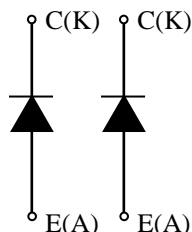


MDM1200H45E2

FEATURES

- * Low VF diode module.
- * Low noise recovery: Ultra soft fast recovery diode.
- * High reverse recovery capability:
Super HiRC Structure.
- * High reliability, high durability diodes.
- * Isolated heat sink (terminal to base).

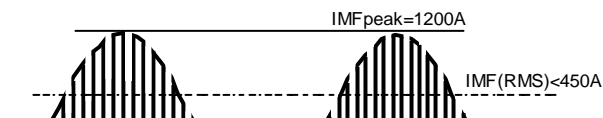
CIRCUIT DIAGRAM



ABSOLUTE MAXIMUM RATINGS (TC=25°C)

Item	Symbol	Unit	MDM1200H45E2
Repetitive Peak Reverse Voltage	V_{RRM}	V	4,500
Forward Current	AC peak	A	1,200
	1ms		2,400
Junction Temperature	T_j	°C	-40 ~ +125
Storage Temperature	T_{stg}	°C	-50 ~ +125 (1)
Isolation Test Voltage	Terminals-base	V_{RMS}	8,400 (AC 1 minute)
	Terminal 1-Terminal 2		8,400 (AC 1 minute)
Screw Torque	Terminals (M8)	N·m	10 (2)
	Mounting (M6)		6 (3)

Notes: (1) Terminal temperature shall not exceed the specified temperature in any operation.
(2) Recommended Value 9 ± 1 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	-	2.0	25	$V_{AK}=4,500V, T_j=125^\circ C$
Forward Voltage Drop	V_F	V	-	3.4	3.9	$I_F=1,200A, T_j=125^\circ C$
Reverse Recovery Time	t_{rr}	μs	-	0.9	1.8	$V_{CC}=2,600V, I_F=1,200A, L_s=180nH$
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	-	3.4	5.1	$T_j=125^\circ C R_g=3.3 \Omega$ (4)

Notes:(4) Counter arm; MBN1200H45E2 VGE= \pm 15V

Rg value is the test condition's value for evaluation of the switching times, not recommended value.
Please, determine the suitable Rg 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	RCE	m Ω	-	0.3	-	per arm
Terminal Stray Inductance	LsCE	nH	-	42	-	per arm
Thermal Impedance	Rth(j-c)	K/W	-	-	0.017	Junction to case (per arm)
Comparative tracking index	CTI		-	600	-	
Contact Thermal Impedance	Rth(c-f)	K/W	-	0.007	-	Case to fin ($\lambda_{grease}=1W/(m \cdot K)$, heat-sink flatness $\leq 50\mu m$)

* 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.

MDM1200H45E2

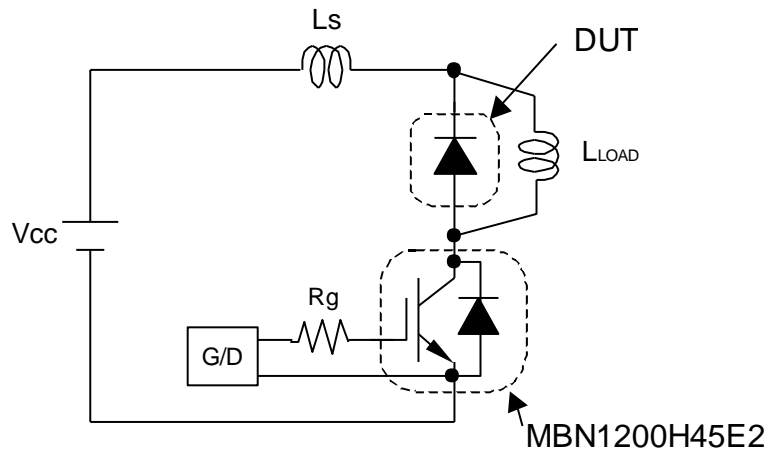


Fig.1 Switching test circuit

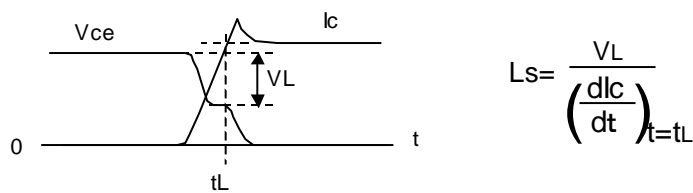
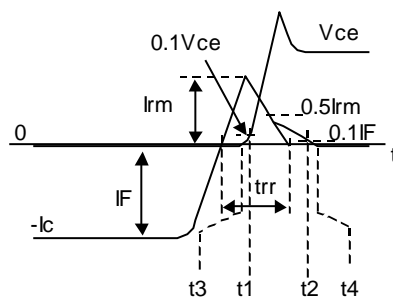


