

MDM1200F33-C3

3300V SiC Diode

FEATURES

- * Ultra low recovery loss with SiC-SBD.
- * Isolated heat sink (terminal to base).
- * RoHS

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Item	Symbol	Unit	MDM1200F33-C3
Repetitive Peak Reverse Voltage	V _{RRM}	V	3,300
Forward Current	AC peak	A	1,200
	1ms		2,400
Operating Junction Temperature	T _{vi op}	°C	-40 ~ +150
Storage Temperature	T _{stg}	°C	-40 ~ +150 (1)
Isolation Test Voltage	Terminals-base	V _{ISO}	V _{RMS} 6,000(AC 1 minute)
Screw Torque	Terminals (M4/M8)	-	2/15 (2)
	Mounting (M6)	-	6 (3)

Notes: (1) Terminal temperature shall not exceed the specified temperature in any operation.
 (2) Recommended Value $1.8 \pm 0.2/15^{+0}_{-3}$ N·m (3) Recommended Value 5.5 ± 0.5 N·m

ELECTRICAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Repetitive Reverse Current	I _{RRM}	mA	-	-	12	V _R =3,300V, T _{vi} =25°C
			-	25	65	V _R =3,300V, T _{vi} =150°C
Forward Voltage Drop	V _F	V	-	2.5	-	I _F =1,200A, T _{vi} =25°C
			-	4.97	6.0	I _F =1,200A, T _{vi} =150°C
Reverse Recovery Time	t _{rr}	μs	-	0.1	-	V _R =1,500V, I _F =1,200A,
Reverse Recovery Current	I _{rr}	A	-	200	-	di/dt=-4500A/μs, L _S =100nH, T _{vi} =150°C,
Reverse Recovery Charge	Q _{rr}	μC	-	25	-	R _g =4.7Ω, C _{ge} =0.1μF (4)
Reverse Recovery Loss	E _{rr}	J/P	-	0.01	0.12	
I ² t value	I ² t	kA ² s	13	-	-	T _{j start} =150°C, 10ms, V _R =0V, half-sinewave

PACKAGE CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Terminal Resistance	R _{C E}	mΩ	-	0.13	-	per arm, T _{vi} =25°C
Stray inductance module	L _{S C E}	nH	-	20	-	per arm
Thermal Impedance	R _{th(j-c)}	K/W	-	-	0.017	Junction to case (per arm)
Comparative tracking index	CTI	-	-	600	-	
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.008	-	Case to fin (per module)

