

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	-40 ~ +150
Storage Temperature	T _{stg}	°C	-50 ~ +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/₋₃N·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	
Switching Times	Rise Time	t _r	-	0.26	0.80	V _{CC} =900V, I _C =1,200A, L=100nH, R _{G(on/off)} =2.7/4.7Ω (3)	
	Turn On Time	t _{on}	-	1.0	2.5		
	Fall Time	t _f	-	1.6	3.0		
	Turn Off Time	t _{off}	-	3.5	6.0		
Turn On Loss	E _{on}	J/P	-	0.40	0.90	V _{GE} =±15V, T _j =150°C	
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)	
Reverse Recovery Loss	E _{rr}	J/P	-	0.48	1.0	V _{GE} =±15V, T _j =150°C	
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)

MBL1200E17F

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 values according to IEC 60747-2 IEC 60747-9

4.Material declaration

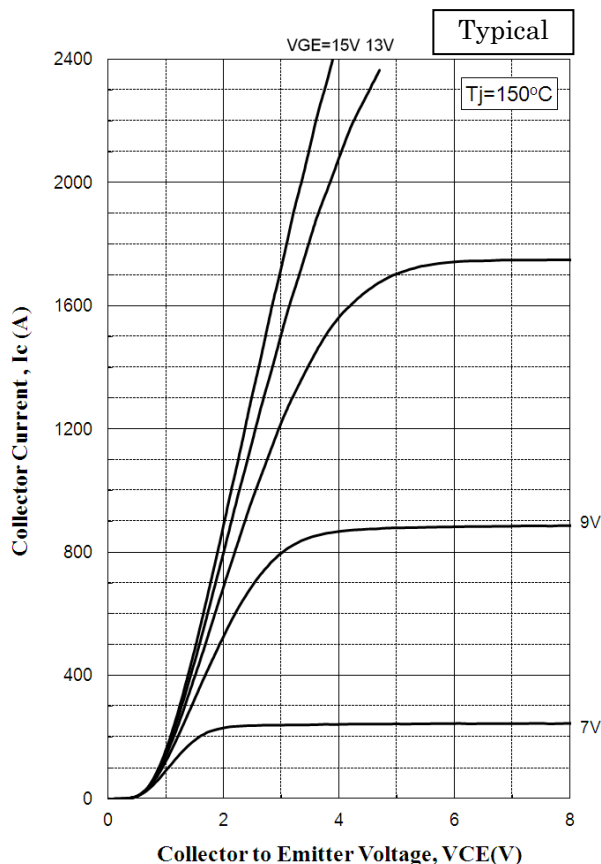
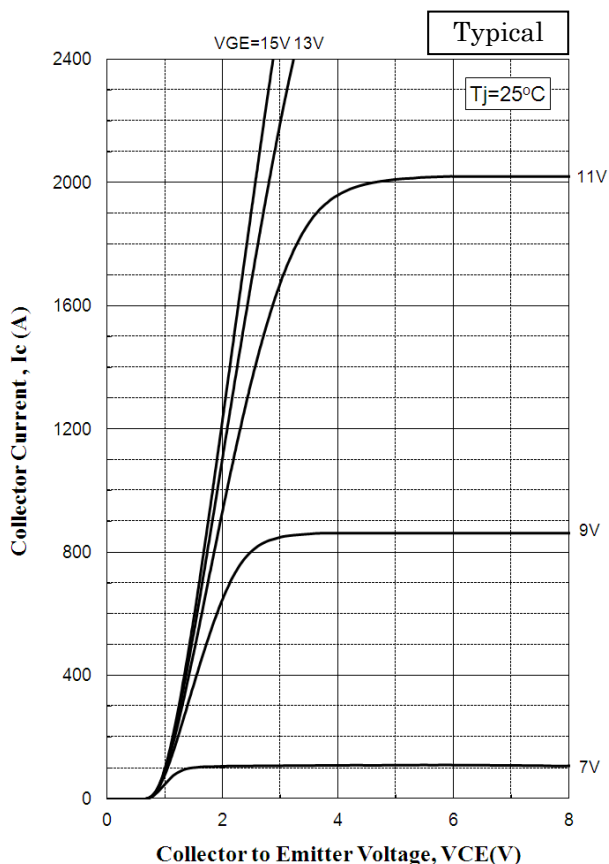
Please note the following materials are contained in the product, in order to keep characteristic and reliability level.