Fig.2 Definition of stray inductance



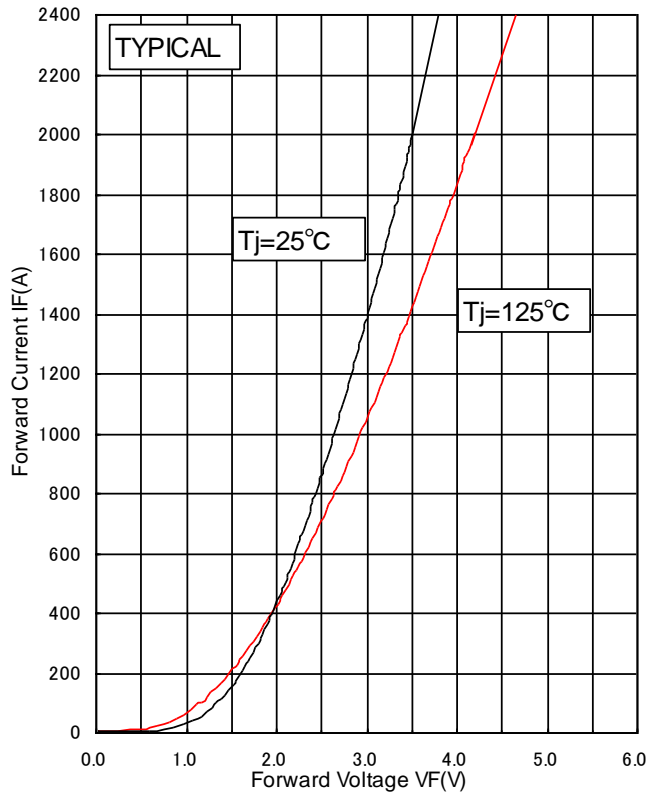
$$\text{Err}(10\%) = \int_{t1}^{t2} IF \cdot Vce \, dt$$