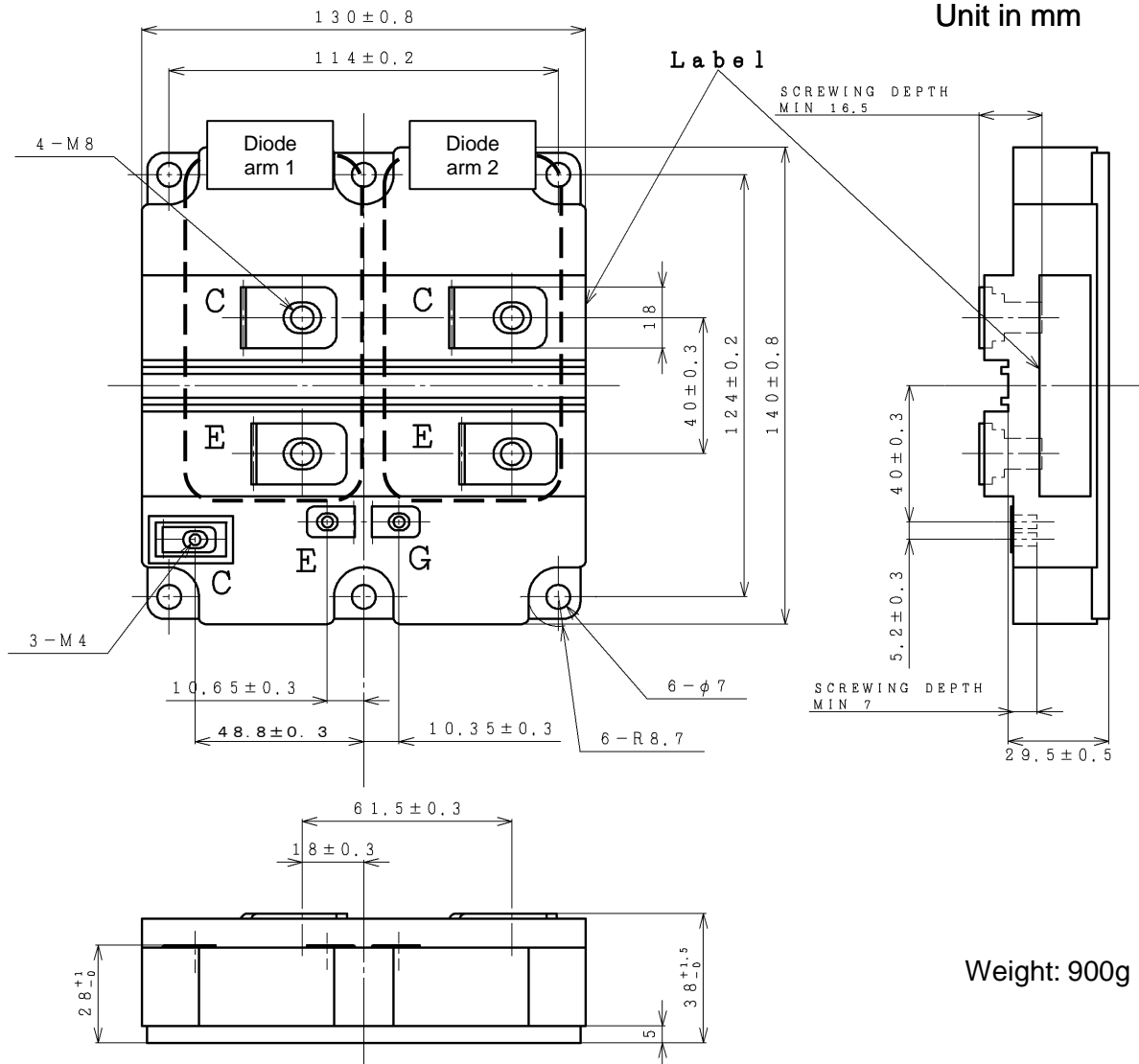
Notes: (4) Counter arm; MBN1200F33F-C3 VGE=+16V/-9V

R_G value is the test condition's value for evaluation 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.

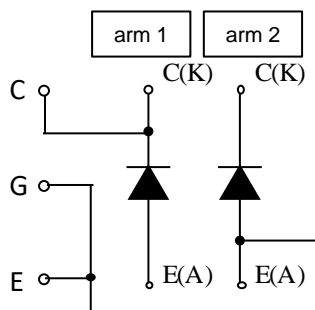
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OUTLINE DRAWING



Weight: 900g

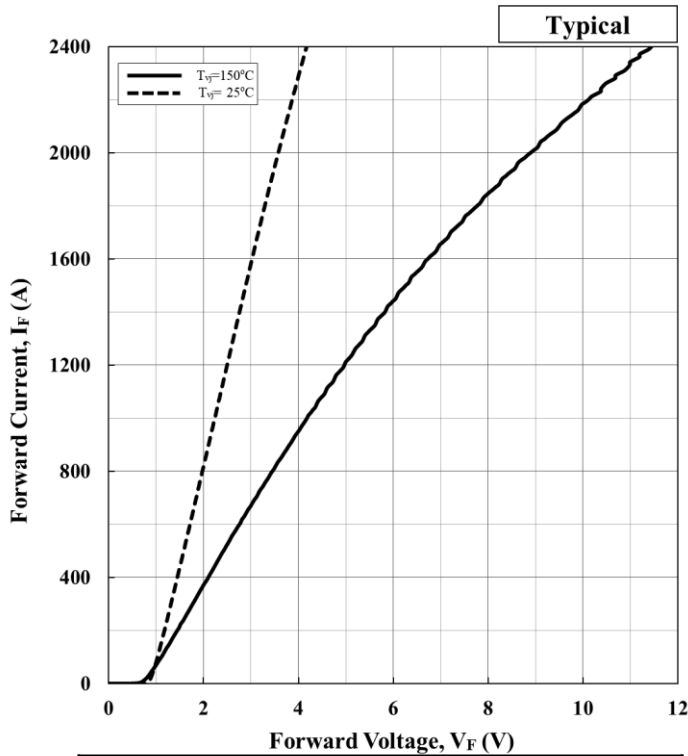
CIRCUIT DIAGRAM



Notice

- Arm1 and Arm2 are not able to use for series connection.
- Auxiliary terminal of Collector, Emitter and Gate are connected to main terminal at internally.

