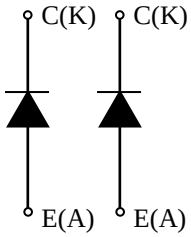
MDM400H45E2

FEATURES

- 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℃)

Item		Symbol	Unit	MDM400H45E2
Repetitive Peak Reverse Voltage		V_{RRM}	V	4,500
Forward Current	DC	I_F	A	400
	1ms	I_{FM}		800
Junction Temperature		Tj	℃	-50～+125
Maximum Junction Temperature		$T_{vj\ max}$	℃	150 (1)
Storage Temperature		T_{stg}	℃	-50 ~ +125 (2)
Isolation Test Voltage	Terminals-base	V_{ISO}	V_{RMS}	10,200 (AC 1 minute)
	Terminal 1-Terminal 2	$V_{ISO\ T\text{-}T}$		10,200 (AC 1 minute)
Screw Torque	Terminals (M8)	-	N·m	10 (3)
	Mounting (M6)	-		6 (4)

Notes: (1) Regarding the definition of $T_{vj\ max}$ for each operation mode, please refer to LD-ES-130737.
(2) Terminal temperature shall not exceed the specified temperature in any operation.
(3) Recommended Value 9±1N·m (4) Recommended Value 5.5±0.5N·m

ELECTRICAL CHARECTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Repetitive Reverse Current	I_{RRM}	mA	-	0.8	8.0	VKA=4,500V, Tj=125℃
Forward Voltage Drop	V_F	V	-	3.4	3.9	IF=400A, Tj=125℃
Reverse Recovery Time	trr	μs	-	0.8	1.6	V_{CC}=2,600V, IF=400A, Ls=190nH
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	-	1.1	1.7	Tj=125°C Rg=4.7Ω (5)

PACKAGE CHARECTERISTICS

Item	Symbol	Unit	Min.	Typ.	Max.	Test Conditions
Terminal Resistance	R_{CE}	mΩ	-	0.3	-	per arm
Terminal Stray Inductance	L_{SCE}	nH	-	42	-	per arm
Thermal Impedance	Rth(j-c)	K/W	-	-	0.052	Junction to case (par arm)
Comparative tracking index	CTI		-	600	-	
Contact Thermal Impedance	Rth(c-f)	K/W	-	0.024	-	Case to fin (λgrease=1W/(m·K), Heat-sink flatness ≤50um)

Notes:(5) Counter arm; MBN800H45E2 VGE=+/-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.

* 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.

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MDM400H45E2

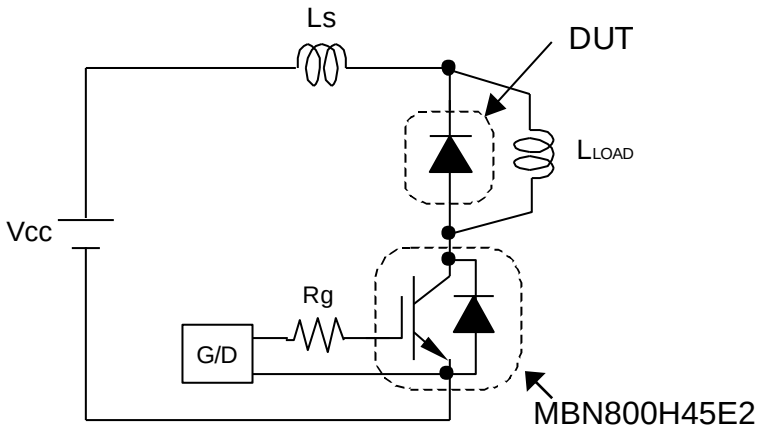


Fig.1 Switching test circuit

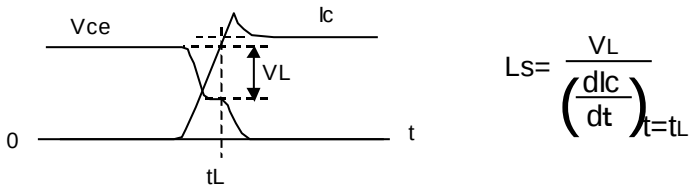
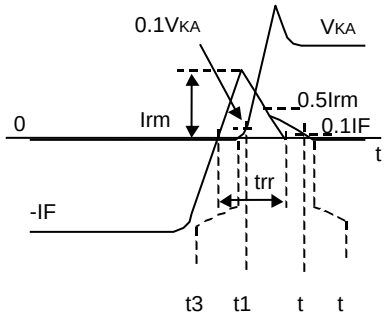