Material	Contained part
Lead (Pb) and its compounds	Solder

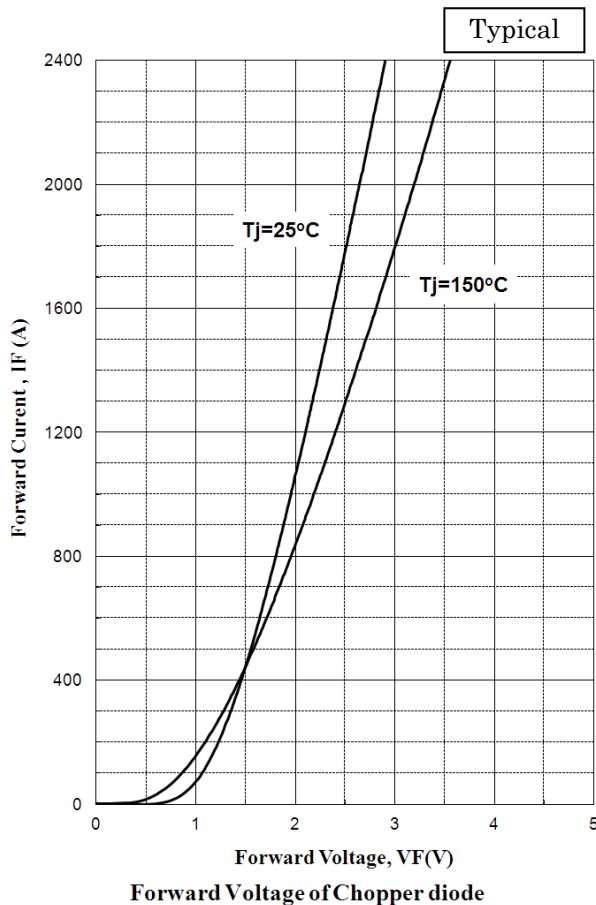
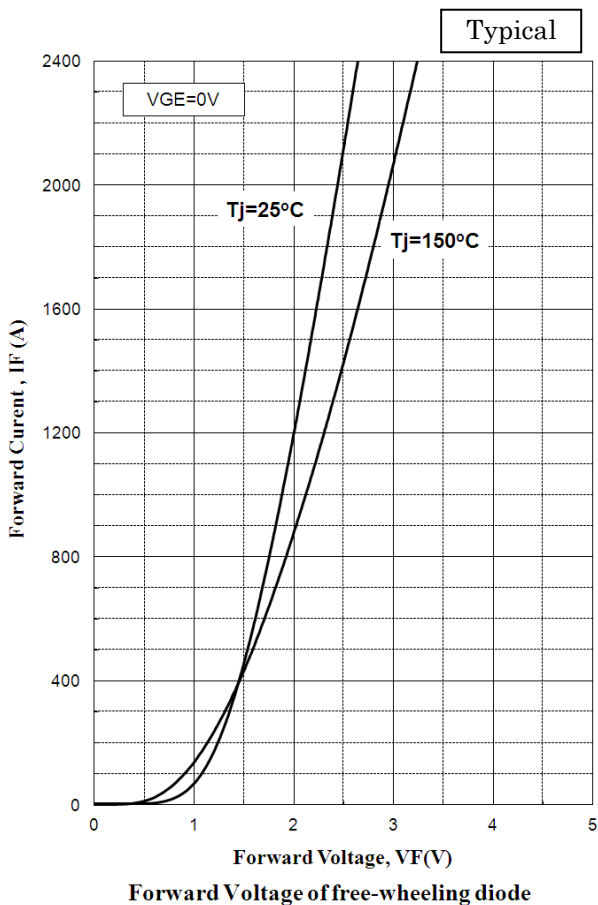
MBL1200E17F

