

MBL1200E17F

Silicon N-channel IGBT 1700V F version

1.FEATURES

- * Soft switching behavior & low conduction loss:
Soft low-injection punch-through with trench gate IGBT.
- * Low driving power:
Low input capacitance with advanced trench gate.
- * Low noise recovery: Ultra soft fast recovery diode.

2.ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Item	Symbol	Unit	MBL1200E17F
Collector Emitter Voltage	V _{CES}	V	1,700
Gate Emitter Voltage	V _{GES}	V	±20
Collector Current	DC	I _C	1,200
	1ms	I _{Cp}	2,400
Forward Current (Free wheel Diode)	DC	I _{F(FWD)}	1,200
	1ms	I _{FM(FWD)}	2,400
Forward Current (Chopper Diode)	DC	I _{F(chopper)}	1,200
	1ms	I _{FM(chopper)}	2,400
Junction Temperature	T _j	°C	-50 ~ +150
Storage Temperature	T _{stg}	°C	-55 ~ +125
Isolation Test 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±0.2 / 15^{+0/-3}N·m (2) Recommended Value 5.5±0.5N·m

3.ELECTRICAL CHARACTERISTICS

1) IGBT + FWD

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Collector Emitter Cut-Off Current	I _{CES}	mA	-	-	10	V _{CE} =1,700V, V _{GE} =0V, T _j =25°C	
			-	23	-	V _{CE} =1,700V, 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 _{CE(sat)}	V	-	2.0	-	I _C =1,200A, V _{GE} =15V, T _j =25°C	
			-	2.4	-	I _C =1,200A, V _{GE} =15V, T _j =150°C	
Gate Emitter Threshold Voltage	V _{GE(TO)}	V	4.1	5.5	7.1	V _{CE} =10V, I _C =120mA, T _j =25°C	
Input Capacitance	C _{ies}	nF	-	63	-	V _{CE} =10V, V _{GE} =0V, f=100kHz, T _j =25°C	
Internal Gate Resistance	R _{ge}	Ω	-	4	-	V _{CE} =10V, V _{GE} =0V, f=100kHz, T _j =25°C	
Turn On Delay Time	t _{d(on)}	μs	-	0.74	1.70	V _{CC} =900V, I _C =1,200A, L=100nH, R _{G(on/off)} =2.7/4.7Ω (3) V _{GE} =±15V, T _j =150°C	
Rise Time	t _r		-	0.26	0.80		
Turn Off Delay Time	t _{d(off)}		-	1.9	3.0		
Fall Time	t _f		-	1.6	3.0		
Turn On Loss	E _{on}	J/P	-	0.40	0.90		
Turn Off Loss	E _{off}	J/P	-	0.93	1.5		
Peak Forward Voltage Drop	V _{FM}	V	-	2.0	-	I _F =1,200A, V _{GE} =0V, T _j =25°C Measured at auxiliary terminals	
			-	2.3	-	I _F =1,200A, V _{GE} =0V, T _j =150°C Measured at auxiliary terminals	
Reverse Recovery Time	t _{rr}	μs	-	0.65	1.5	V _{CC} =900V, I _F =1,200A, L=100nH, R _{G(on/off)} =2.7/4.7Ω (3) V _{GE} =±15V, T _j =150°C	
Reverse Recovery Loss	E _{rr}	J/P	-	0.48	1.0		
Thermal Impedance	IGBT	R _{th(j-c)}	K/W	-	-	0.022	Junction to case
	FWD	R _{th(j-c)}		-	-	0.033	
Contact Thermal Impedance		R _{th(c-f)}	K/W	-	0.016	-	Case to fin (at IGBT+FWD part)

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2) Chopper DIODE

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Repetitive Reverse Current	I _{RRM}	mA	-	-	10.0	V _R =1,700V, T _j =25°C
			-	23	-	V _R =1,700V, T _j =150°C
Peak Forward Voltage Drop (Between main terminals)	V _F	V	-	2.1	-	I _F =1,200A, T _j =25°C Measured at main terminal
			-	2.4	-	I _F =1,200A, T _j =150°C Measured at main terminal
Reverse Recovery Time	t _{rr}	μs	-	0.65	1.5	V _{CC} =900V, I _F =1,200A, L=100nH, R _G (on)=2.7Ω (3) V _{GE} =±15V, T _j =150°C
Reverse Recovery Loss	E _{rr}	J/P	-	0.48	1.0	
Thermal Impedance	R _{th(j-c)}	K/W			0.033	Junction to case
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.016	-	Case to fin (at Chopper Diode part)

Notes: (3) R_G value is the test condition's value for decision of the switching times, not recommended value. Please, determine the suitable R_G value after the measurement of switching waveforms(overshoot voltage, etc.)with appliance mounted.

* 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.

