

MDM800H45E2

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).

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Item	Symbol	Unit	MDM800H45E2
Repetitive Peak Reverse Voltage	V _{RRM}	V	4,500
Forward Current	DC	I _F	800
	1ms	I _{FM}	1,600
Operating Junction Temperature	T _{vj op}	°C	-40 ~ +125
Storage Temperature	T _{stg}	°C	-50 ~ +125 (1)
Isolation Test Voltage	Terminals-base	V _{ISO}	10,200(AC 1 minute)
	Terminal 1-Terminal 2	V _{ISO T-T}	10,200(AC 1 minute)
Screw Torque	Terminals (M8)	-	10 (2)
	Mounting (M6)	-	6 (3)

Notes: (1) Terminal temperature shall not exceed the specified temperature in any operation.

(2) Recommended Value 9±1N·m (3) Recommended Value 5.5±0.5N·m

ELECTRICAL CHARACTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Repetitive Reverse Current	I _{RRM}	mA	-	1.3	17	V _R =4,500V, T _{vj} =125°C
Forward Voltage Drop	V _F	V	-	3.4	3.9	I _F =800A, T _{vj} =125°C
Reverse Recovery Time	t _{rr}	μs	-	0.8	1.6	V _R =2,600V, I _F =800A, L _S =190nH
Reverse Recovery Loss	E _{rr(10%)}	J/P	-	2.1	-	T _{vj} =125°C, R _G =4.7Ω (4)
Partial discharge extinction voltage	V _e	V _{RMS}	3,500	-	-	f=50Hz, Q _{PD} ≤10pC(acc. to IEC 61287)

Notes: (4) Counter arm; MBN800H45E2 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	-	0.3	-	per arm, T _{vj} =25°C
Stray inductance module	L _{SCE}	nH	-	42	-	per arm
Thermal Impedance	R _{th(j-c)}	K/W	-	-	0.026	Junction to case (per arm)
Comparative tracking index	CTI		-	600	-	
Contact Thermal Impedance	R _{th(c-f)}	K/W	-	0.007	-	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.

MDM800H45E2

DEFINITION OF TEST CIRCUIT

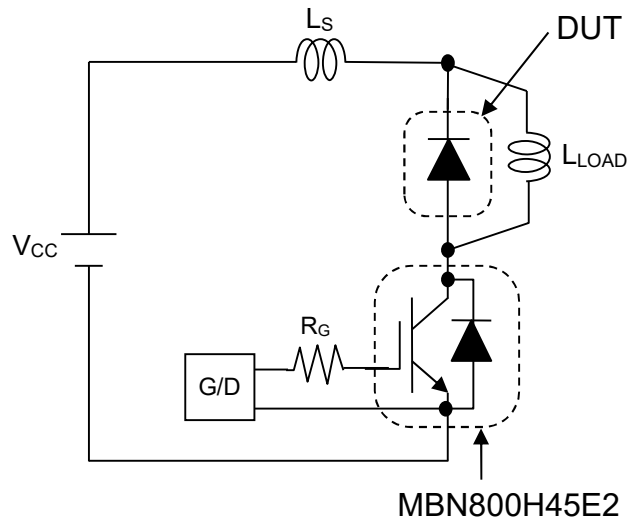


Fig.1 Switching test circuit

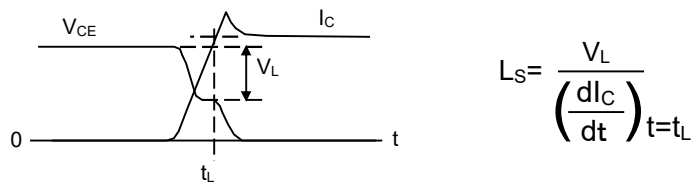
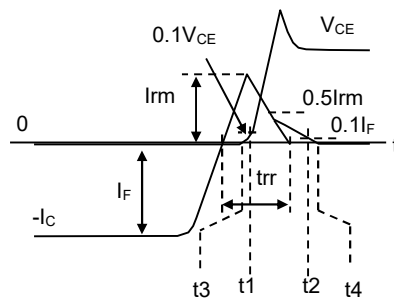


