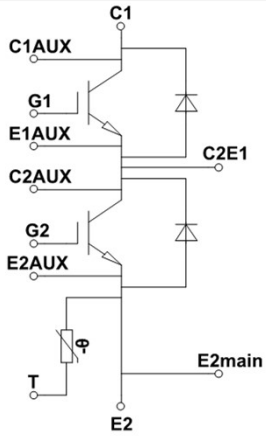
MBM1000FS17G

Silicon N-channel IGBT 1700V G version



Circuit diagram

FEATURES

- High current density package
- Low stray inductance & low Rth(j-c)
- Half-bridge (2in1)
- Built in temperature sensor
- Scalable large current easily handled by paralleling
- Equipped with current sensing terminals

ABSOLUTE MAXIMUM RATINGS (Tc=25°C)

Item		Symbol	Unit	MBM1000FS17G
Collector Emitter Voltage		V_{CES}	V	1,700
Gate Emitter Voltage		V_{GES}	V	±20
Collector Current	DC	I_C	A	1,000
	1ms	I_{CM}		2,000
Forward Current	DC	I_F	A	1,000
	1ms	I_{FM}		2,000
Junction Temperature		$T_{vj\ op}$	°C	-50 ~ +150
Storage Temperature		T_{stg}	°C	-55 ~ +150
Isolation Voltage		V_{ISO}	V_{RMS}	4,000(AC 1 minute)
Screw Torque	Terminals (M3/M8)	M	N·m	0.8/15
	Mounting (M6)	M		6.0 (1)

Notes: (1) 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	-	1	20	V_{CE}=1,700V, V_{GE}=0V, T_{vj}=25°C
				-	10	-	V_{CE}=1,700V, V_{GE}=0V, T_{vj}=150°C
Gate Emitter Leakage Current		I_{GES}	nA	-500	-	+500	V_{GE}=±20V, V_{CE}=0V, T_{vj}=25°C
Collector Emitter Saturation Voltage		V_{CEsat}	V	-	1.85	-	I_C=1,000A, V_{GE}=15V, T_{vj}=25°C
				1.7	2.15	2.6	I_C=1,000A, V_{GE}=15V, T_{vj}=150°C
Gate Emitter Threshold Voltage		$V_{GE(th)}$	V	5.5	6.5	7.5	V_{CE}=10V, I_C=1,000mA, T_{vj}=25°C
Input Capacitance		C_{ies}	nF	-	76	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, T_{vj}=25°C
Internal Gate Resistance		$R_{g(int)}$	Ω	-	2.1	-	V_{CE}=10V, V_{GE}=0V, f=100kHz, T_{vj}=25°C
Turn On Delay Time		$t_{d(on)}$	µs	-	0.4	-	V_{CC}=900V, I_C=1,000A
Rise Time		t_r		-	0.2	-	Ls=40nH
Turn Off Delay Time		$t_{d(off)}$		-	1.1	-	R_G(on/off)=2.7Ω/10Ω (2)
Fall Time		t_f		-	0.8	-	V_{GE}=±15V, T_{vj}=150°C
Forward Voltage Drop		V_F	V	-	1.75	-	I_F=1,000A, V_{GE}=0V, T_{vj}=25°C
				1.45	1.90	2.35	I_F=1,000A, V_{GE}=0V, T_{vj}=150°C
Reverse Recovery Time		t_{rr}	µs	-	0.5	-	V_{CC}=900V, I_F=1,000A, Ls =40nH T_{vj}=150°C
Turn-on Loss per Pulse		E_{on}	J/P	-	0.39	-	V_{CC}=900V, Ic=1,000A, Ls =40nH
Turn-off Loss per Pulse		E_{off}	J/P	-	0.38	-	R_G(on/off)=2.7Ω/10Ω (2)
Reverse Recovery Loss per Pulse		E_{rr}	J/P	-	0.39	-	V_{GE}=±15V, T_{vj}=150°C
Short Circuit Pulse Width		t_{SC}	µs	6	-	-	V_{CC}=1300V,Ls=40nH R_G(on/off)=2.7/100Ω,V_{GE}=±15V,Tj=150°C
Stray Inductance Module		L_{SCE}	nH	-	9	-	Between C1(main) and E2(main)
NTC-Thermistor	Resistance	R_{25}	kΩ	-	5	-	Tc=25 °C
	Deviation	△R/R	%	-5		5	Tc=25 °C
	B-constant	$B_{(25/50)}$	K	-	3375	-	Between 25 °C and 50 °C
Thermal Impedance	IGBT	Rth(j-c)	K/W	-	-	0.032	Junction to case
	FWD	Rth(j-c)		-	-	0.053	
Contact Thermal Impedance		Rth(c-f)	K/W	-	0.02	-	Case to fin (per 1 arm)

Notes: (2) R_G value is a test condition value for evaluation, not recommended value.
Please determine the suitable R_G value by measuring switching behavior and checking results with the respective SOA.