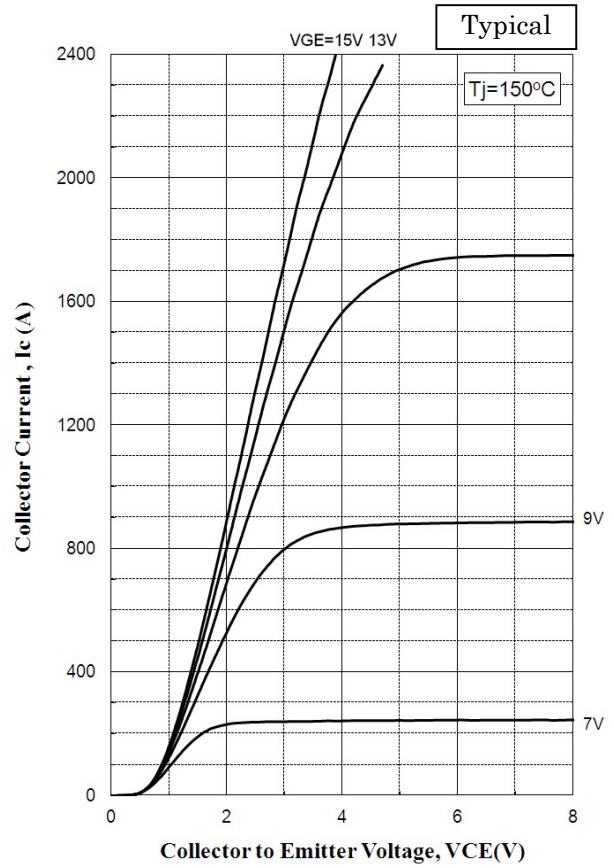
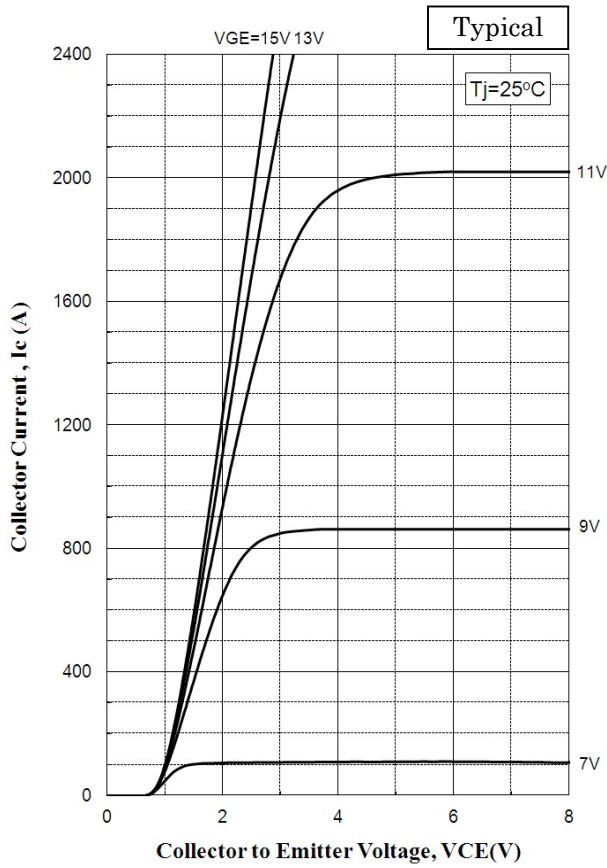
4. Material declaration

Please note the following materials are contained in the product, in order to keep characteristic and reliability level.