Fig.2 Definition of stray inductance



$$Err(10\%)=\int_{t1}^{t2} IF\cdot V_{KA}\,dt \qquad (t2=t_2,\ t4=t_4)$$

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

Fig.3 Definition of switching loss

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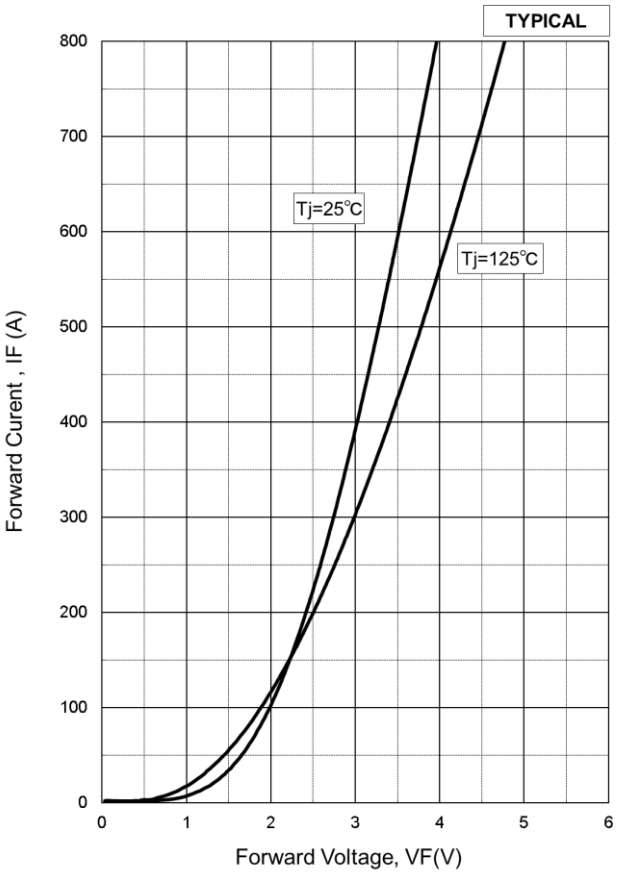
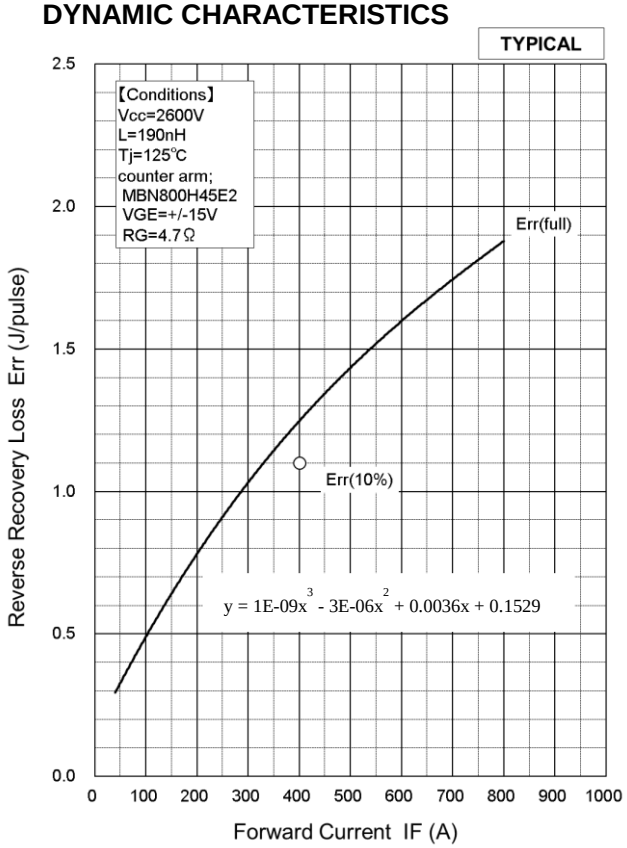
STATIC CHARACTERISTICS