* 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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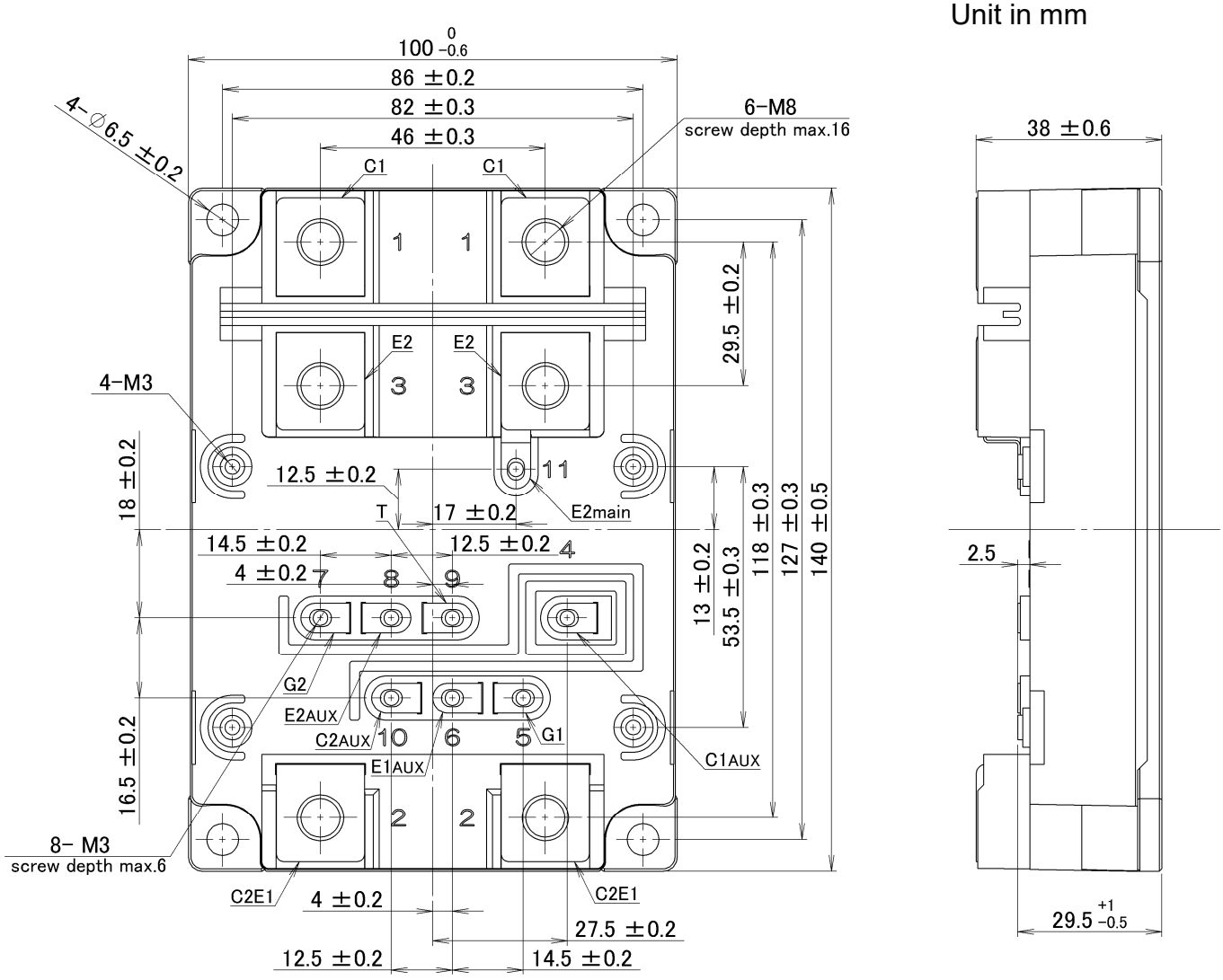
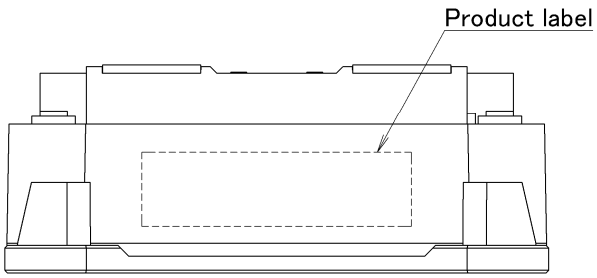
OUTLINE DRAWING

Unit in mm





Weight: 770(g)