5.CHARACTERISTICS CURVE

5.1 STATIC CHARACTERISTICS

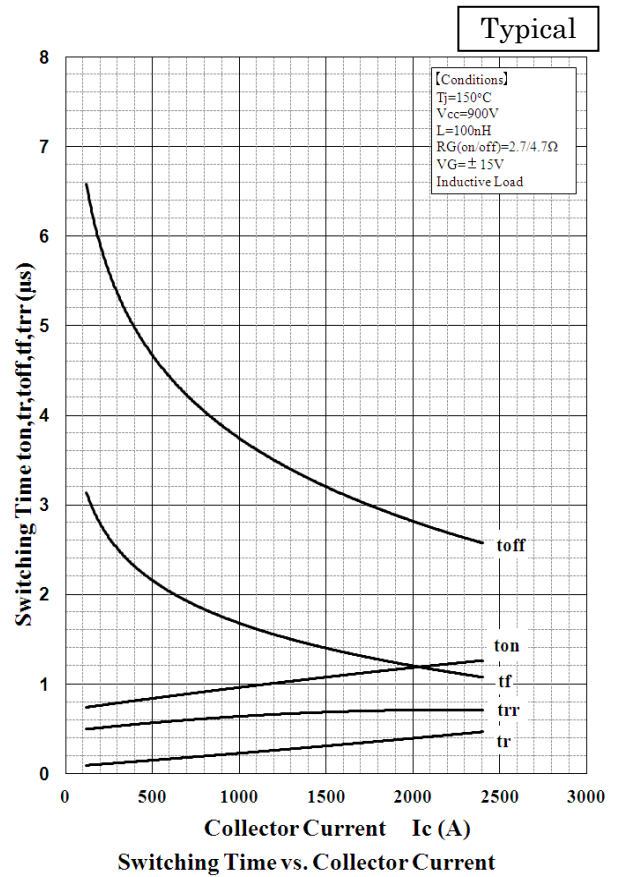
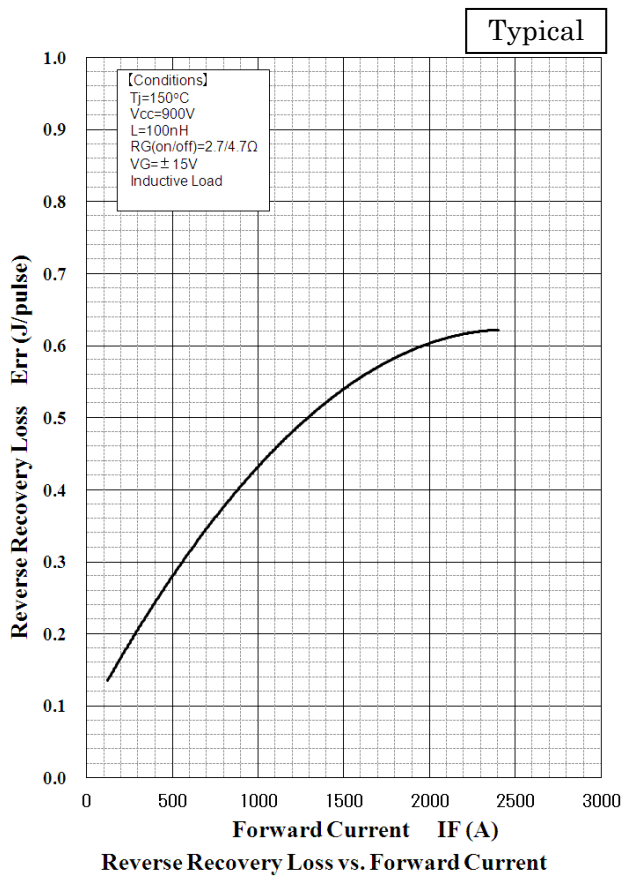
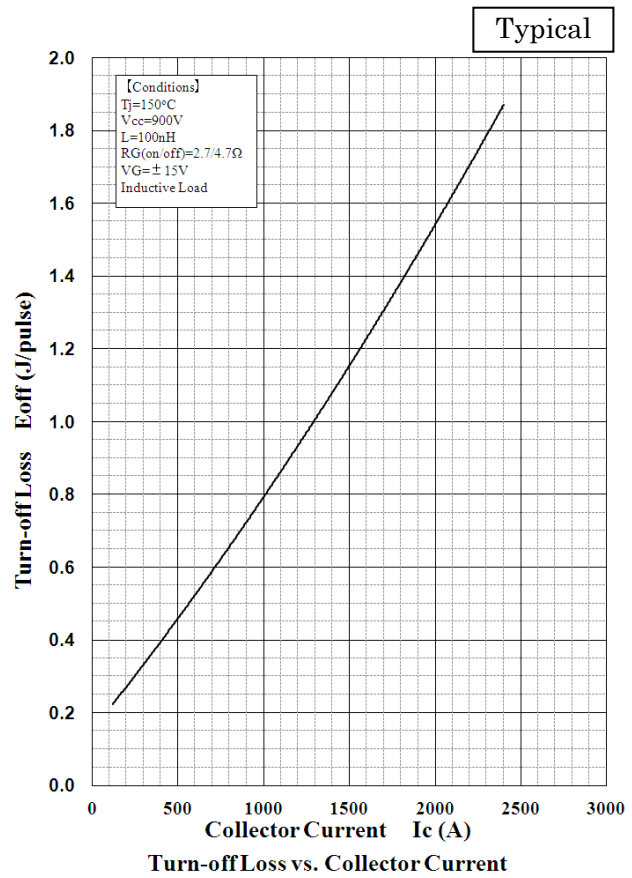
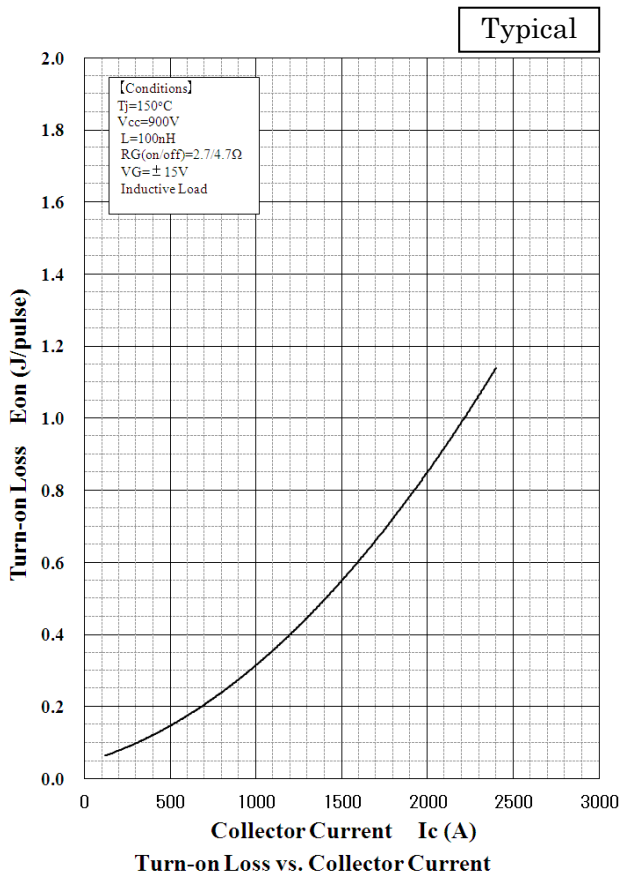


