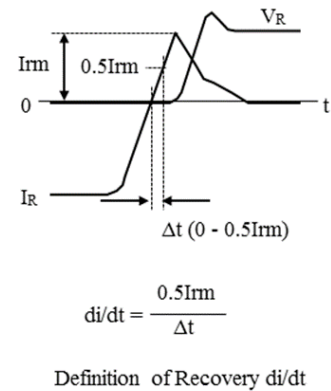
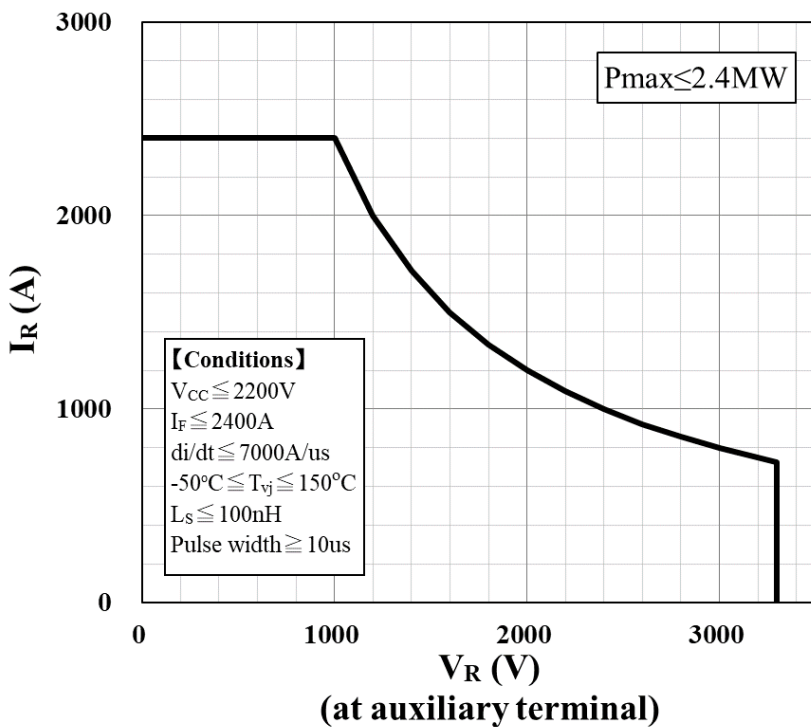


Switching time vs. Gate Resistance

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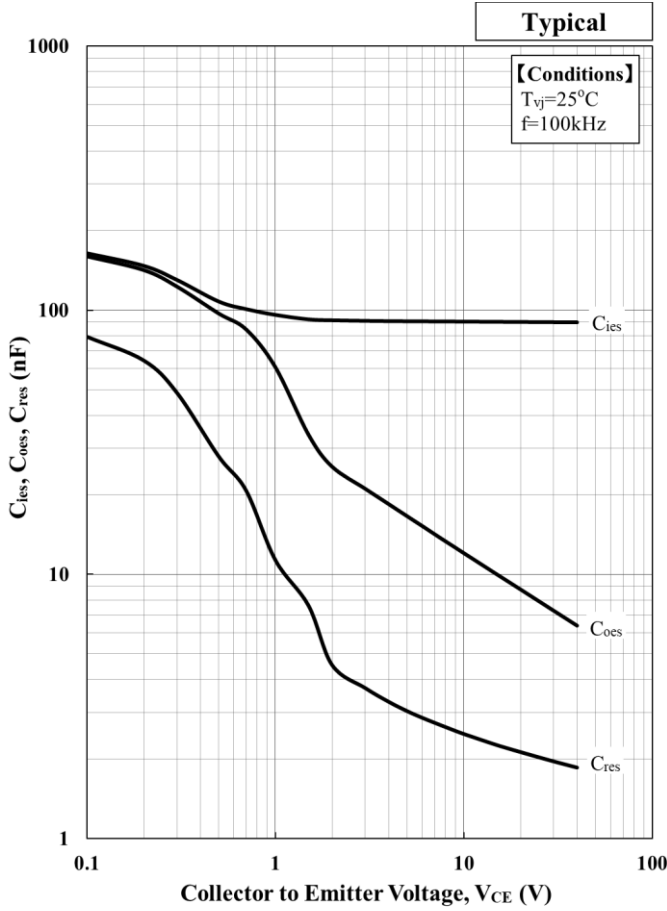


Reverse Bias Safe Operation Area (RBSOA)

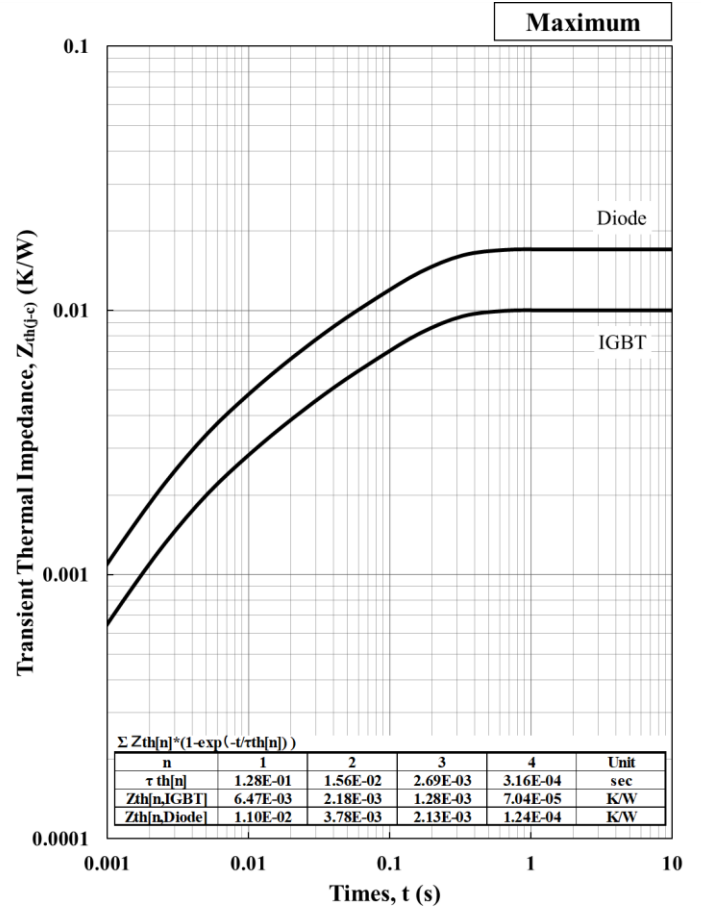


Reverse Recovery Safe Operation Area (RRSOA)

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Capacitance vs. Collector to Emitter Voltage



Transient Thermal Impedance Curve

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- For inquiries relating to the products, please contact nearest representatives that is located "Inquiry" portion on the top page of a home page.
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