MDM1000E33E2

FEATURES

* Low noise due to ultra soft fast recovery diode.
* High reliability, high durability diodes.
* Isolated heat sink (terminal to base).

ABSOLUTE MAXIMUM RATINGS (T_C=25ºC)

Item		Symbol	Unit	MDM1000E33E2
Repetitive Peak Reverse Voltage		V_{RRM}	V	3,300
Forward Current	DC	I_F	A	1,000
	1ms	I_{FM}		2,000
Operating Junction Temperature		$T_{vj\ op}$	ºC	-40 ~ +150
Storage Temperature		T_{stg}	ºC	-40 ~ +125
Isolation Test Voltage	Terminals-base	V_{ISO}	V_{RMS}	6,000(AC 1 minute)
	Terminal 1-Terminal 2	$V_{ISO\ T\text{-}T}$		6,000(AC 1 minute)
Screw Torque	Terminals (M8)	-	N·m	15 (1)
	Mounting (M6)	-		6 (2)

Notes: (1) Recommended Value 15^{+0}_{-3}N·m (2) Recommended Value 5.5±0.5N·m

ELECTRICAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions	
Repetitive Reverse Current	I_{RRM}	mA	-	2.5	25	V_R=3,300V, T_{vj}=125ºC	
Forward Voltage Drop	V_F	V	-	2.5	3.0	I_F=1,000A, T_{vj}=125ºC	
			-	2.5	-	I_F=1,000A, T_{vj}=150ºC	
Reverse Recovery Time	t_{rr}	μs	-	0.7	1.2		
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	-	1.6	2.3	T_{vj}=125ºC	V_R=1,650V, I_F=1,000A, L_S=100nH, R_G=3.3Ω (3)
	$E_{rr(full)}$		-	2.0	-		
			-	2.3	-	T_{vj}=150ºC	

Notes: (3) Counter arm; MBN1200E33D V_{GE}=+/-15V
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

PACKAGE CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Terminal Resistance	R_{CE}	mΩ	-	0.2	-	per arm, T_{vj}=25ºC
Stray inductance module	L_{SCE}	nH	-	21	-	per arm
Thermal Impedance	$R_{th(j\text{-}c)}$	K/W	-	-	0.017	Junction to case (per arm)
Comparative tracking index	CTI		-	600	-	
Contact Thermal Impedance	$R_{th(c\text{-}f)}$	K/W	-	0.008	-	Case to fin (λgrease=1W/(m·K), Heat-sink flatness ≤50um)

* 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.

MDM1000E33E2

DEFINITION OF TEST CIRCUIT

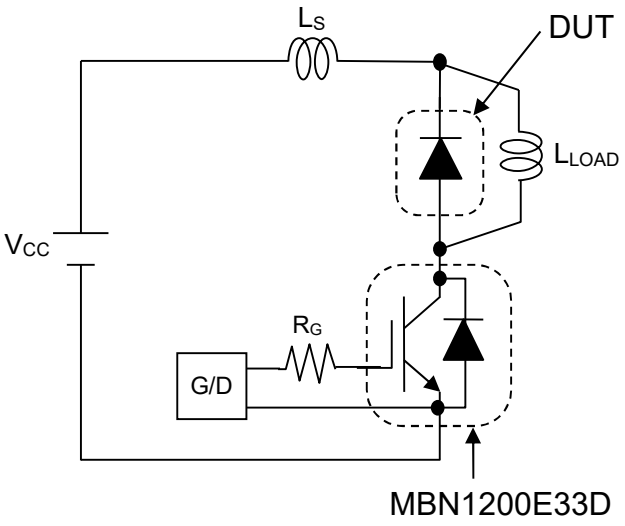
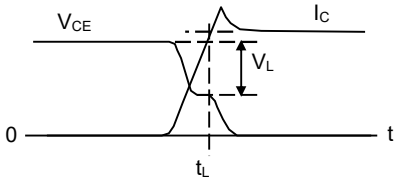
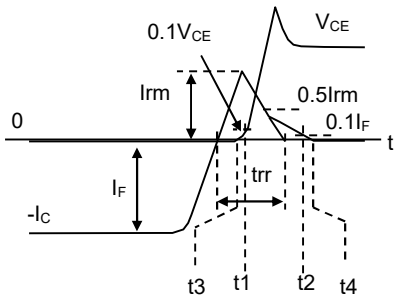