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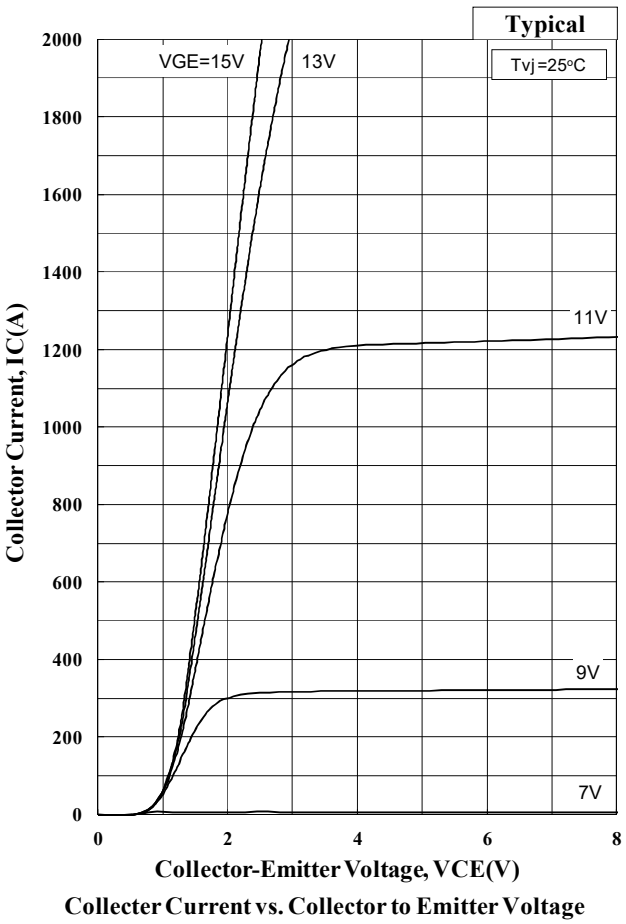
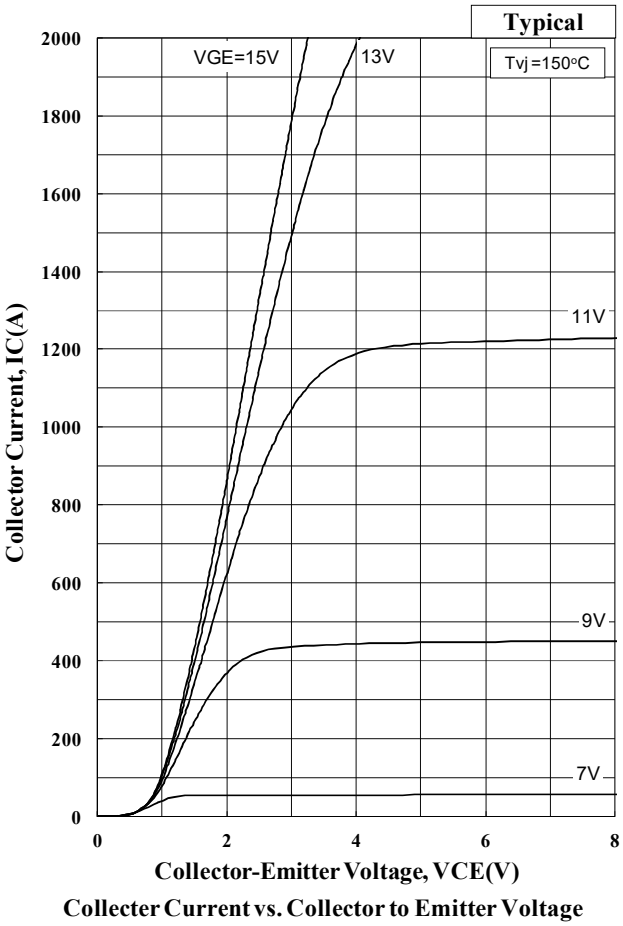
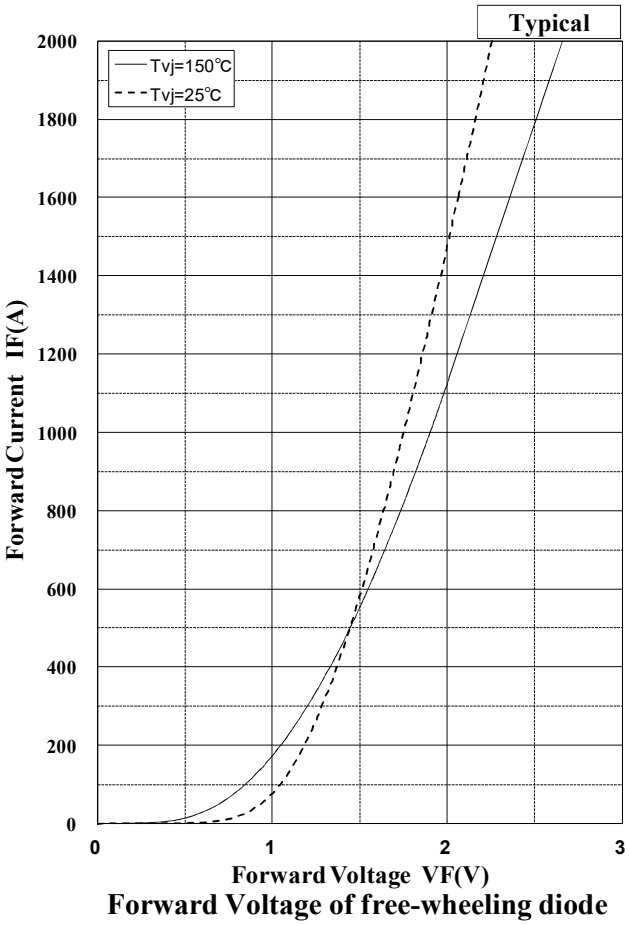


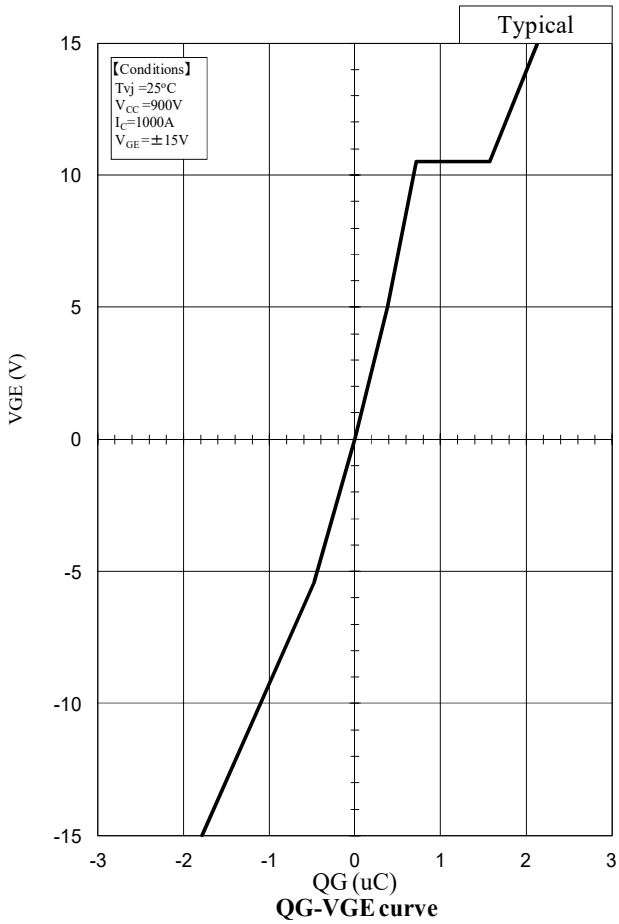
Collecter Current vs. Collector to Emitter Voltage