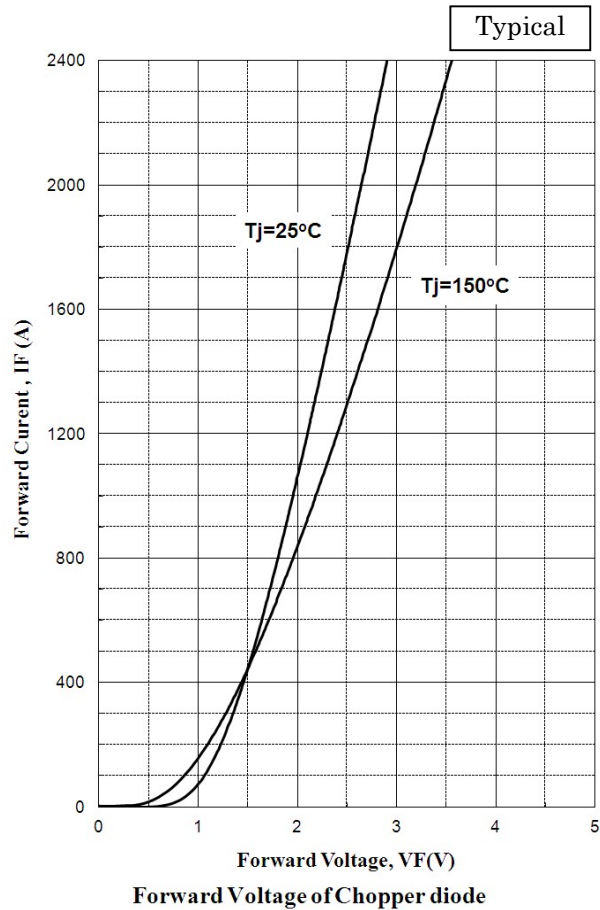
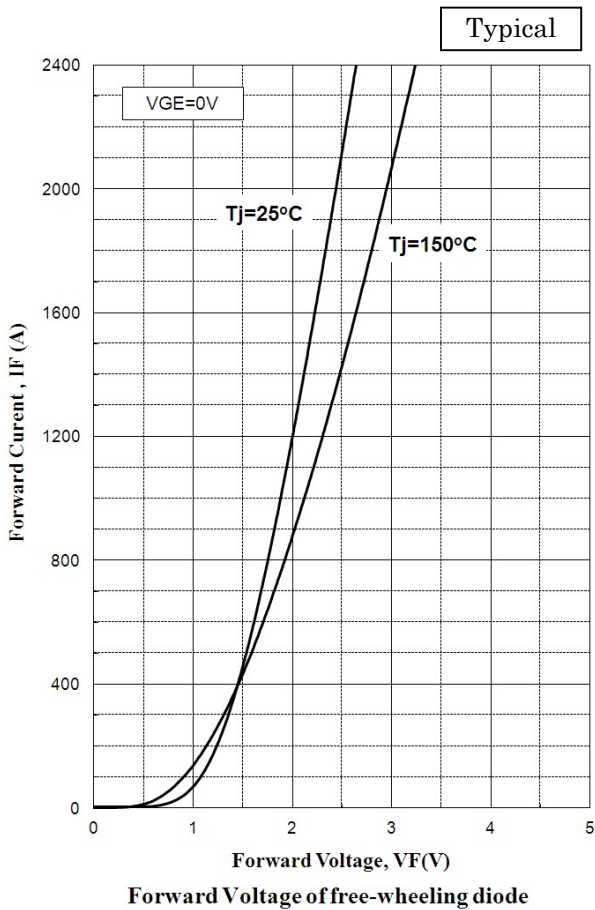
Material	Contained part
Lead (Pb) and its compounds	Solder