Fig.1 Switching test circuit



$$L_S = \frac{V_L}{\left(\frac{dI_C}{dt}\right)_{t=t_L}}$$

Fig.2 Definition of stray inductance



$$E_{rr(10\%)} = \int_{t1}^{t2} I_F \cdot V_{CE}\, dt$$

$$E_{rr(full)} = \int_{t3}^{t4} I_F \cdot V_{CE}\, dt$$

Fig.3 Definition of switching loss

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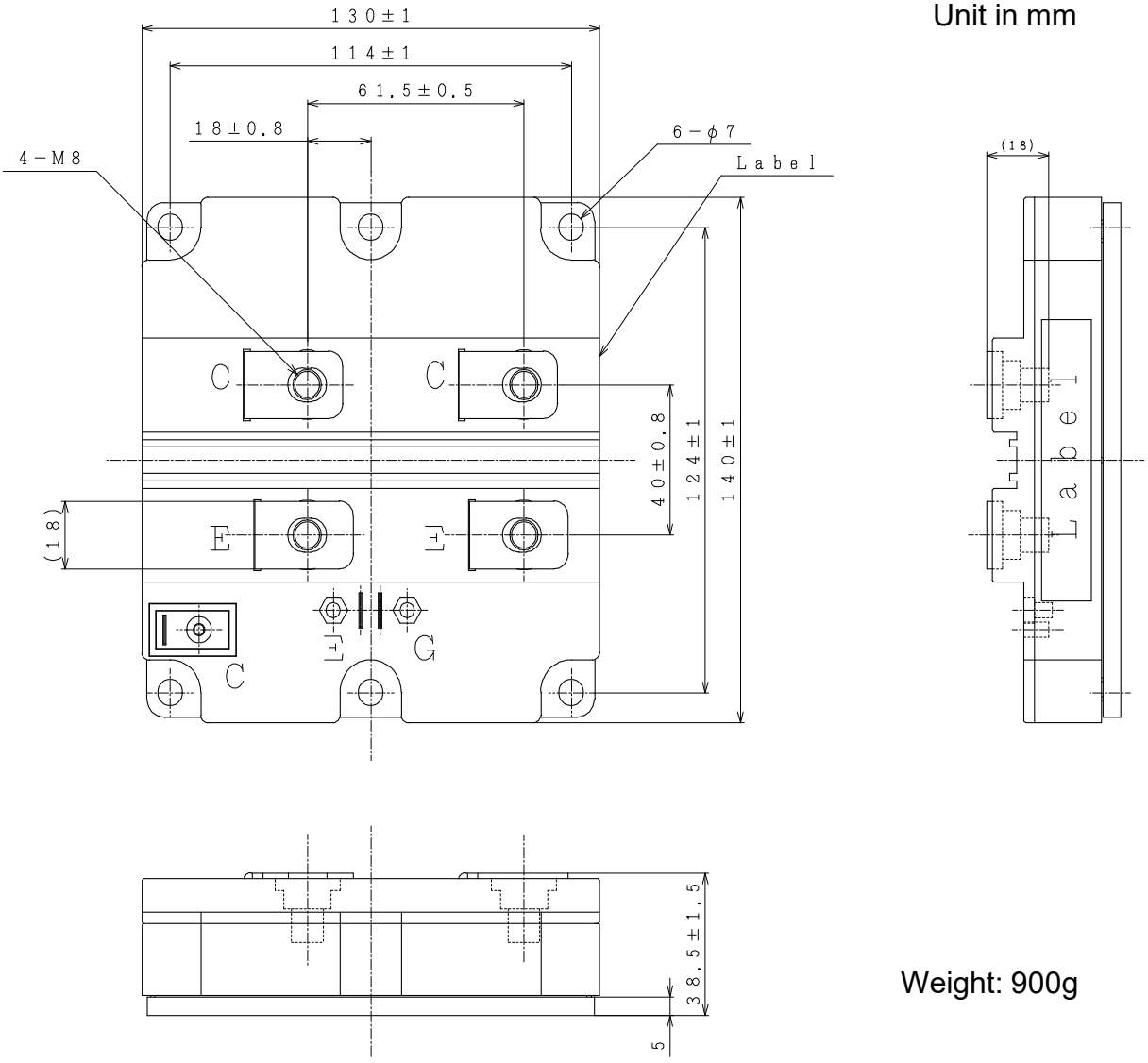
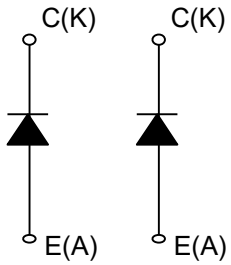
OUTLINE DRAWING