Collecter Current vs. Collector to Emitter Voltage



Forward Voltage of free-wheeling diode



QG-VGE curve

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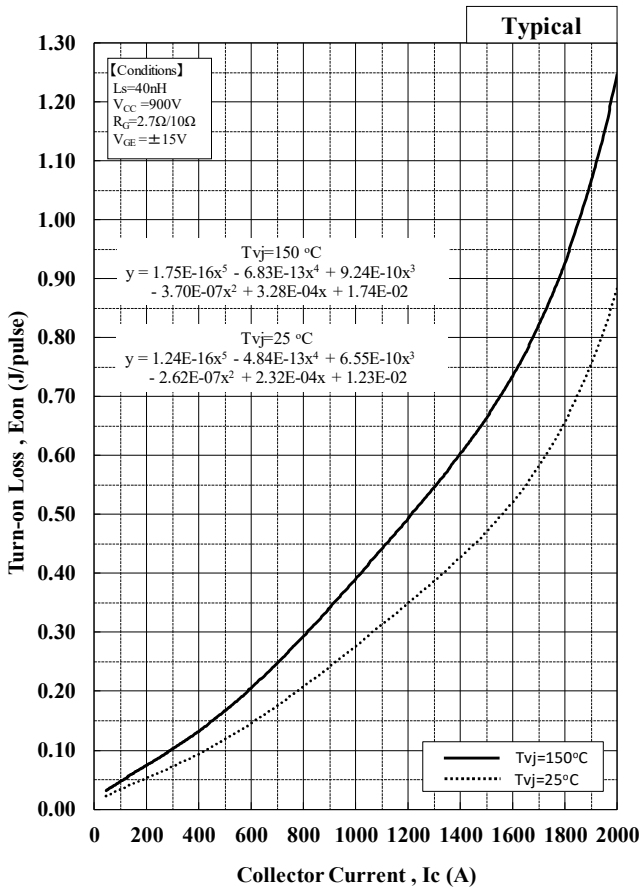
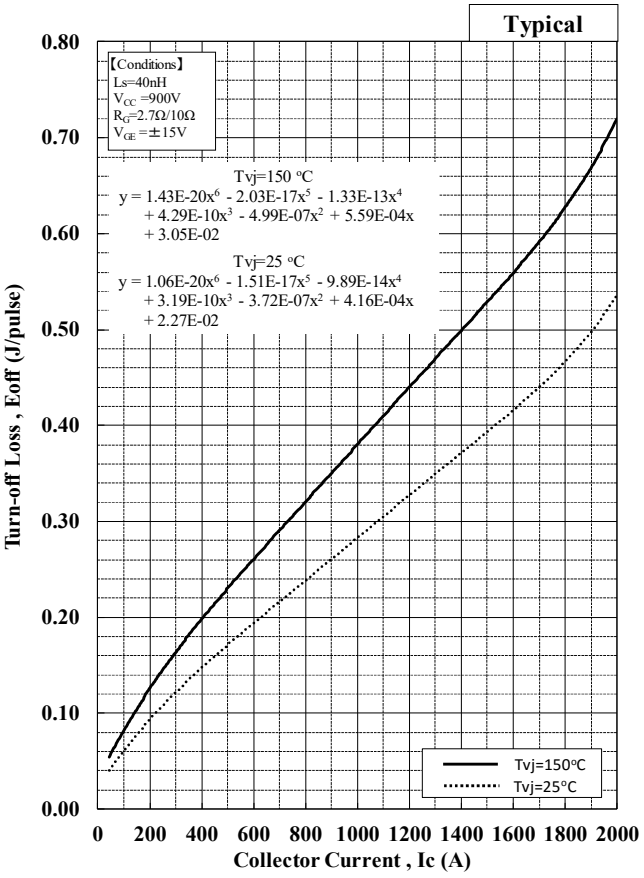
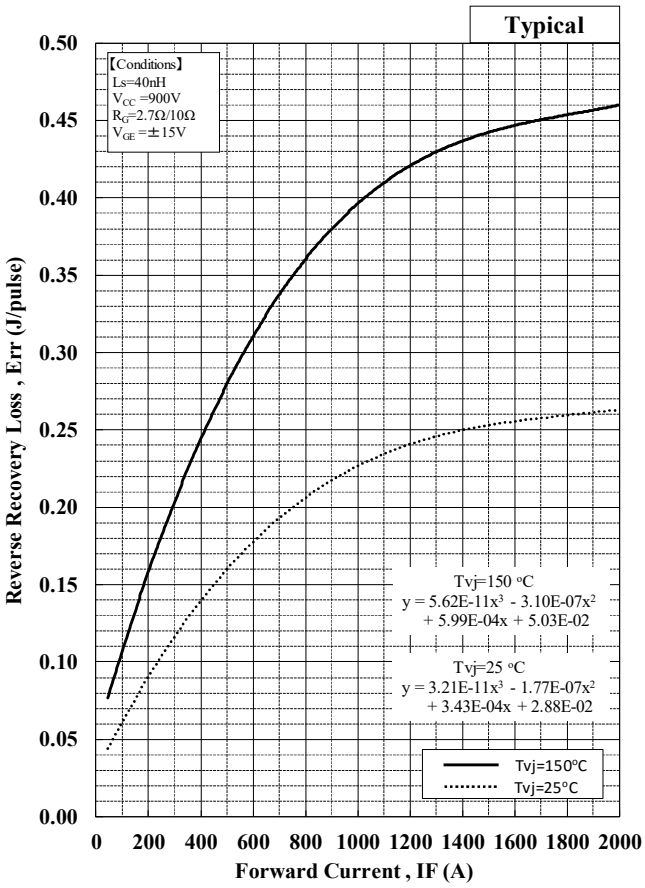