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5.CHARACTERISTICS CURVE 5.1 STATIC CHARACTERISTICS

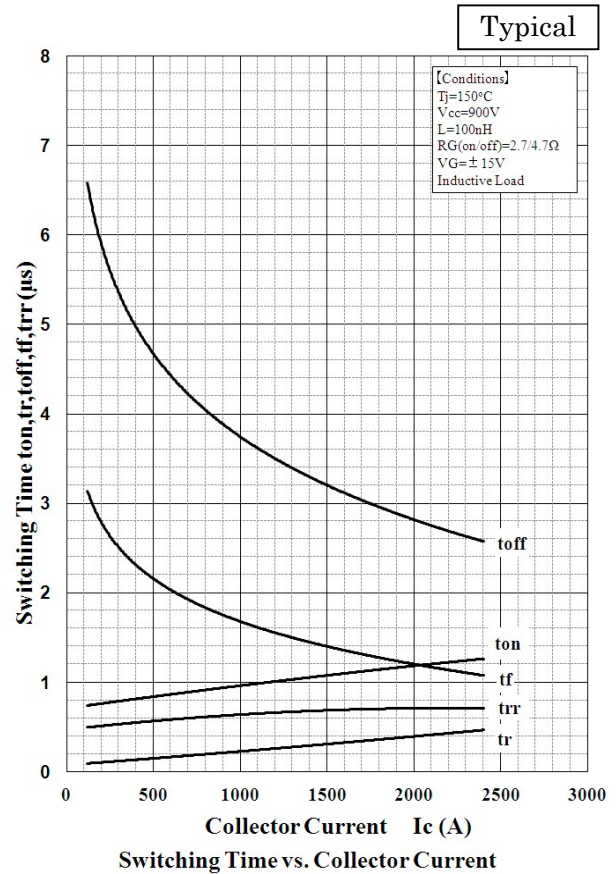
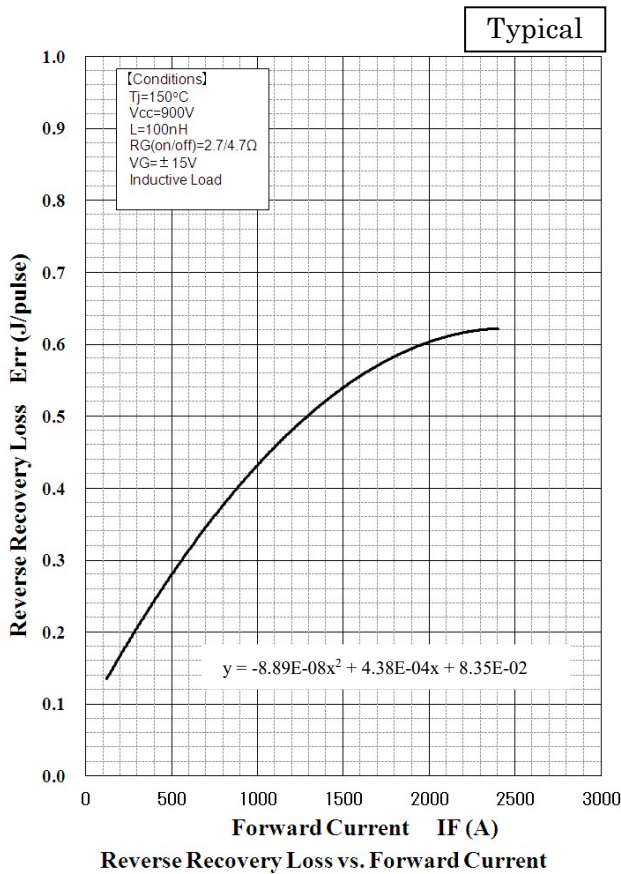
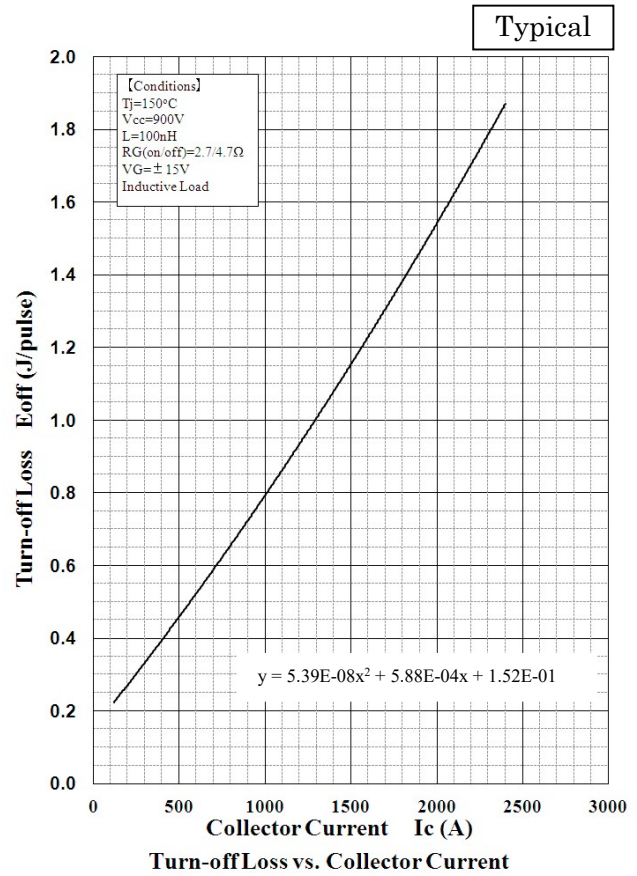
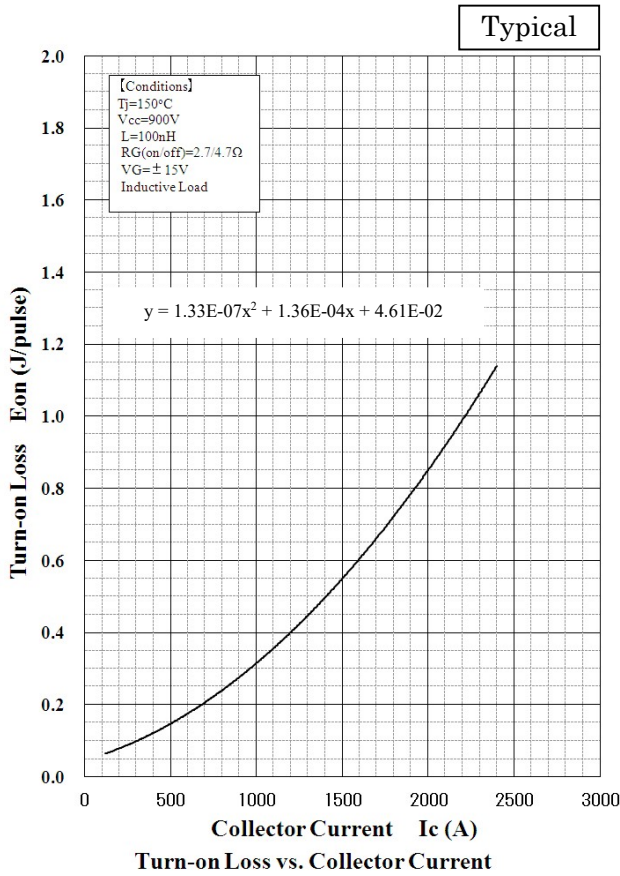