$$\text{Err}(\text{Full}) = \int_{t3}^{t4} IF \cdot Vce \, dt$$

Fig.3 Definition of switching loss

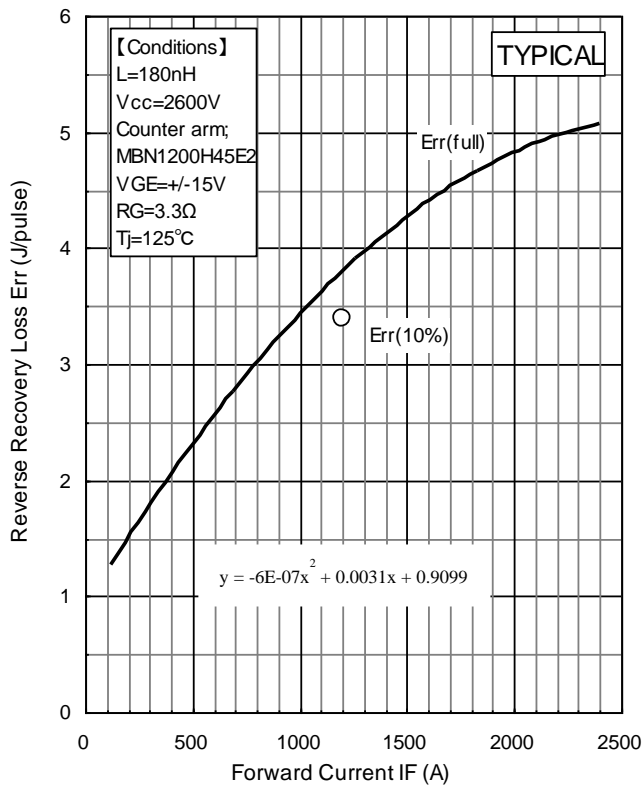
MDM1200H45E2

STATIC CHARACTERISTICS

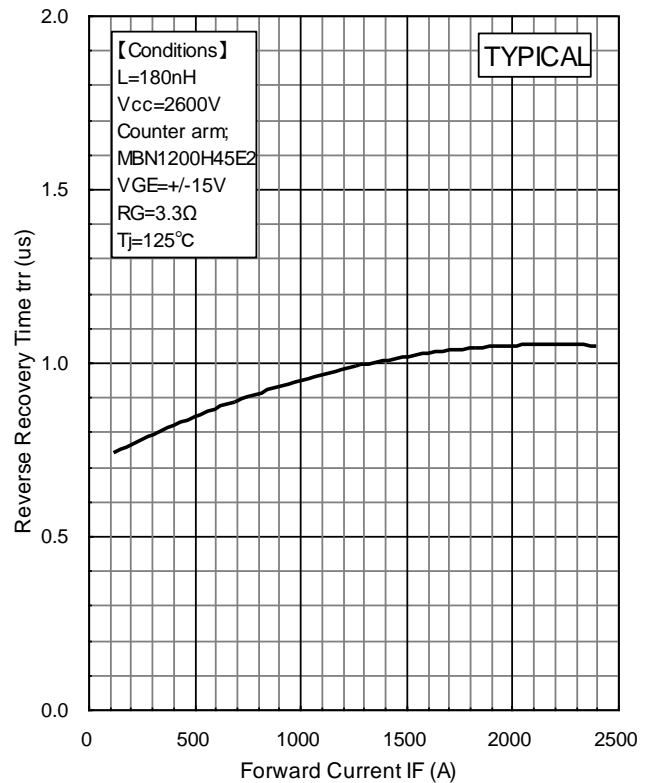


Forward Voltage of diode

DYNAMIC CHARACTERISTICS

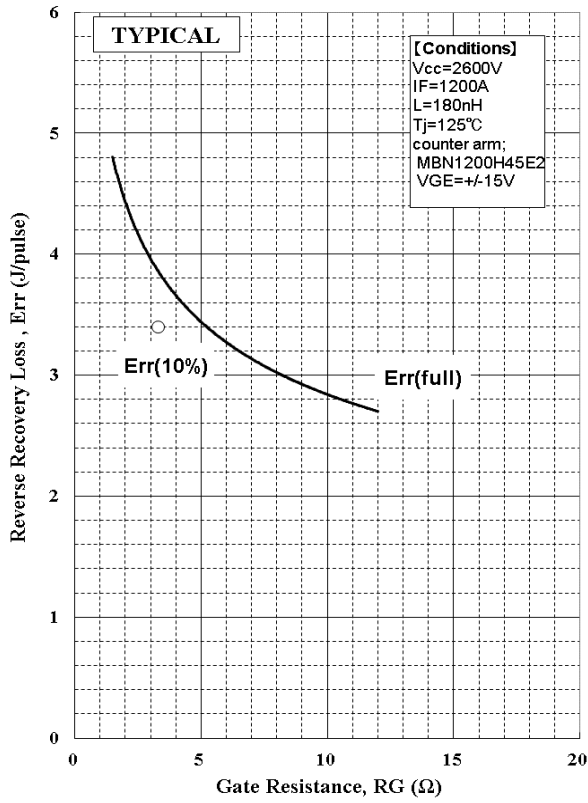


Recovery Loss vs. Forward Current

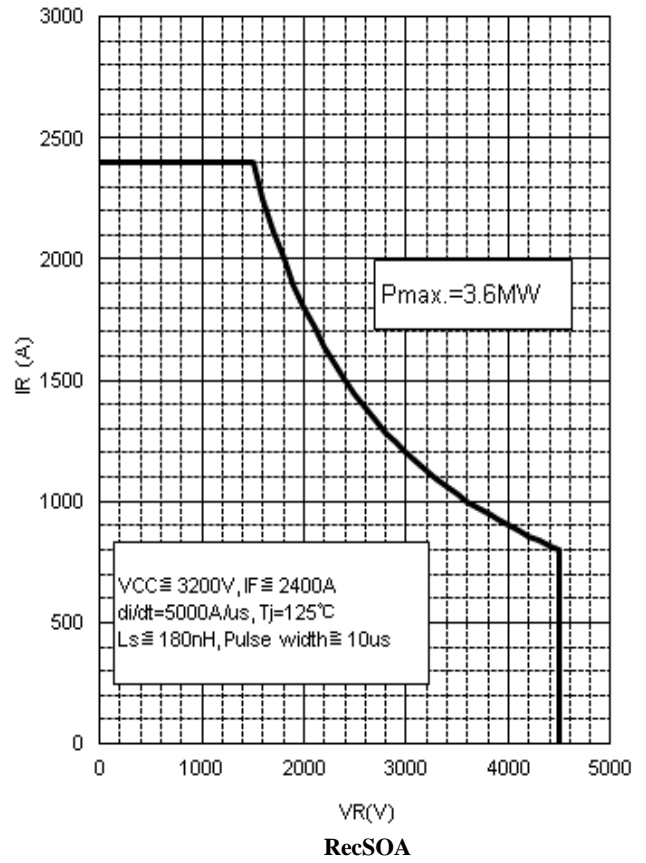


Recovery Time vs. Forward Current

MDM1200H45E2



Recovery Loss vs. Gate Resistance