Collector Current vs. Collector to Emitter Voltage

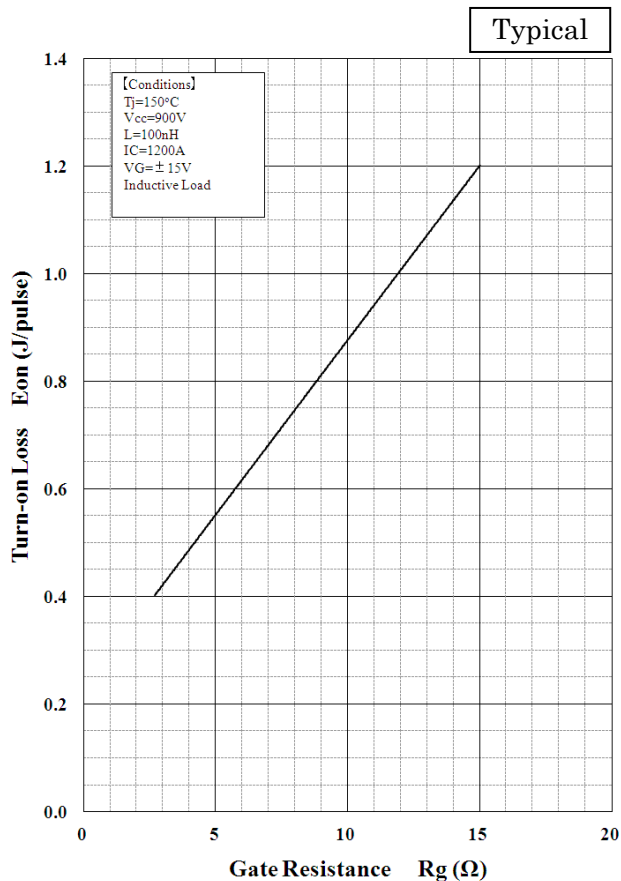


MBL1200E17F

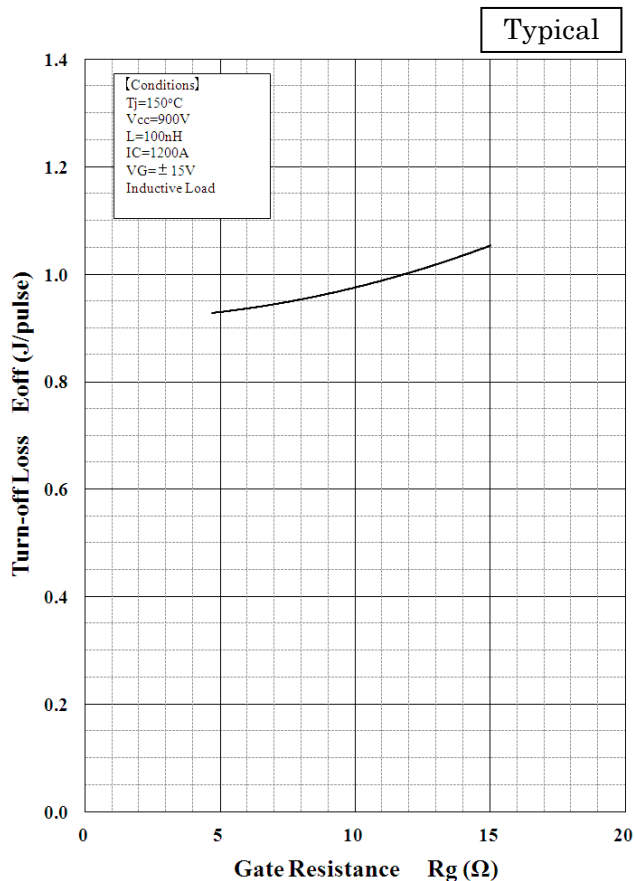
5.2 DYNAMIC CHARACTERISTICS



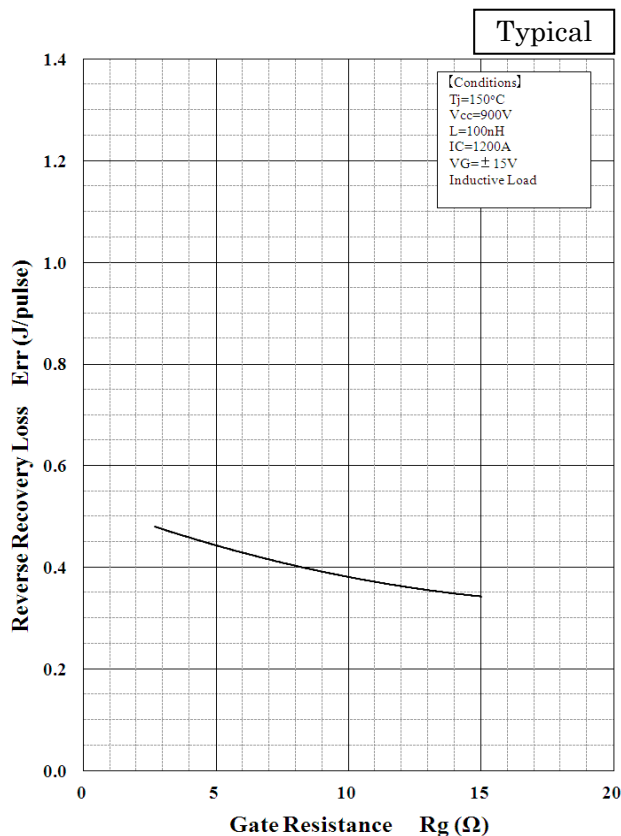