Collector Current vs. Collector to Emitter Voltage

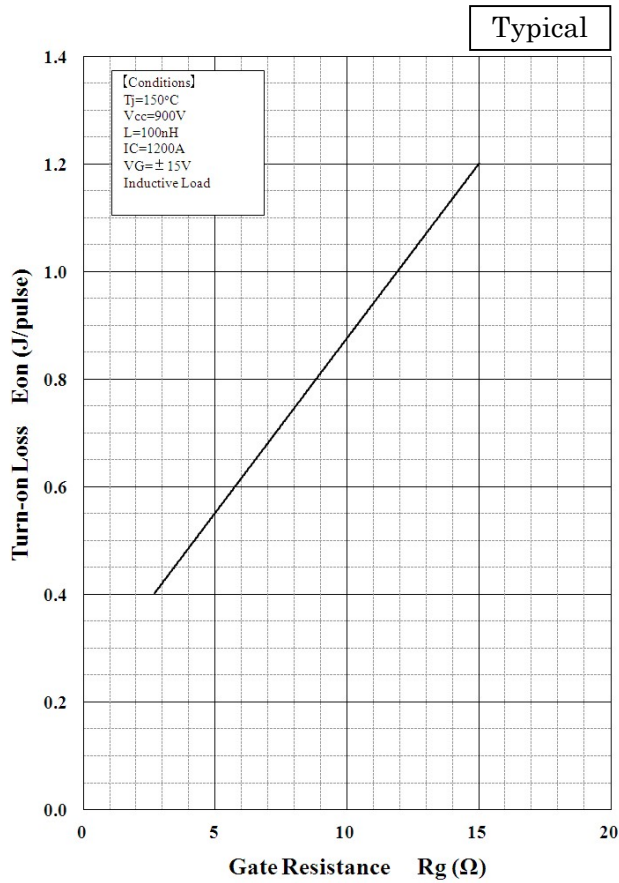


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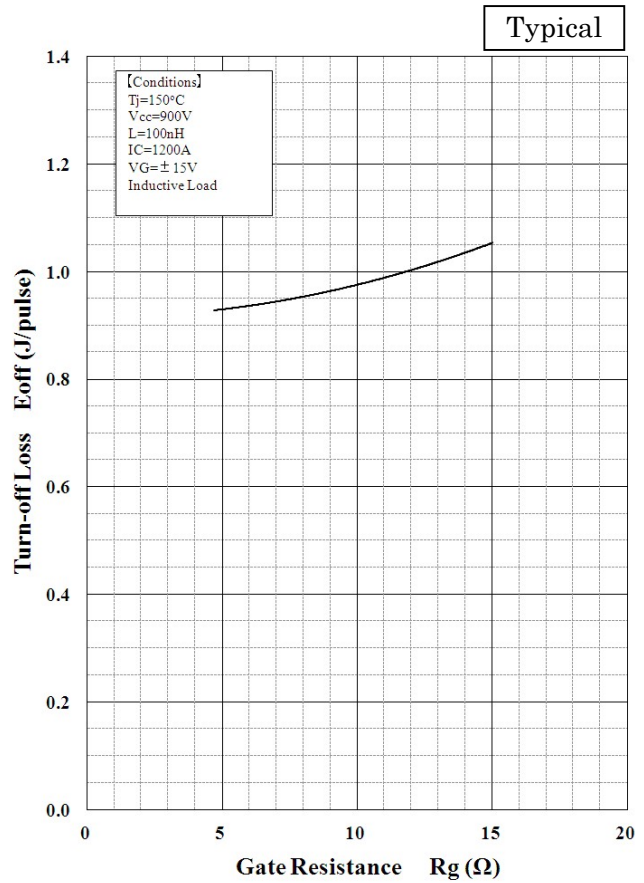
5.2 DYNAMIC CHARACTERISTICS



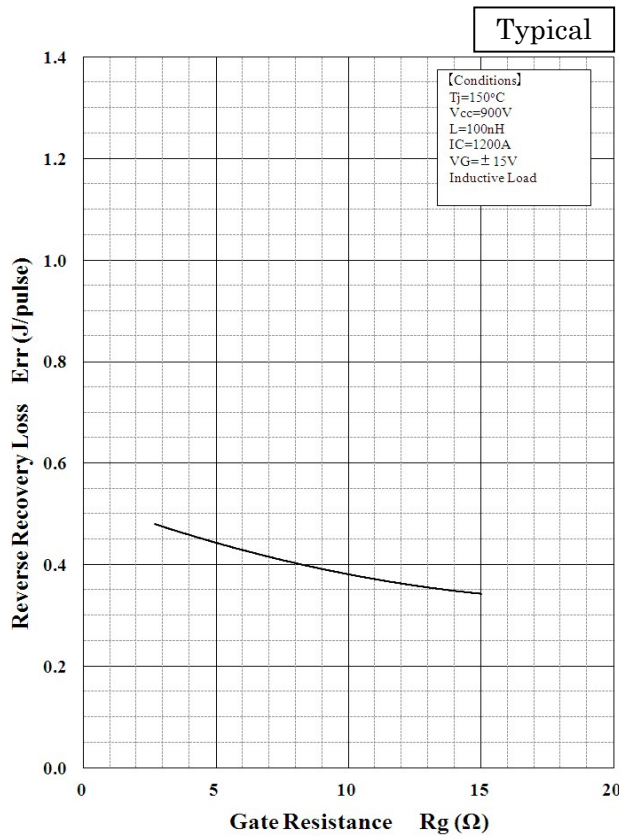
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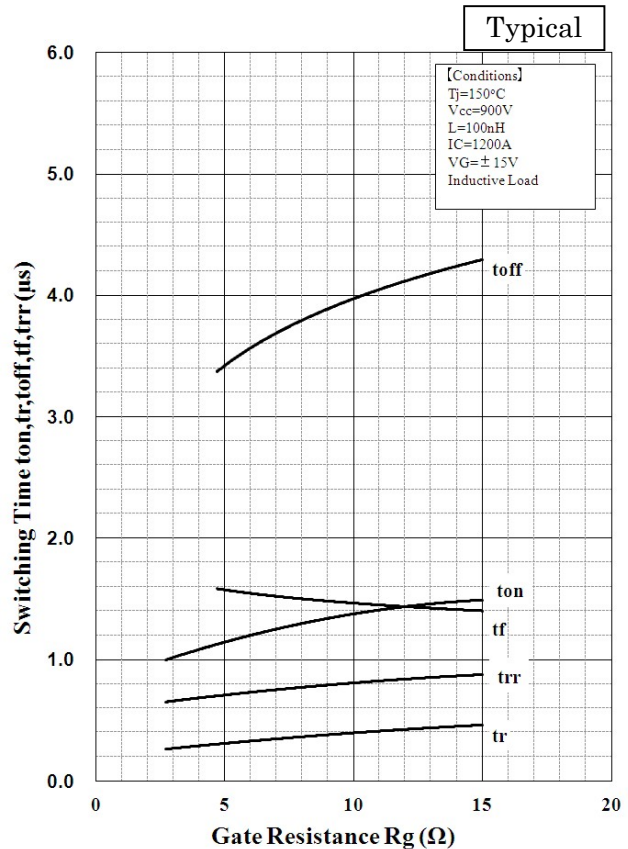
Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance