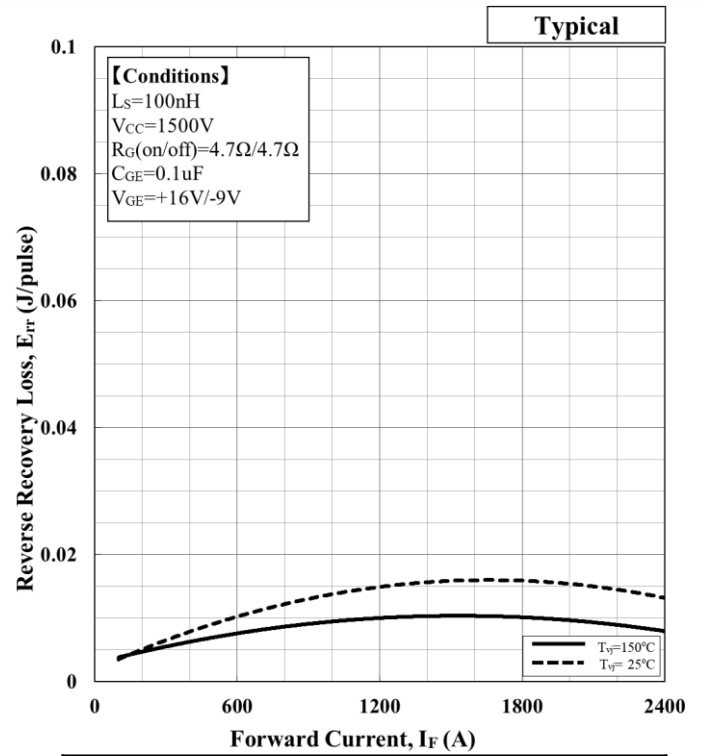
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$$V_F [V] = a_3 \cdot |I_c|^3 + a_2 \cdot |I_c|^2 + a_1 \cdot |I_c| + a_0$$

Temp.[°C]	a_3	a_2	a_1	a_0
25	5.28.E-11	-1.68.E-07	1.47.E-03	8.84.E-01
150	2.63.E-10	-1.43.E-07	3.28.E-03	7.86.E-01