Unit in mm



Weight: 900g

CIRCUIT DIAGRAM



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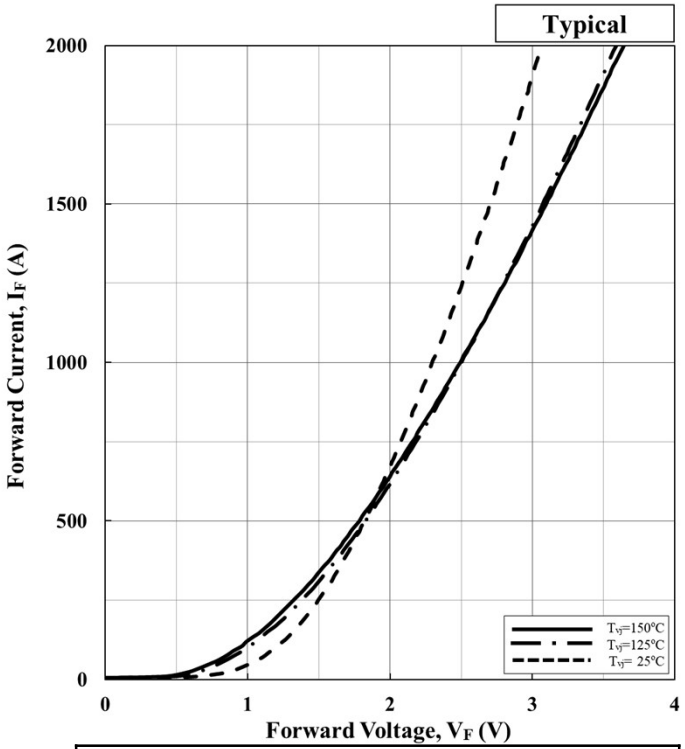
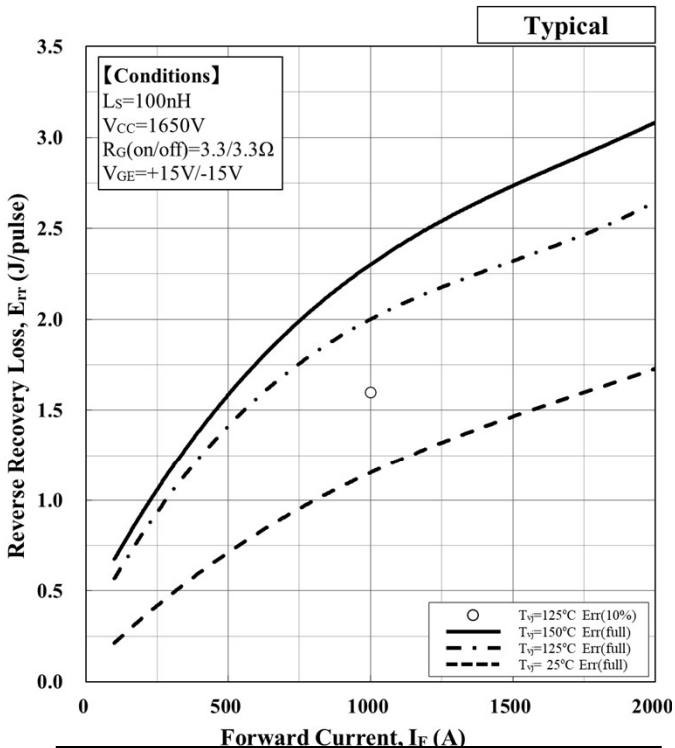