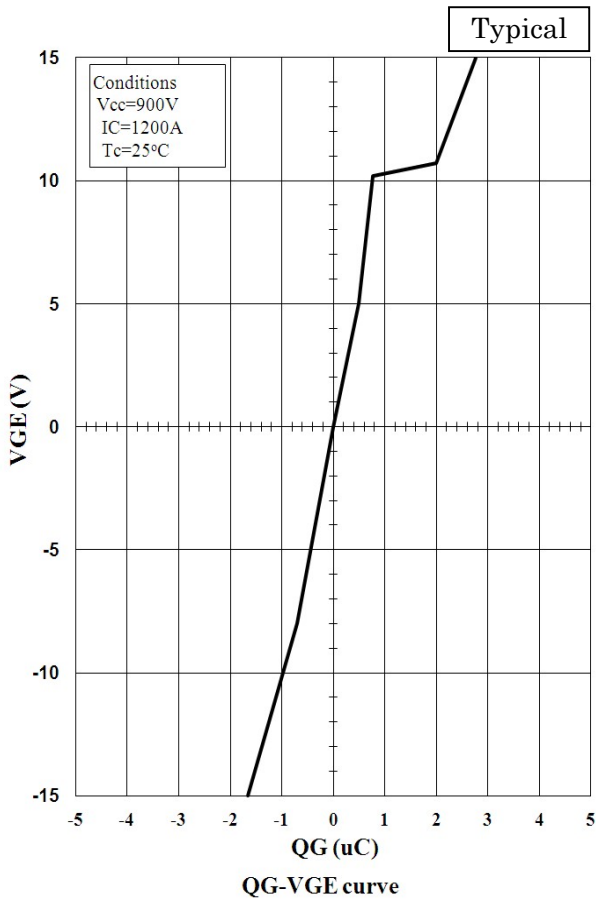
Reverse Recovery Loss vs. Gate Resistance