Fig.2 Definition of stray inductance



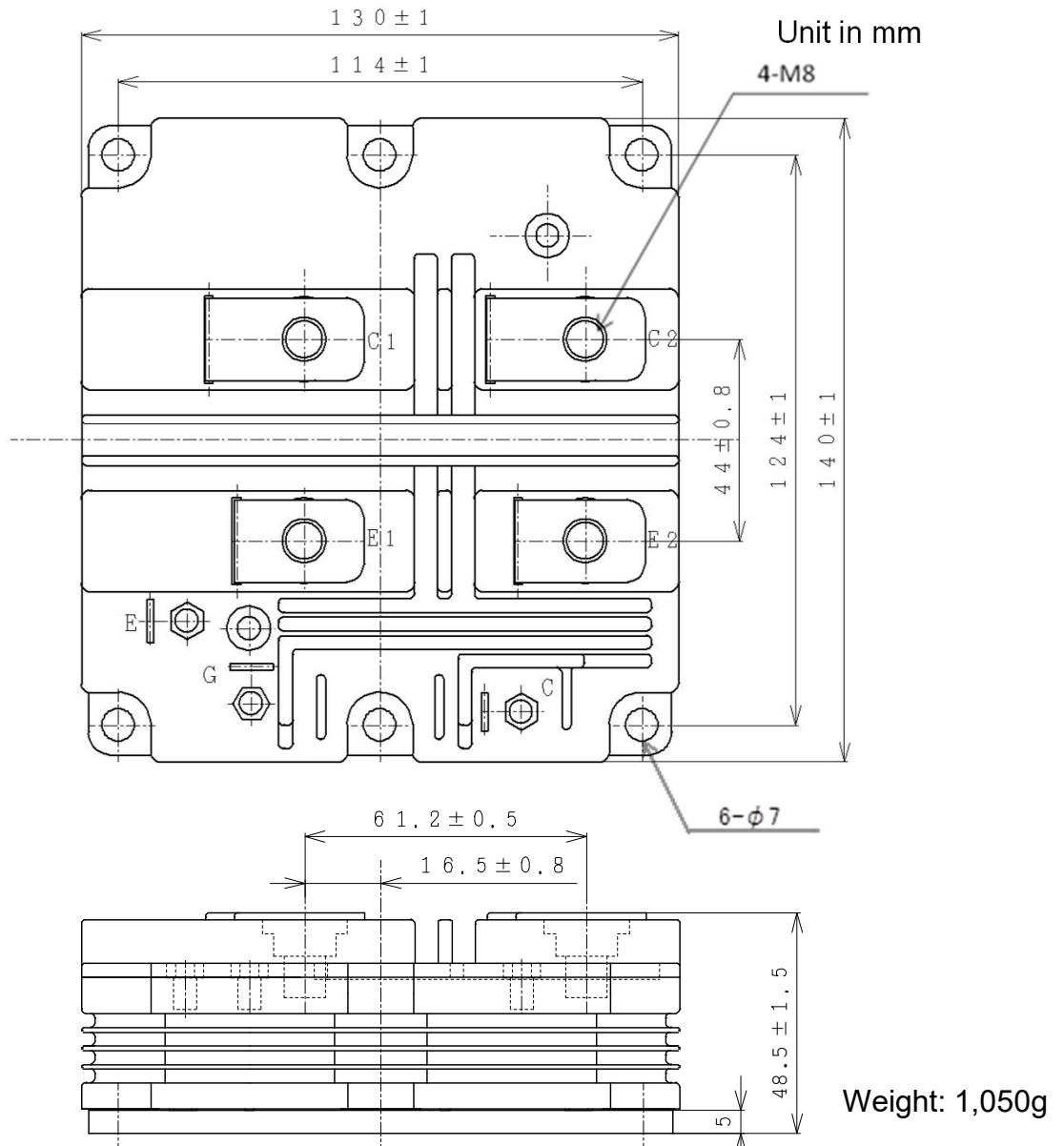
$$E_{rr(10\%)} = \int_{t_1}^{t_2} I_F \cdot V_{CE} dt$$