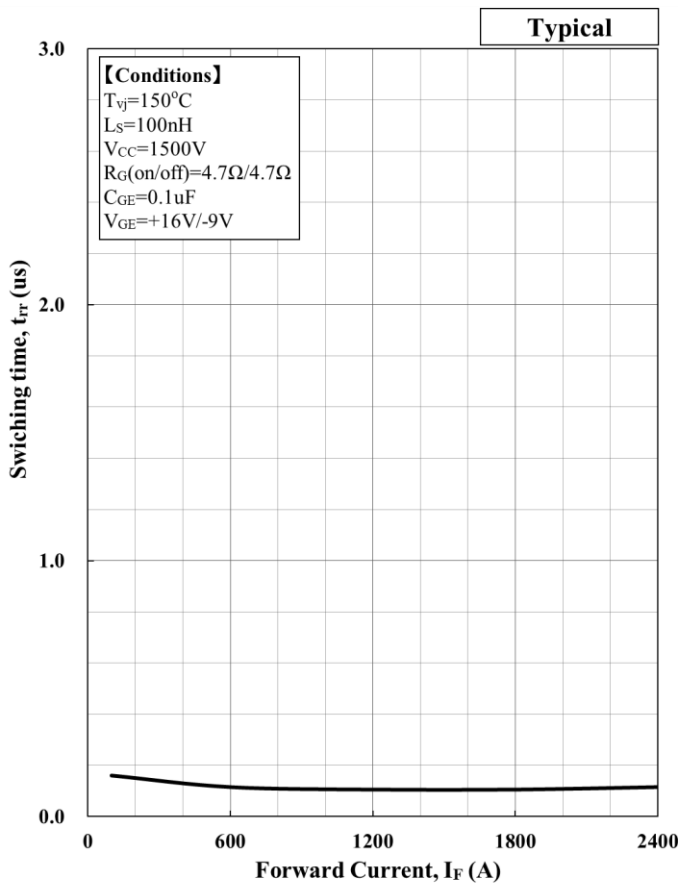
Forward Voltage of diode



$$E [J] = a_3 \cdot |I_c|^3 + a_2 \cdot |I_c|^2 + a_1 \cdot |I_c| + a_0$$

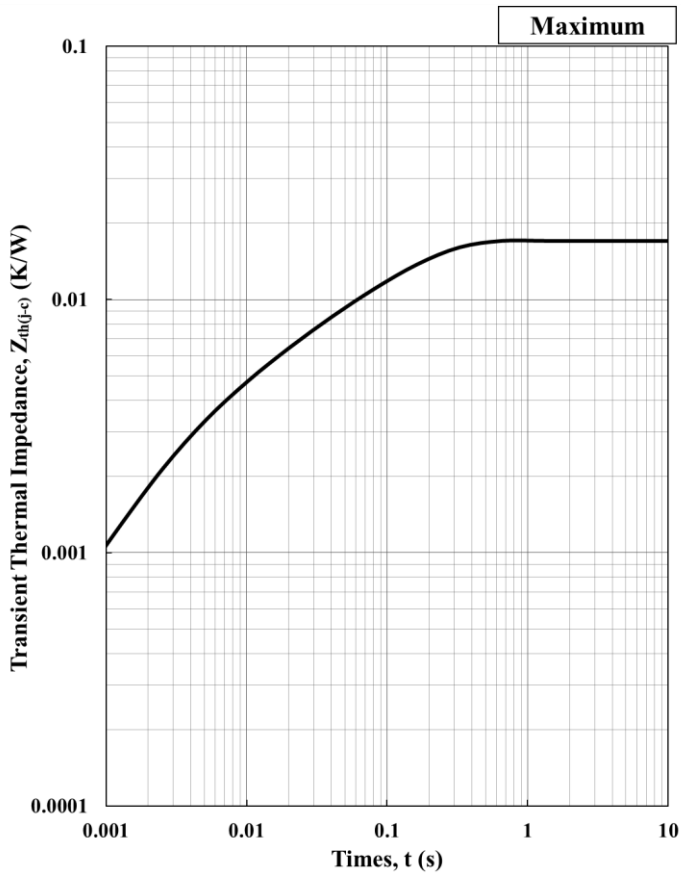
Temp.[°C]	a_3	a_2	a_1	a_0
25	0.00.E+00	-5.13.E-09	1.70.E-05	1.85.E-03
150	0.00.E+00	-3.20.E-09	9.80.E-06	2.85.E-03

Recovery loss vs. Forward current



Switching time vs. Forward Current

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Transient Thermal Impedance Curve

Foster model lumped circuit constant

n	1	2	3	4	Unit
R th, Diode [n]	3.20E-03	2.30E-03	9.51E-03	2.00E-03	[K/W]
C th, Diode [n]	9.37E-01	1.31E+01	1.05E+01	1.50E+02	[J/K]

Cauer model lumped circuit constant

n	1	2	3	4	Unit
R th, Diode [n]	4.32E-03	8.29E-03	3.72E-03	6.77E-04	[K/W]
C th, Diode [n]	8.03E-01	5.53E+00	1.65E+01	4.09E+02	[J/K]

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Notices

1. Since mishandling of semiconductor devices may cause malfunctions, please be sure to read "Precautions for Safe Use and Notices" in the individual brochure before use.
2. When designing an electronic circuit using semiconductor devices, please do not exceed the absolute maximum rating specified for the device under any external fluctuations. And for pulse applications, please also do not exceed the "Safe Operating Area (SOA)".
3. Semiconductor devices may sometimes break down by accidental or unexpected surge voltage, so please be careful about the safety design such as redundant design and malfunction prevention design which don't cause the damage expand even if they break down.
4. 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 with Hitachi's sales department staff. (When semiconductor devices fail, as a result the semiconductor devices or wiring, wiring pattern may smoke, ignite, or the semiconductor devices themselves may burst.)
5. A semi-processed article is done now using solder which contains lead inside the semiconductor devices. There is possibility of the regulation substance depend on the applied models, so please check before using.
6. This specification is a material for component selection, which describes specifications of power semiconductor devices (hereinafter referred to as products), characteristic charts, and external dimension drawings.
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8. For handling other than described in this manual, follow the handling instructions (IGBT-HI-00002).

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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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Hitachi power semiconductor home page address

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