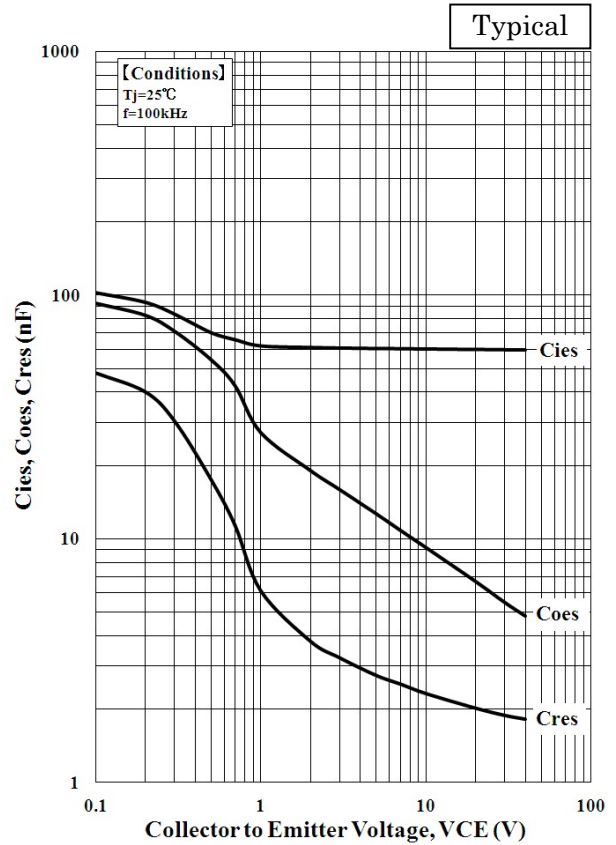
Switching Time vs. Gate Resistance

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5.3 QG-VG CURVE

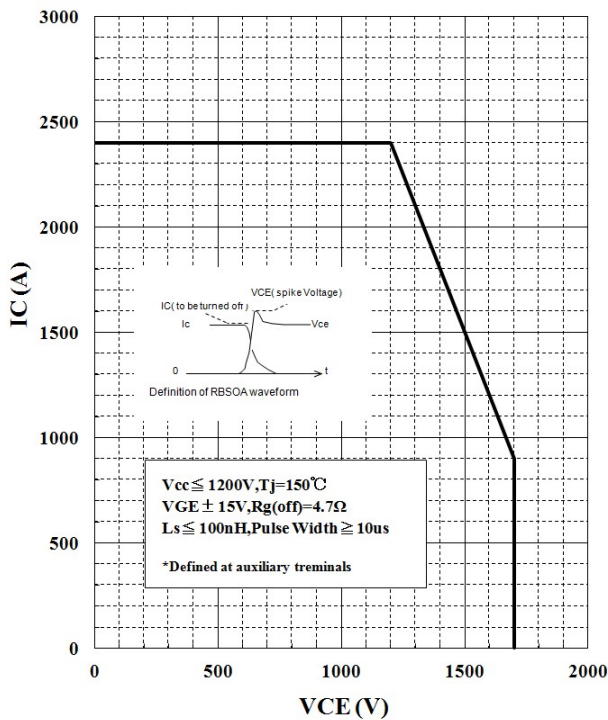


5.4 Cies, Coes, Cres CURVE

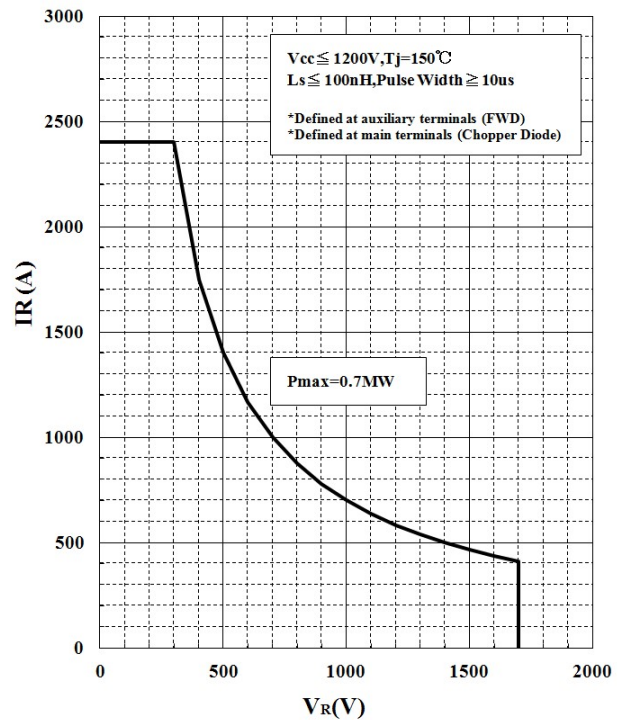


Capacitance vs. Collector to Emitter Voltage

5.5 RBSOA

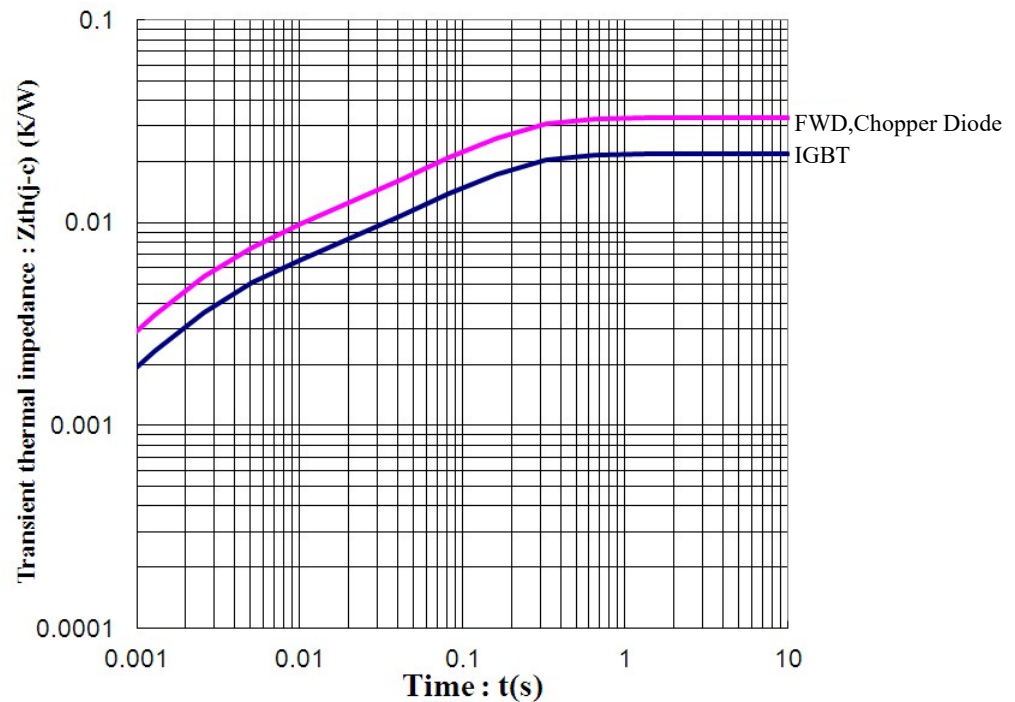


5.6 RecSOA



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6. TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