MBL1200E17F



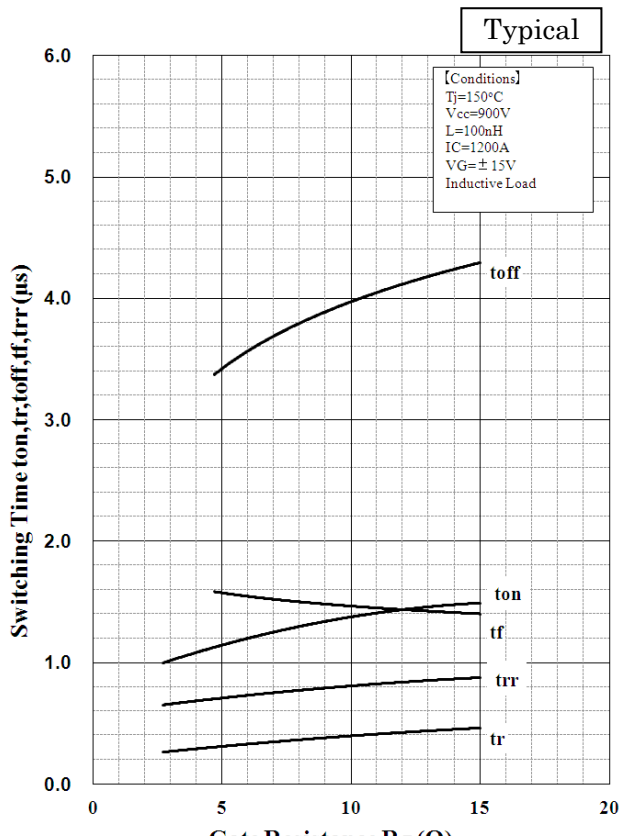
Turn-on Loss vs. Gate Resistance



Turn-off Loss vs. Gate Resistance



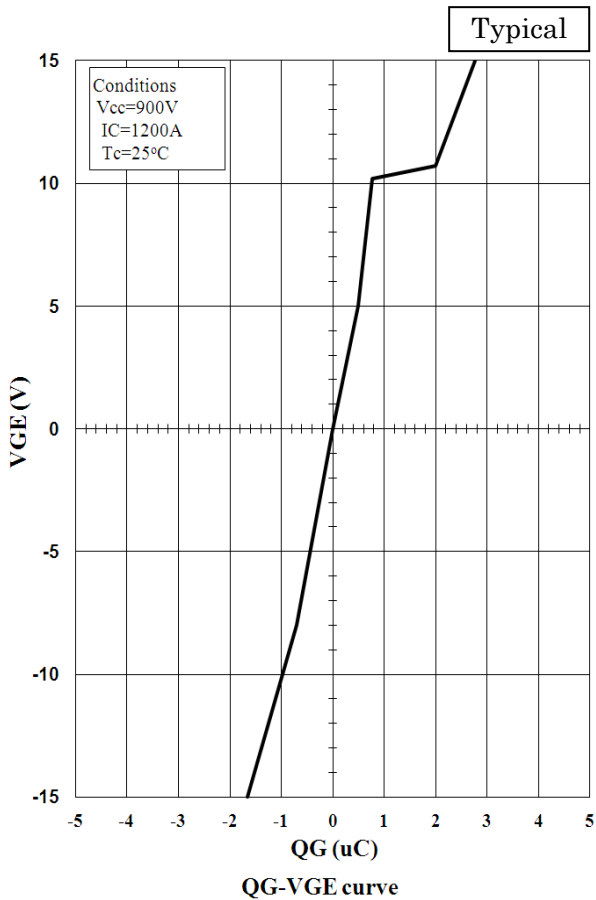
Reverse Recovery Loss vs. Gate Resistance