$$E_{rr(full)} = \int_{t_3}^{t_4} I_F \cdot V_{CE} dt$$

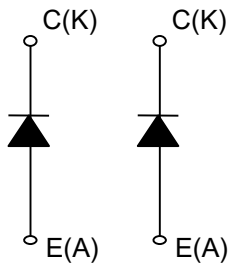
Fig.3 Definition of switching loss

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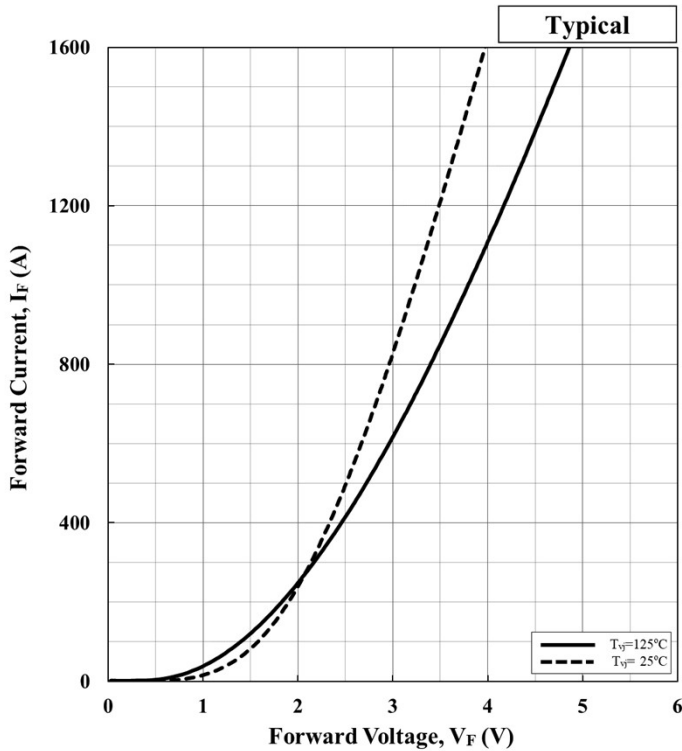
OUTLINE DRAWING



CIRCUIT DIAGRAM



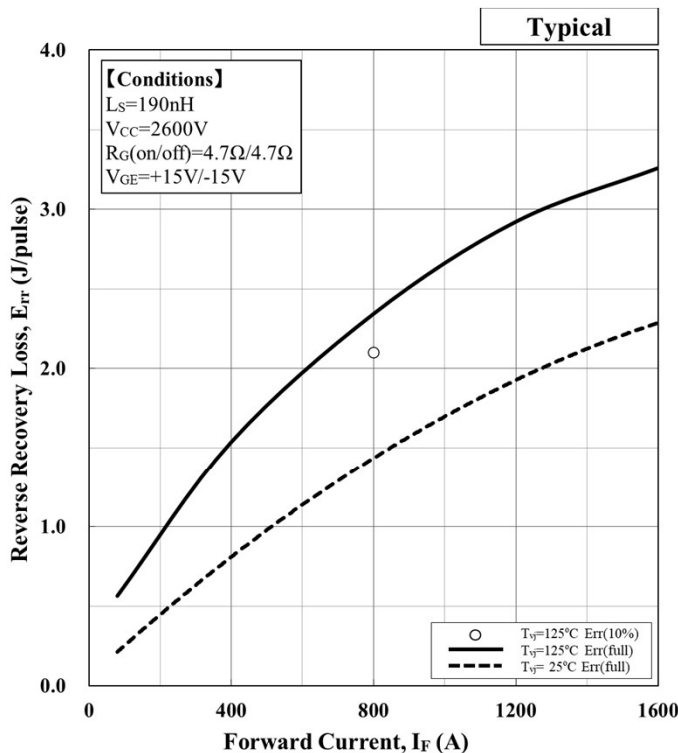
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$$V_F[V] = a_3 \cdot |I_F|^3 + a_2 \cdot |I_F|^2 + a_1 \cdot |I_F| + a_0$$

Temp.[°C]	a_3	a_2	a_1	a_0
25	4.64.E-10	-1.60.E-06	3.04.E-03	1.33.E+00
125	5.49.E-10	-2.02.E-06	4.23.E-03	1.04.E+00