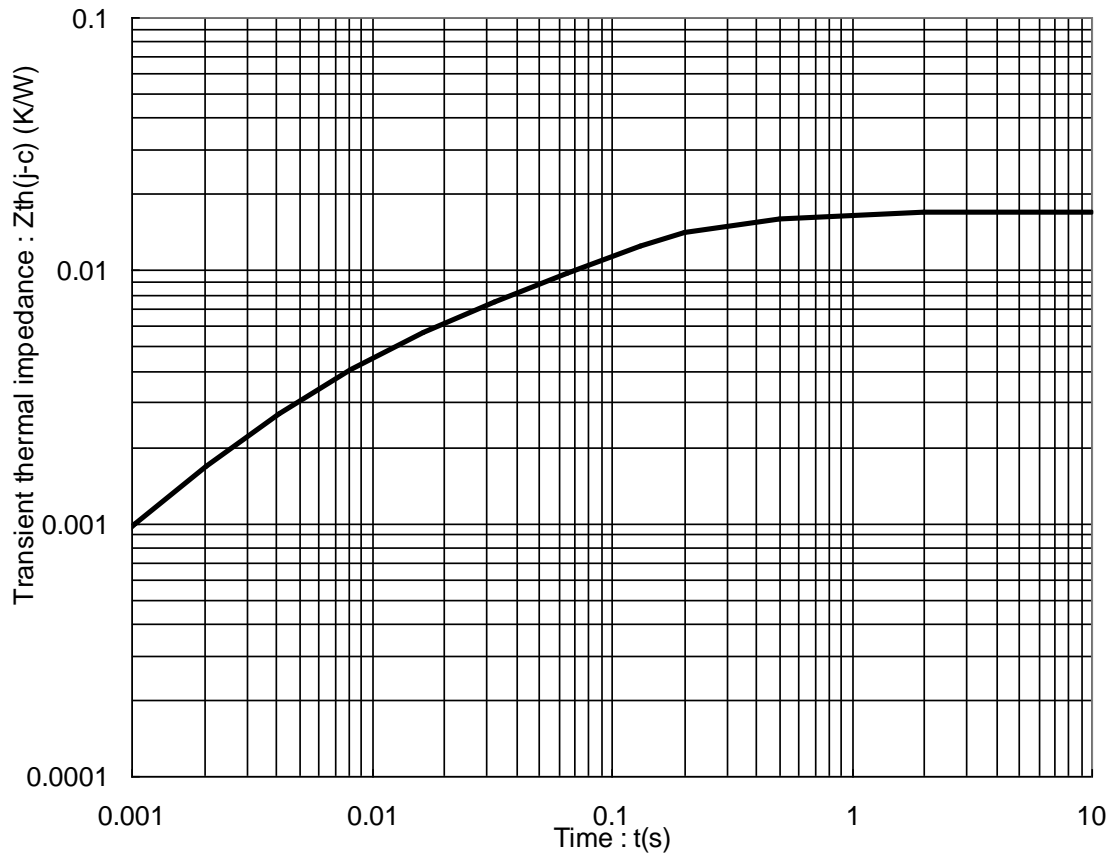


RecSOA

MDM1200H45E2

TRANSIENT THERMAL IMPEDANCE

Maximum



Transient Thermal Impedance Curve

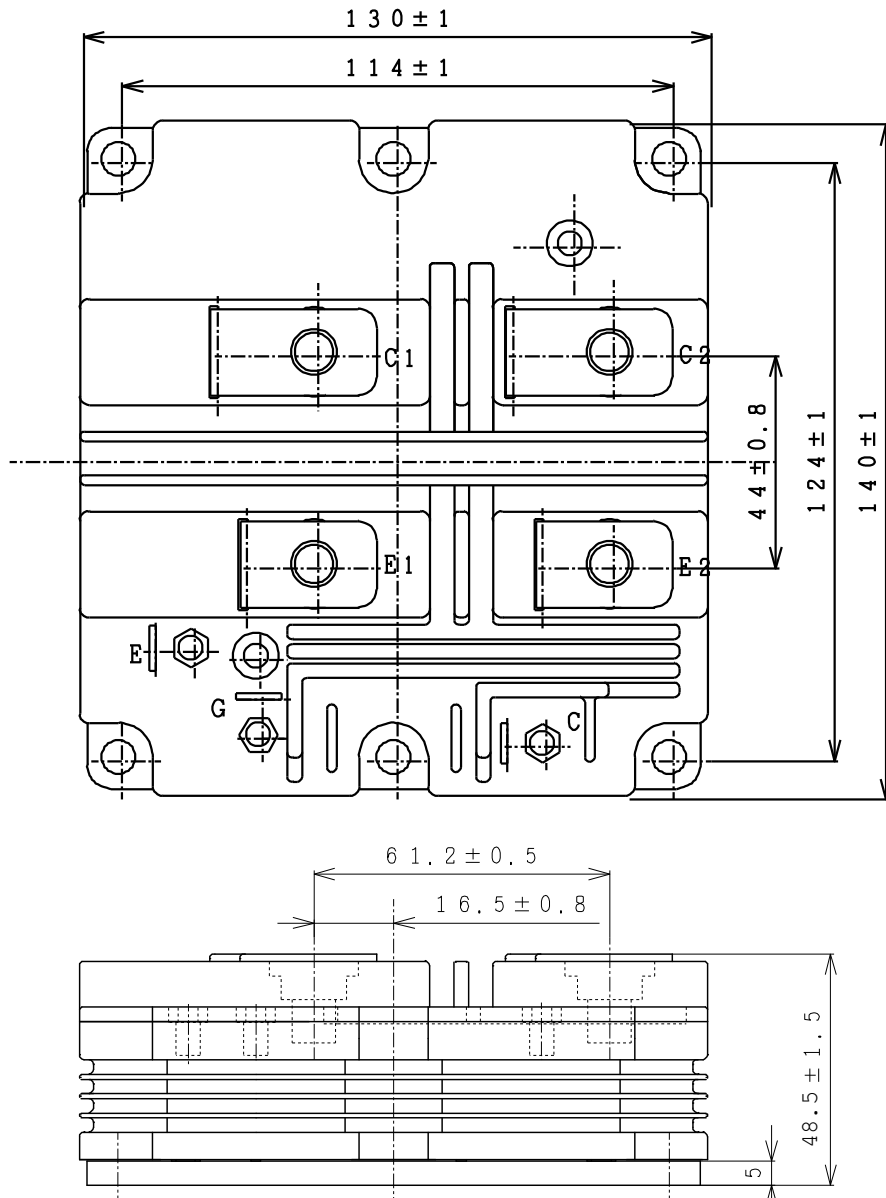
Curve Approximation Model
 $\sum r_{th}[n] * (1 - \exp(-t/r_{th}[n]))$

n	1	2	3	4	Unit
$\tau_{th}[n]$	3.98E-01	6.81E-02	1.32E-02	3.16E-04	sec
$r_{th}[n,IGBT]$	1.02E-02	3.35E-03	3.19E-03	2.87E-04	K/W

MDM1200H45E2

OUTLINE DRAWING

Unit in mm



Weight: 1050(g)

Material declaration

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

Material	Contained part
Lead (Pb) and its compounds	Solder

MDM1200H45E2

Minebea POWER SEMICONDUCTORS

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 MPSD'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.
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 which is located "Inquiry" portion on the top page of a home page.

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