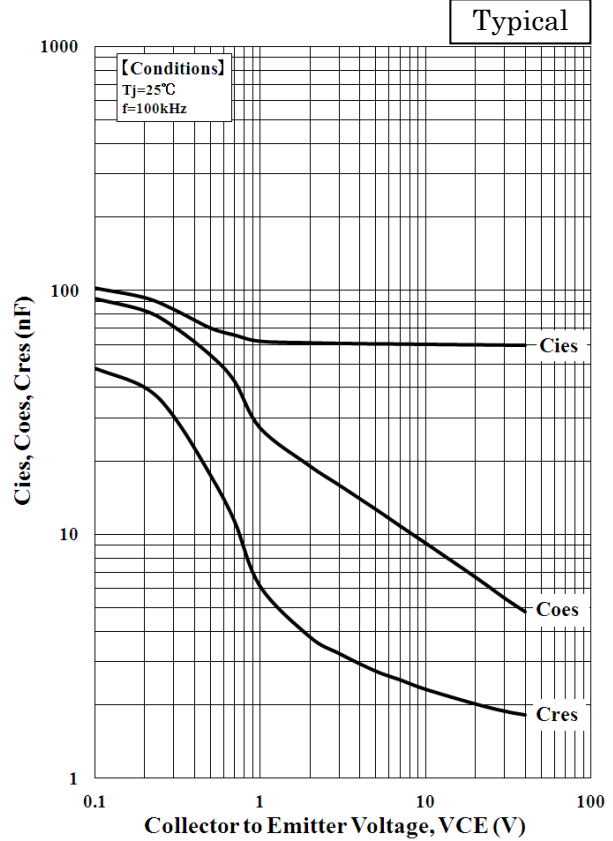
Switching Time vs. Gate Resistance

MBL1200E17F

5.3 QG-VGE CURVE

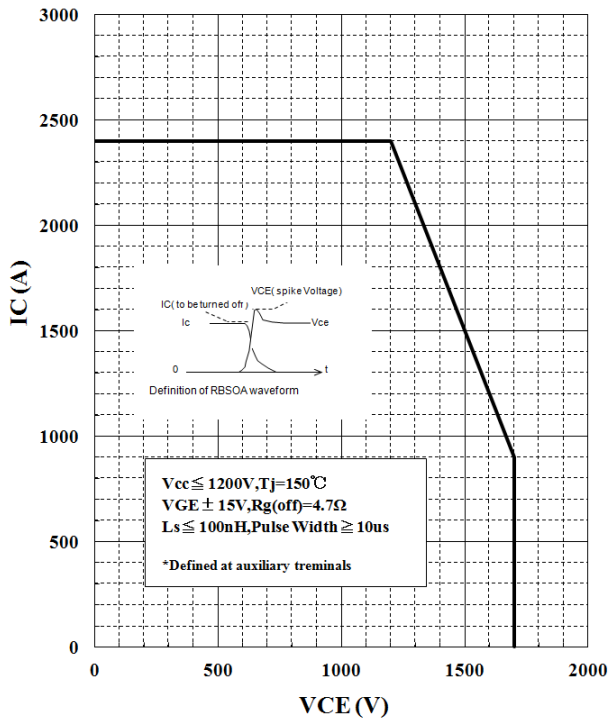


5.4 Cies, Coes, Cres CURVE

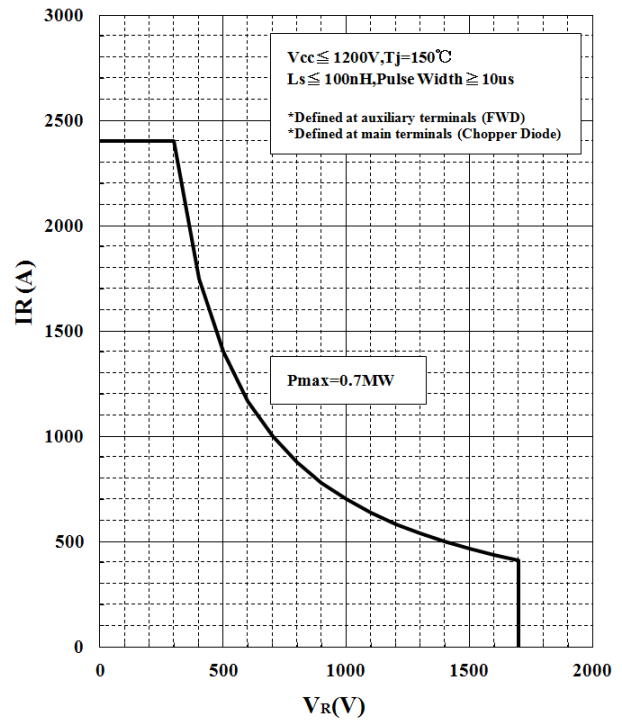


Capacitance vs. Collector to Emitter Voltage

5.5 RBSOA

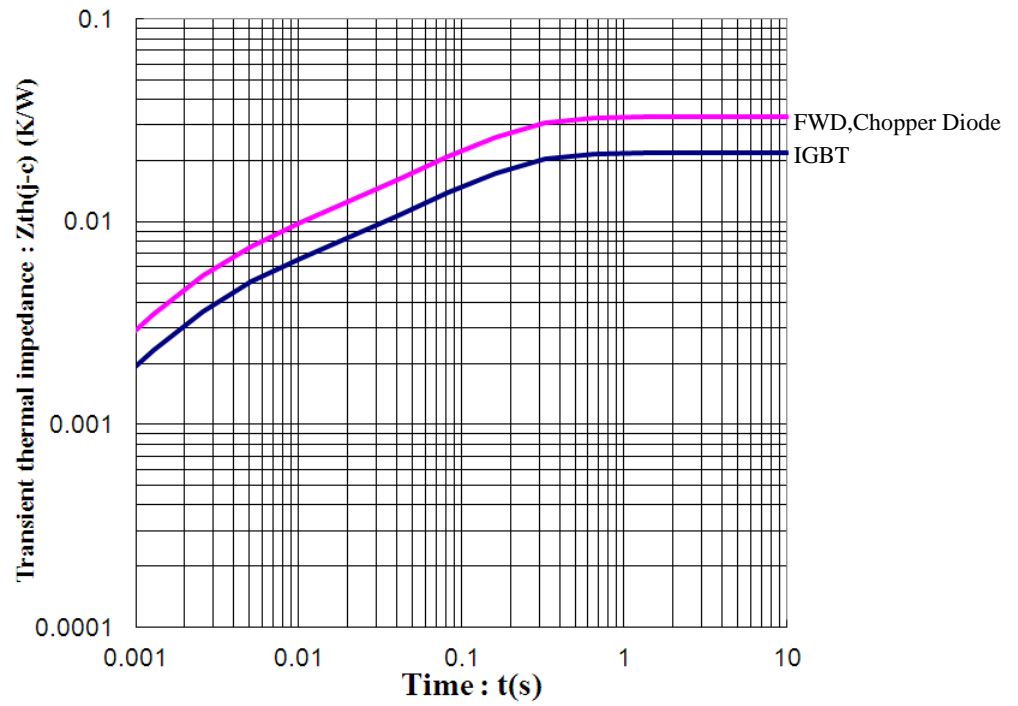


5.6 RecSOA



MBL1200E17F

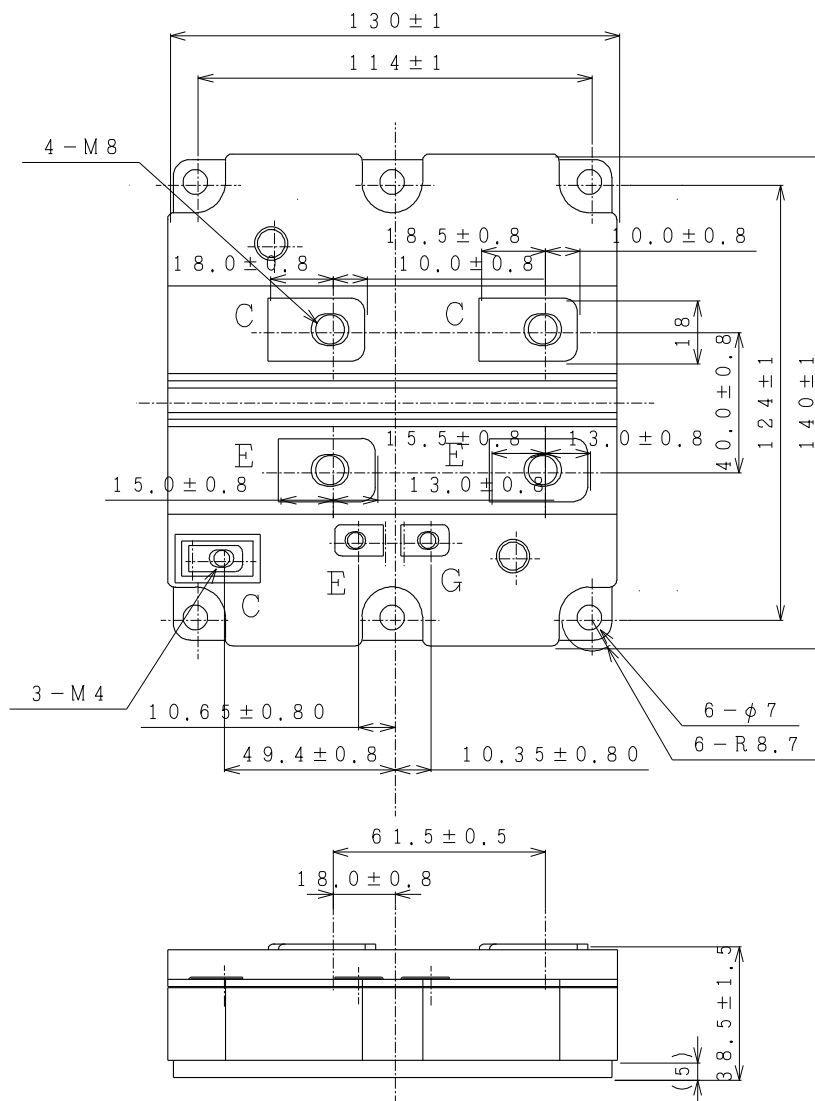
6. TRANSIENT THERMAL IMPEDANCE



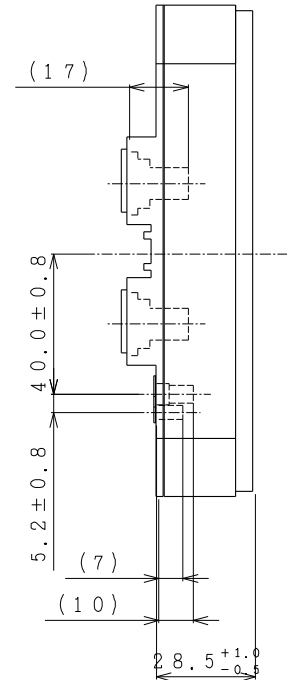
Transient Thermal Impedance Curve

MBL1200E17F

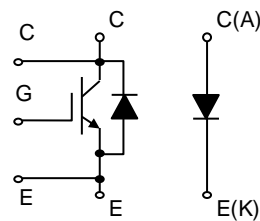
7. PACKAGE OUTLINE DRAWING



Unit in mm



Weight: 900(g)



Circuit diagram

MBL1200E17F

HITACHI POWER SEMICONDUCTORS

Notices

1. The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact Hitachi sales department for the latest version of this data sheets.
2. Please be sure to read "Precautions for Safe Use and Notices" in the individual brochure before use.