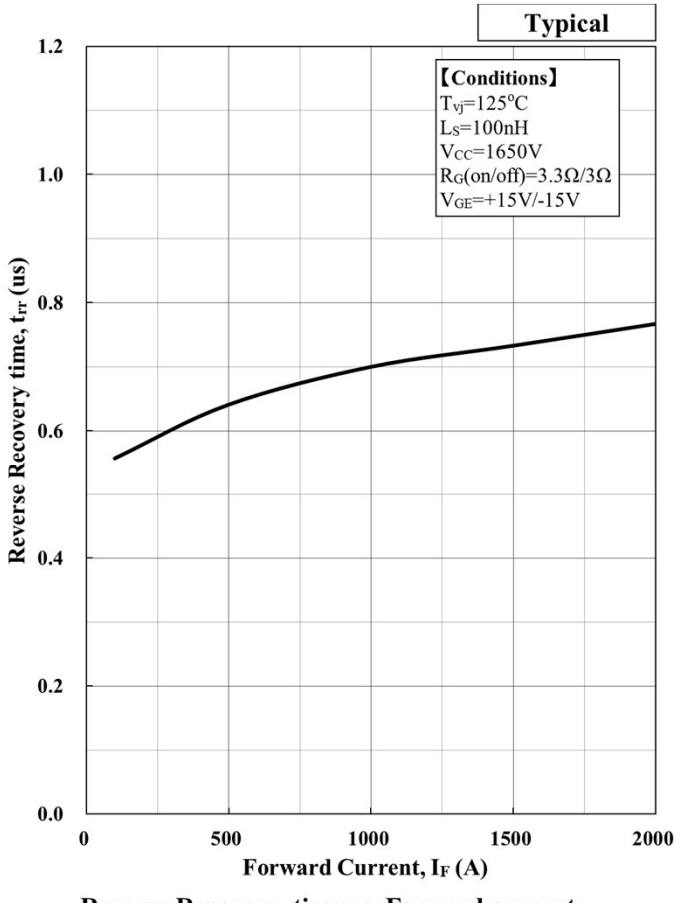
$V_F[V] = a_3 \cdot \lvert I_F \rvert^3 + a_2 \cdot \lvert I_F \rvert^2 + a_1 \cdot \lvert I_F \rvert + a_0$				
Temp.[°C]	a_3	a_2	a_1	a_0
25	1.56E-10	-6.95E-07	1.77E-03	1.08E+00
125	1.81E-10	-8.35E-07	2.33E-03	8.32E-01
150	1.78E-10	-8.23E-07	2.38E-03	7.64E-01

Forward Current vs. Forward Voltage
(Measured at main terminal)



$E\ [J] = a_3 \cdot \lvert I_F \rvert^3 + a_2 \cdot \lvert I_F \rvert^2 + a_1 \cdot \lvert I_F \rvert + a_0$				
Temp.[°C]	a_3	a_2	a_1	a_0
25	1.05E-10	-5.74E-07	1.56E-03	6.33E-02
125	3.64E-10	-1.63E-06	2.98E-03	2.86E-01
150	2.64E-10	-1.36E-06	3.01E-03	3.88E-01