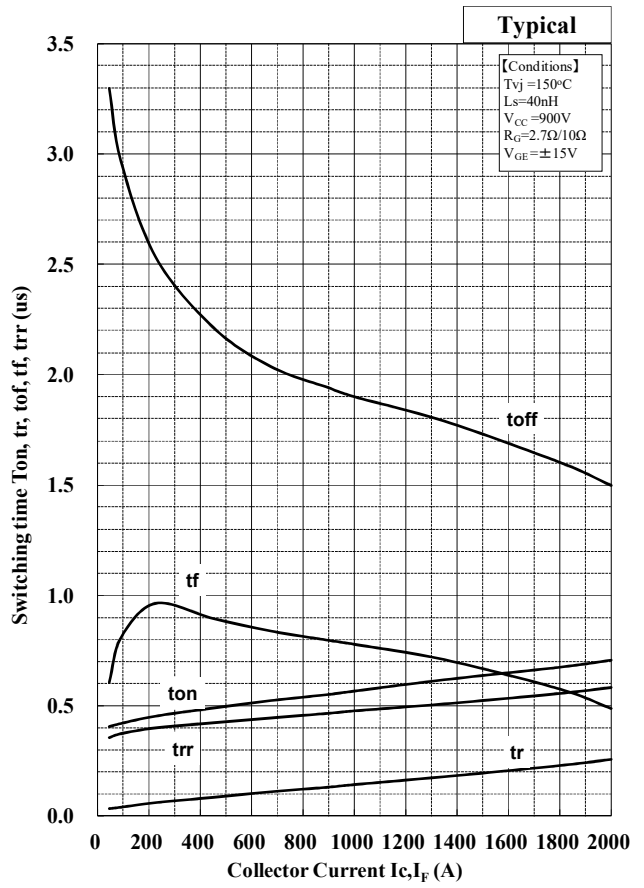
Turn-on Loss vs. Collector Current



Turn-off Loss vs.Collector Current



Recovery Loss vs. Forward Current



Switching time vs. Collector Current

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