3. In cases where extremely high reliability is required (such as use in nuclear power control, aerospace and aviation, traffic equipment, life-support-related medical equipment, fuel control equipment and various kinds of safety equipment), safety should be ensured by using semiconductor devices that feature assured safety or by means of users' fail-safe precautions or other arrangement. Or consult Hitachi's sales department staff.
4. In no event shall Hitachi be liable for any damages that may result from an accident or any other cause during operation of the user's units according to this data sheets. Hitachi assumes no responsibility for any intellectual property claims or any other problems that may result from applications of information, products or circuits described in this data sheets.
5. In no event shall Hitachi be liable for any failure in a semiconductor device or any secondary damage resulting from use at a value exceeding the absolute maximum rating.
6. No license is granted by this data sheets under any patents or other rights of any third party or Hitachi Power Semiconductor Device, Ltd.
7. This data sheets may not be reproduced or duplicated, in any form, in whole or in part, without the expressed written permission of Hitachi Power Semiconductor Device, Ltd.
8. The products (technologies) described in this data sheets are not to be provided to any party whose purpose in their application will hinder maintenance of international peace and safety not are they to be applied to that purpose by their direct purchasers or any third party. When exporting these products (technologies), the necessary procedures are to be taken in accordance with related laws and regulations.

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

Hitachi power semiconductor home page address <http://www.hitachi-power-semiconductor-device.co.jp/en/>