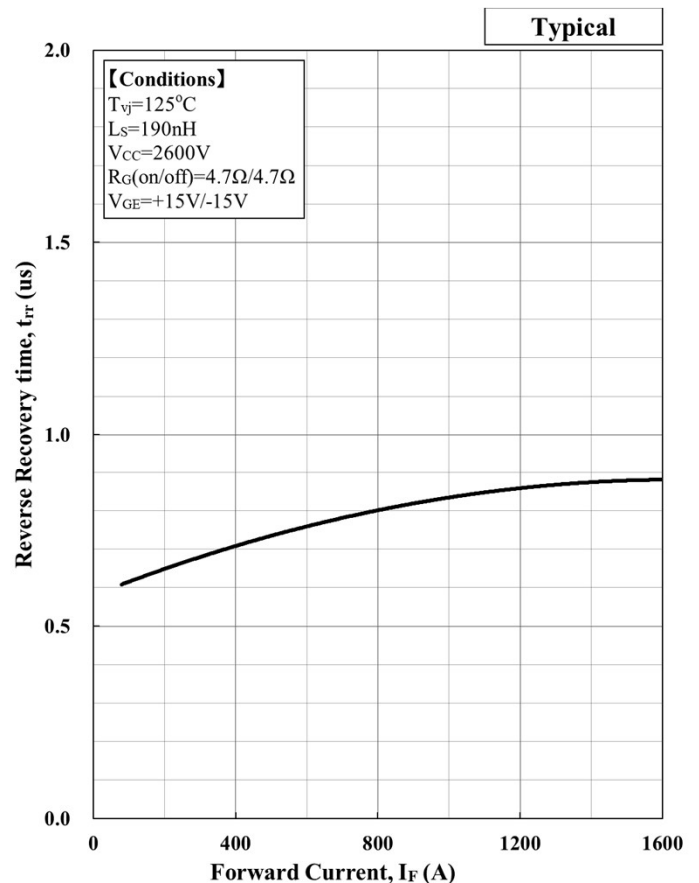
Forward Current vs. Forward Voltage



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

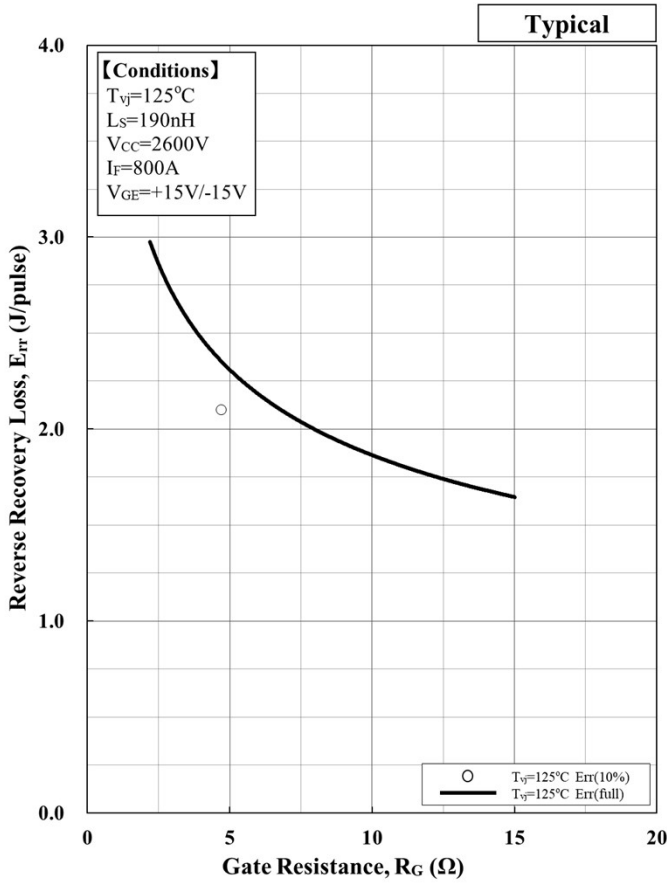
Temp.[°C]	a_3	a_2	a_1	a_0
25	7.25E-11	-5.99E-07	2.18E-03	3.70E-02
125	2.62E-10	-1.55E-06	3.67E-03	2.86E-01