Recovery loss vs. Forward current



Reverse Recovery time vs. Forward current

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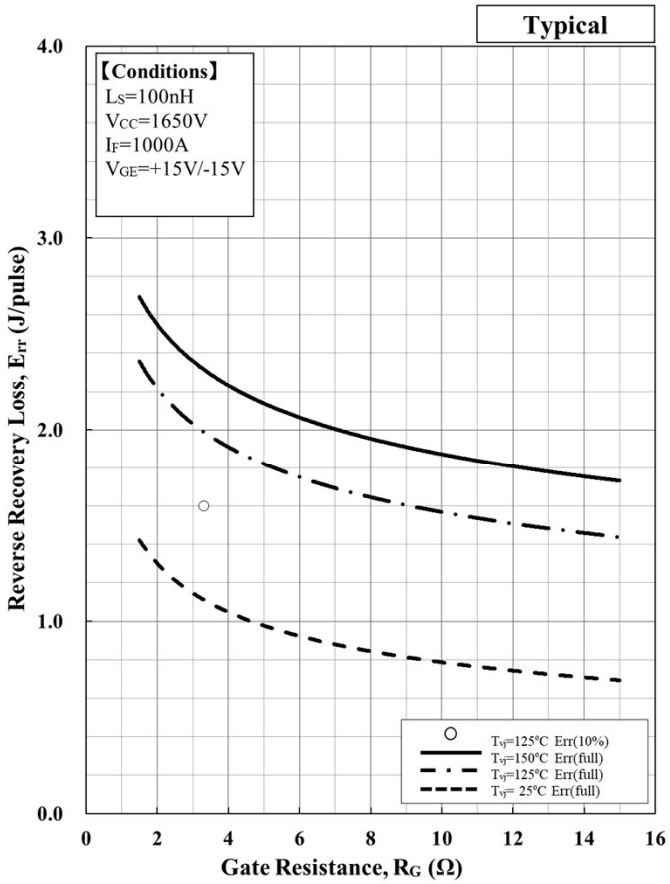
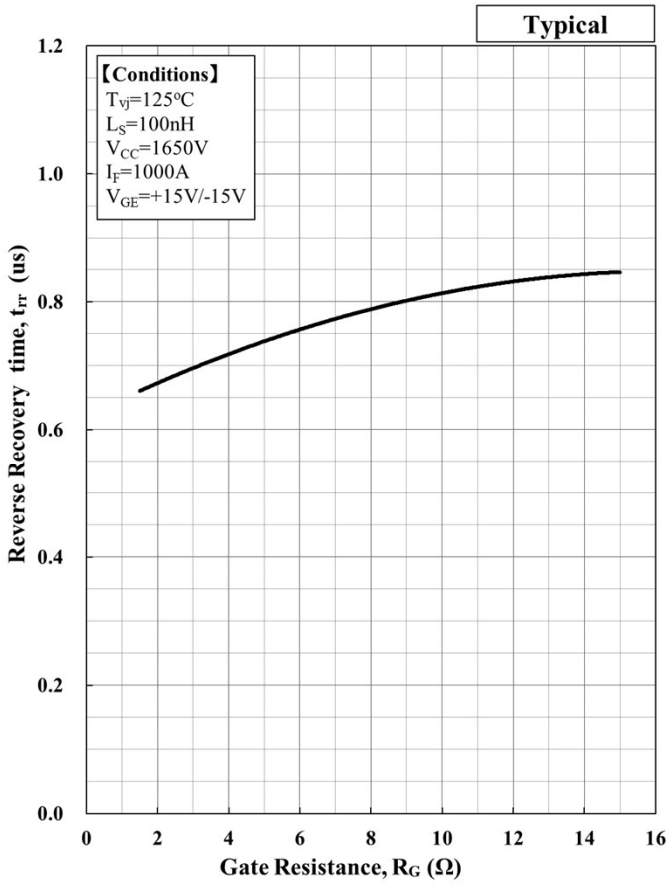
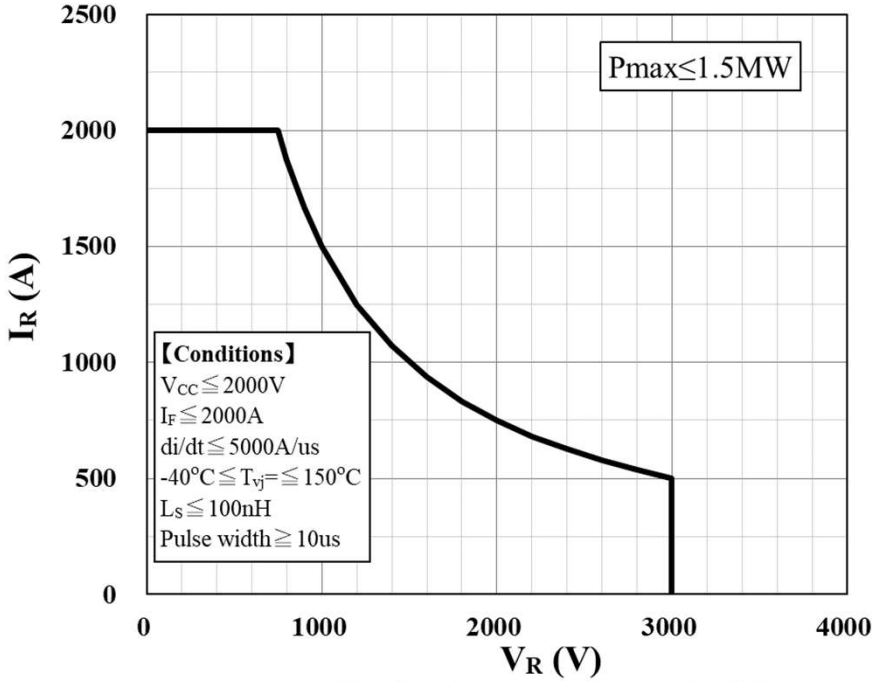
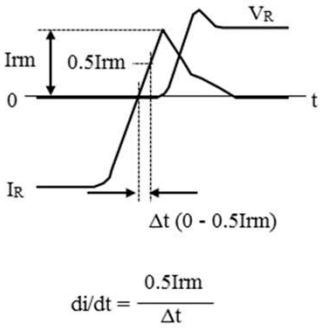