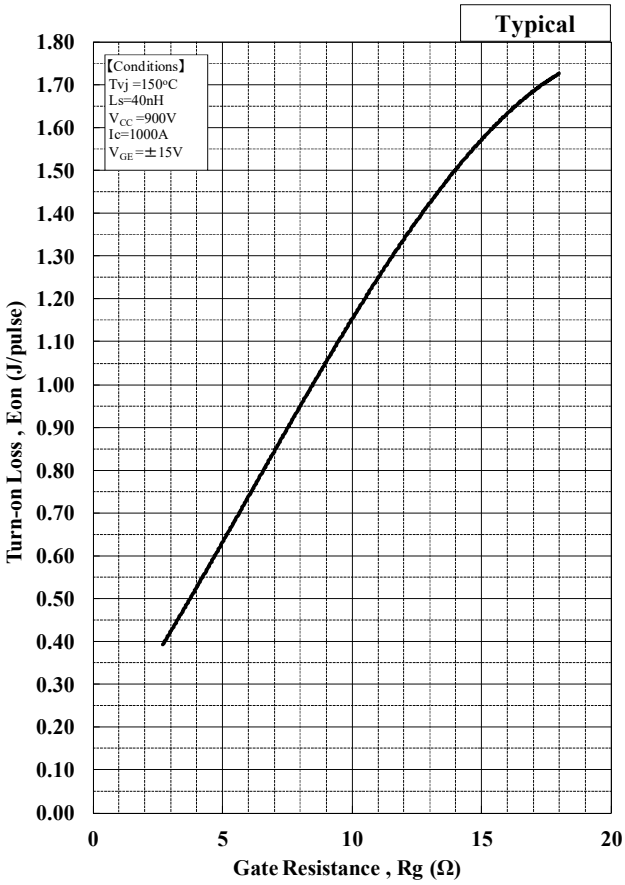
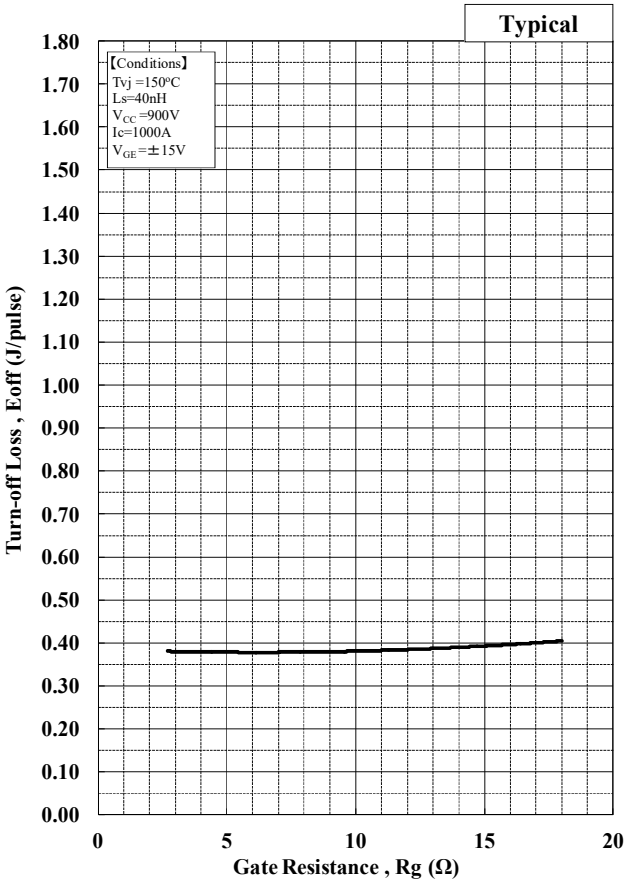
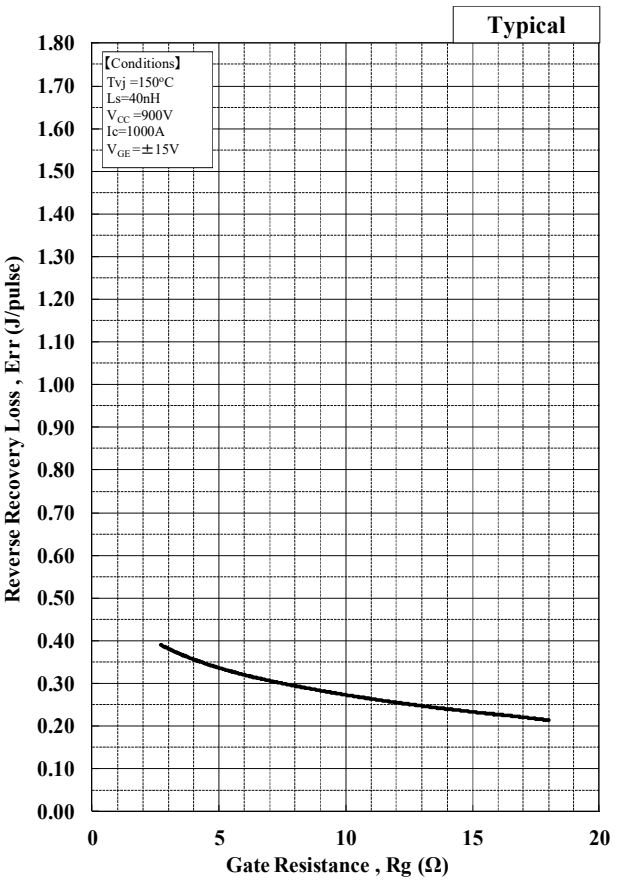


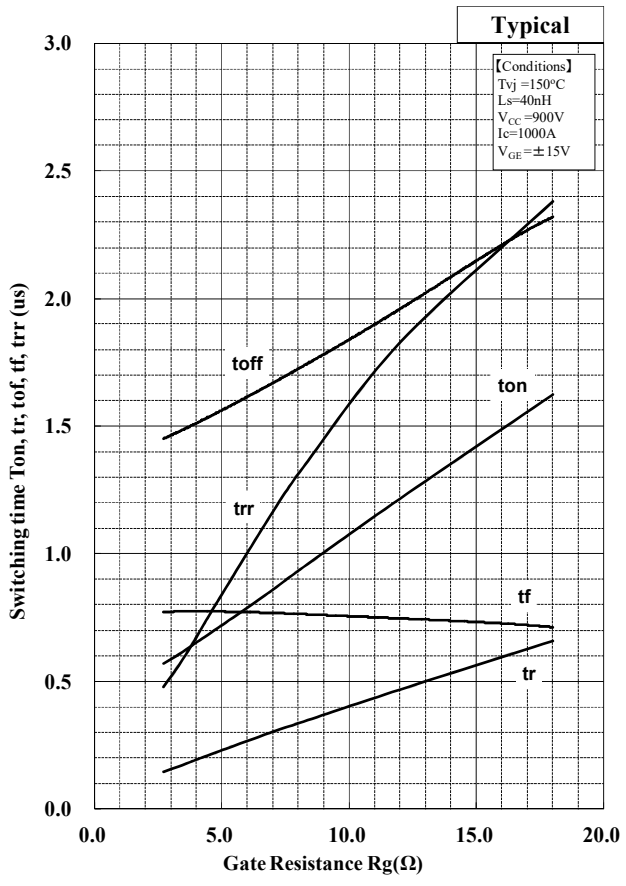
Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance