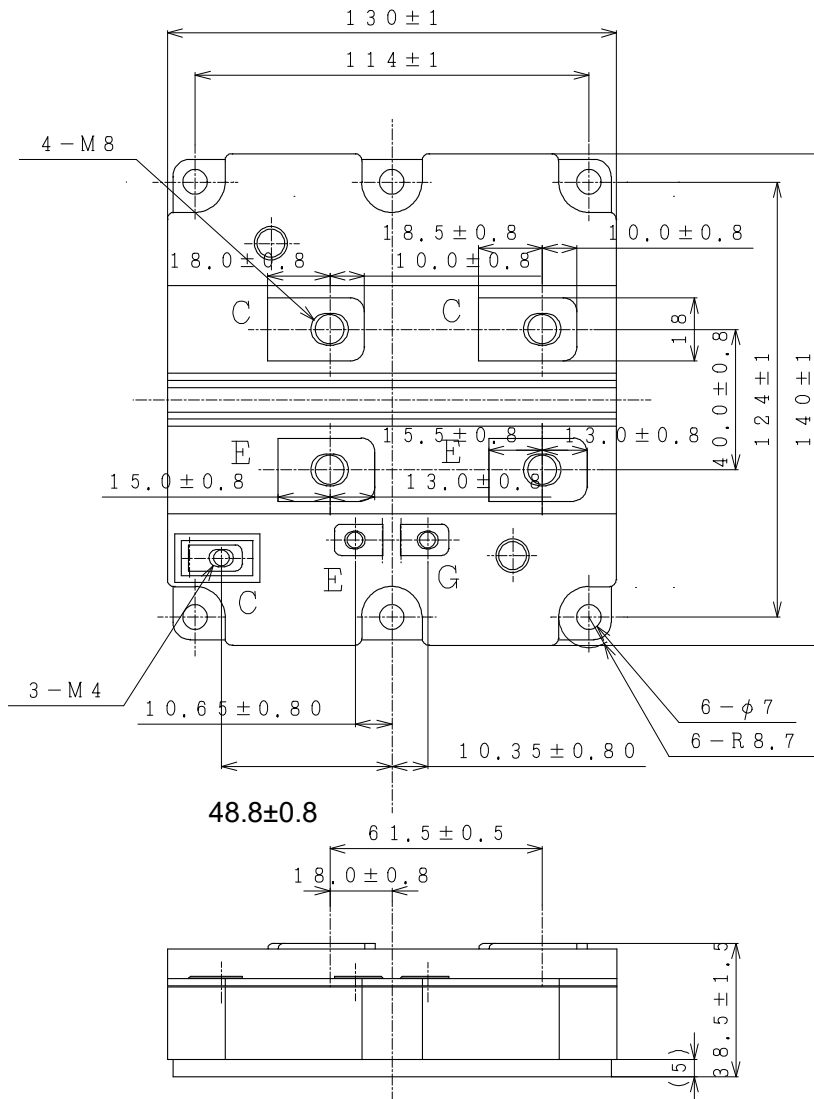
Curve approximation model

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

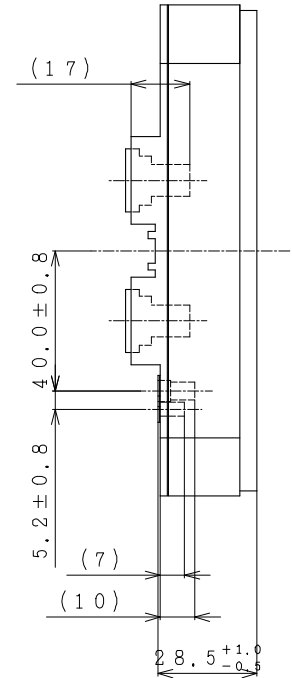
n	1	2	3	4	Unit
$r_{th}[n]$	1.45E-01	2.03E-02	2.33E-03	3.16E-04	sec
$r_{th}[n,IGBT]$	1.41E-02	3.76E-03	3.74E-03	4.21E-04	K/W
$r_{th}[n,Diode]$	2.10E-02	5.93E-03	5.45E-03	6.50E-04	K/W

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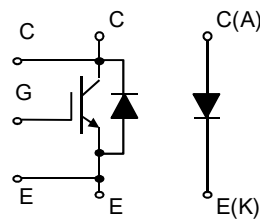
7. PACKAGE OUTLINE DRAWING



Unit in mm



Weight: 900(g)



Circuit diagram

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HITACHI POWER SEMICONDUCTORS

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