Reverse Recovery loss vs. Gate Resistance



Reverse Recovery time vs. Gate Resistance





Definition of Recovery di/dt

(Defined at power terminals)

Reverse Recovery Safe Operation Area (RRSOA)

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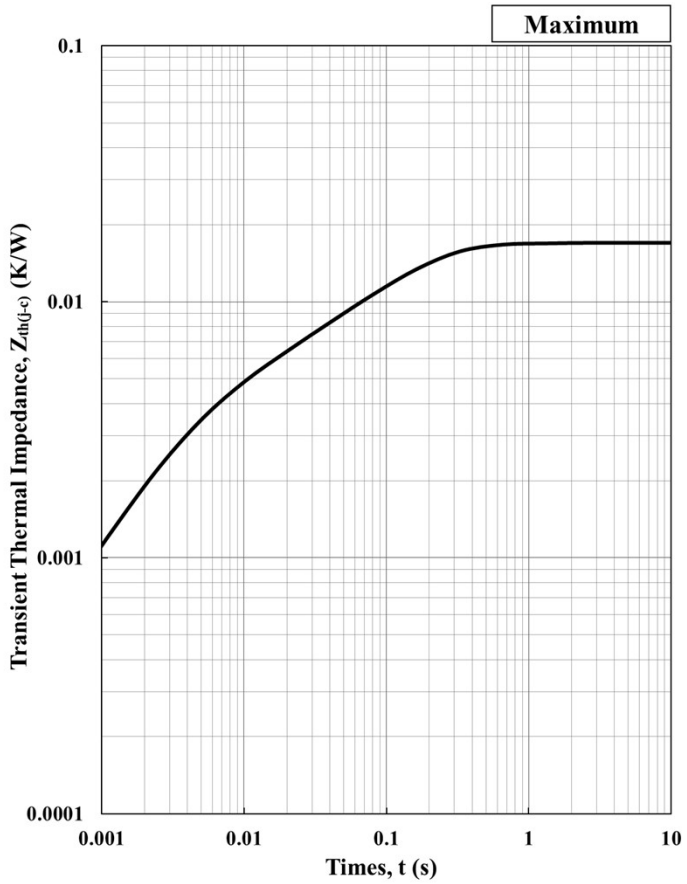

Transient Thermal Ipedance Curve

Foster model lumped circuit constant

n	1	2	3	4	Unit
R th, Diode [n]	1.03E-02	2.88E-03	3.29E-03	5.06E-04	[K/W]
C th, Diode [n]	1.48E+01	1.05E+01	1.41E+00	1.77E+00	[J/K]

Cauer model lumped circuit constant

n	1	2	3	4	Unit
R th, Diode [n]	2.63E-03	3.03E-03	6.16E-03	5.14E-03	[K/W]
C th, Diode [n]	6.96E-01	9.82E-01	6.22E+00	1.79E+01	[J/K]

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

MDM1000E33E2

Minebea POWER SEMICONDUCTORS

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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)".
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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.
7. 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 with Minebea power semiconductor sales department for the latest version of this data sheets.
8. For handling other than described in this manual, follow the handling instructions (IGBT-HI-00002).

■ 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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