Recovery Loss vs. Gate Resistance



Switching time vs. Gate Resistance

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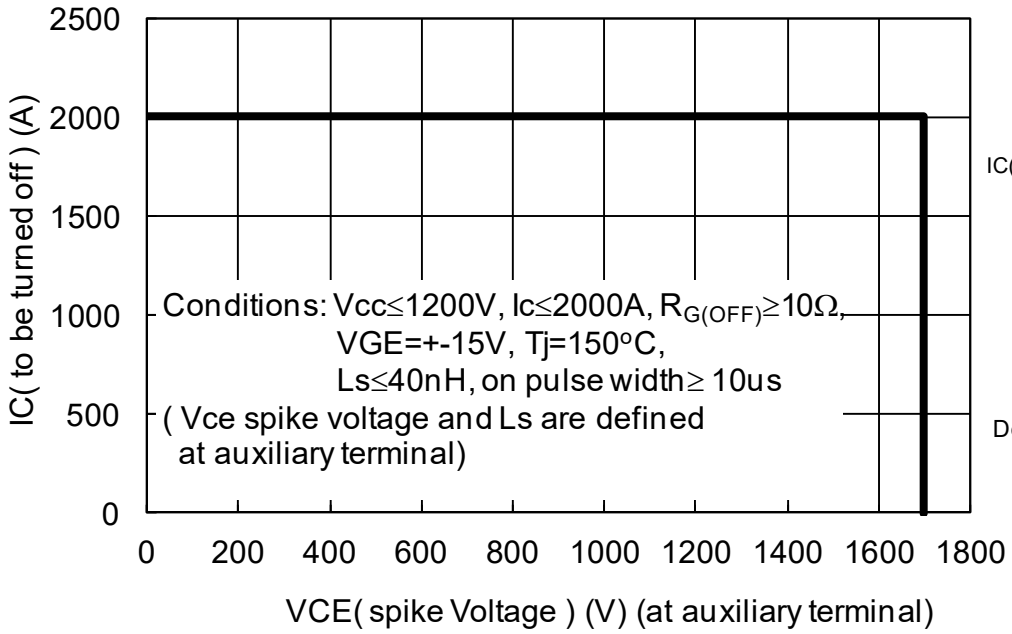
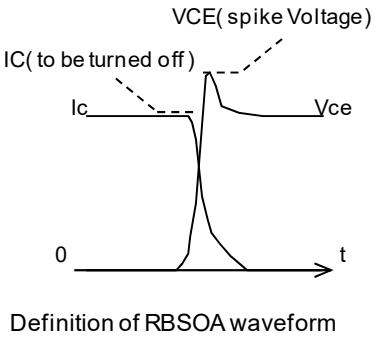
RBSOA



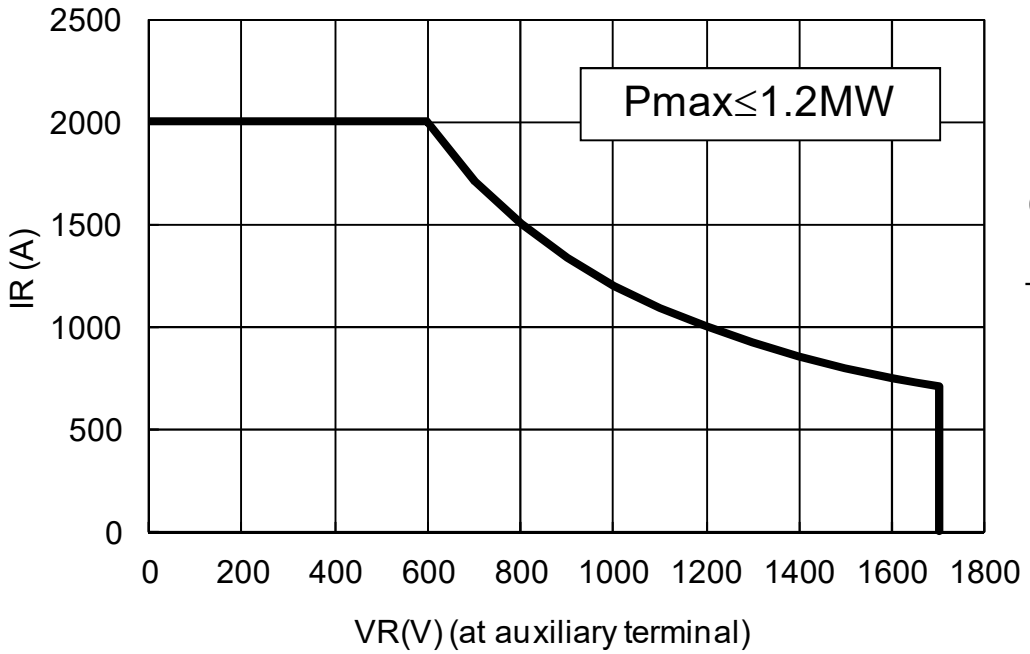


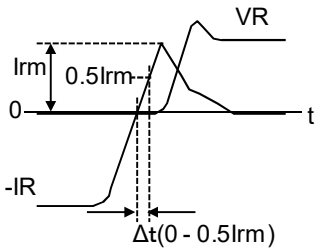
Definition of RBSOA waveform

Reverse bias safe operation area (RBSOA)