Recovery loss vs. Forward current

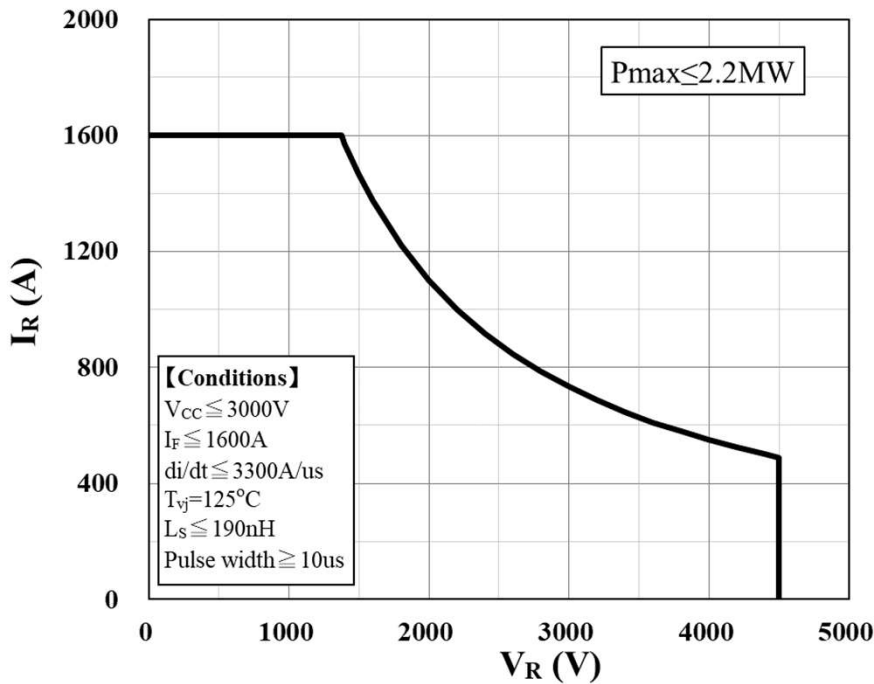


Reverse Recovery time vs. Forward Current

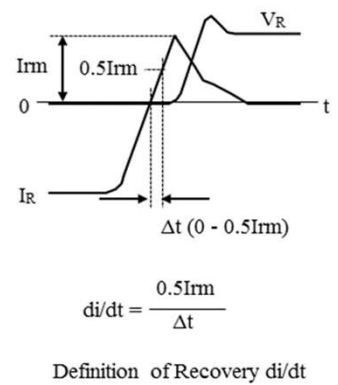
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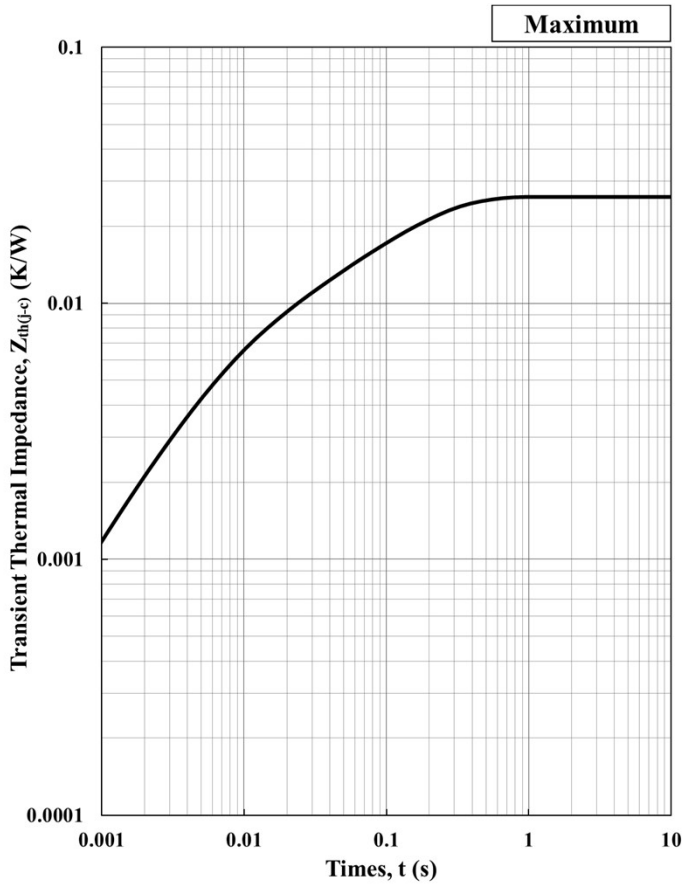
Reverse Recovery loss vs. Gate Resistance



(Defined at power terminal)
Reverse Recovery Safe Operation Area (RRSOA)



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Transient Thermal Impedance Curve

Foster model lumped circuit constant

n	1	2	3	4	Unit
R th, Diode [n]	1.61E-02	4.91E-03	4.76E-03	2.61E-04	[K/W]
C th, Diode [n]	1.02E+01	5.51E+00	1.28E+00	3.29E+00	[J/K]

Cauer model lumped circuit constant

n	1	2	3	4	Unit
R th, Diode [n]	3.81E-03	5.20E-03	8.04E-03	8.93E-03	[K/W]
C th, Diode [n]	7.34E-01	5.00E-01	4.02E+00	1.11E+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

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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.
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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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