Reverse Recovery SOA

Conditions:
Ls≤40nH, Vcc≤1200V, IF≤2000A, di/dt≤8000A/us, Tj=150°C





$$di/dt = \frac{0.5Irm}{\Delta t}$$

Definition of Recovery di/dt

Reverse Recovery SOA

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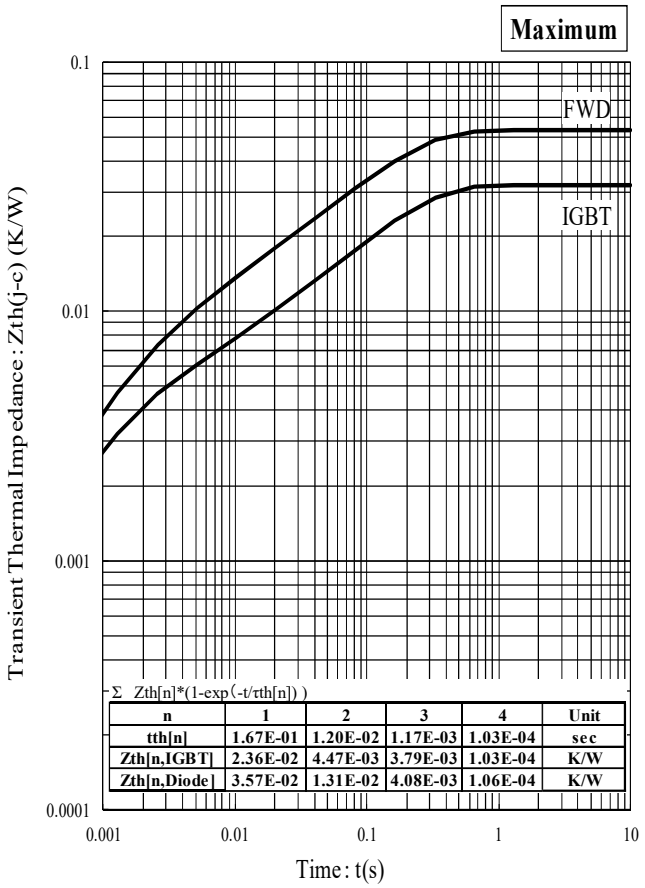
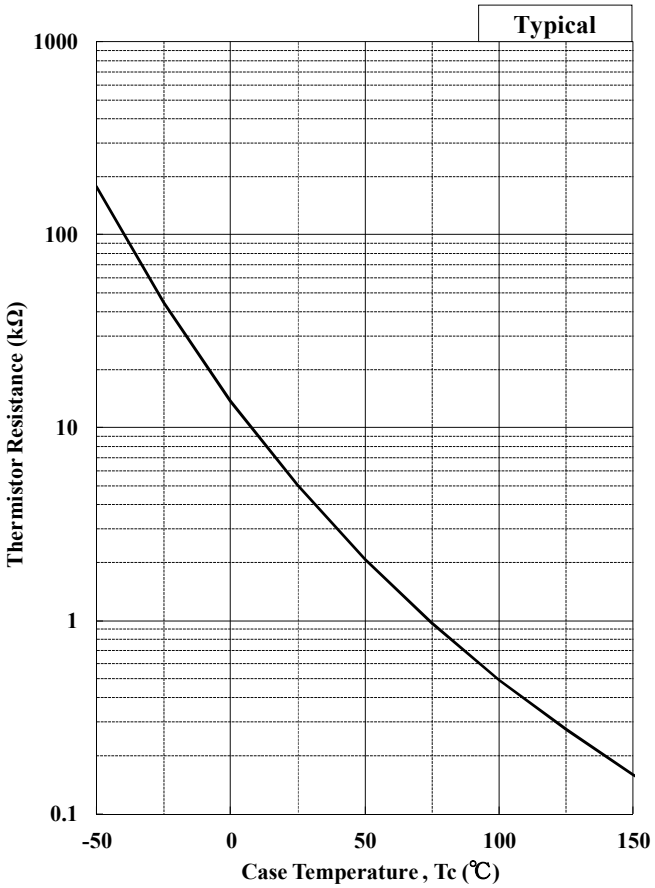


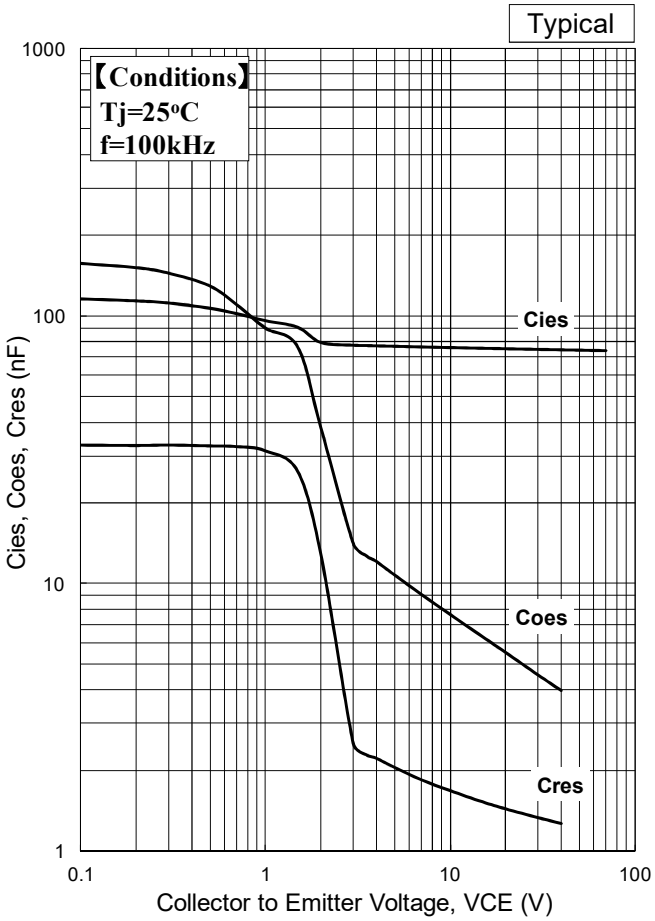
Σ Zth[n]*(1-exp(-t/τth[n]))

n	1	2	3	4	Unit
tth[n]	1.67E-01	1.20E-02	1.17E-03	1.03E-04	sec
Zth[n,IGBT]	2.36E-02	4.47E-03	3.79E-03	1.03E-04	K/W
Zth[n,Diode]	3.57E-02	1.31E-02	4.08E-03	1.06E-04	K/W

Transient Thermal Impedance Curve



Thermistor Resistance vs. Temperature



Capacitance vs. Collector to Emitter Voltage

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