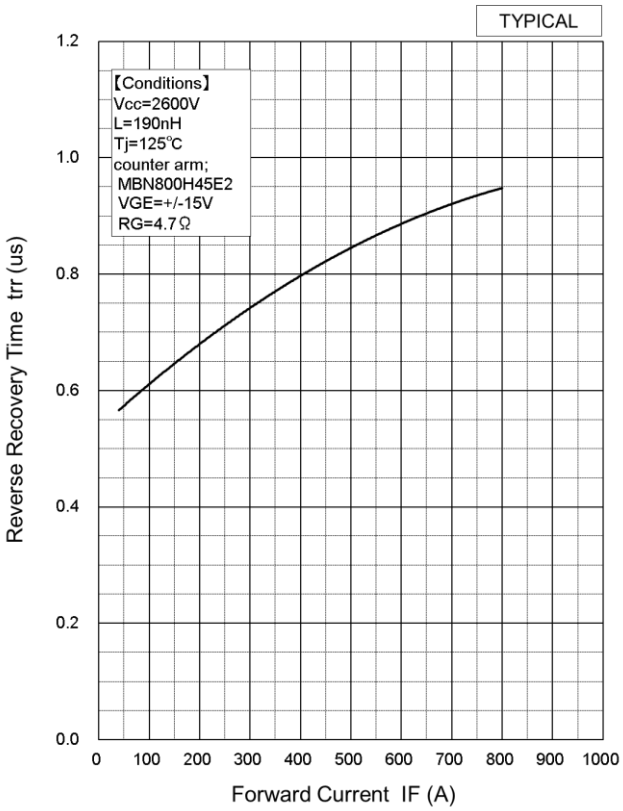


Forward Voltage of free-wheeling diode

DYNAMIC CHARACTERISTICS



Recovery Loss vs. Forward Current



Recovery Time vs. Forward Current

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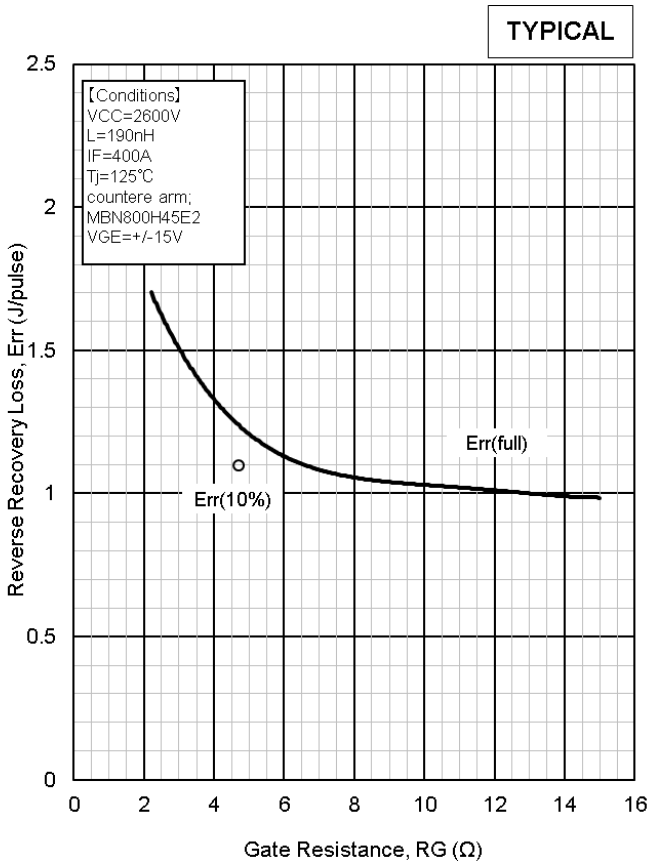

Recovery loss vs. Gate Resistance

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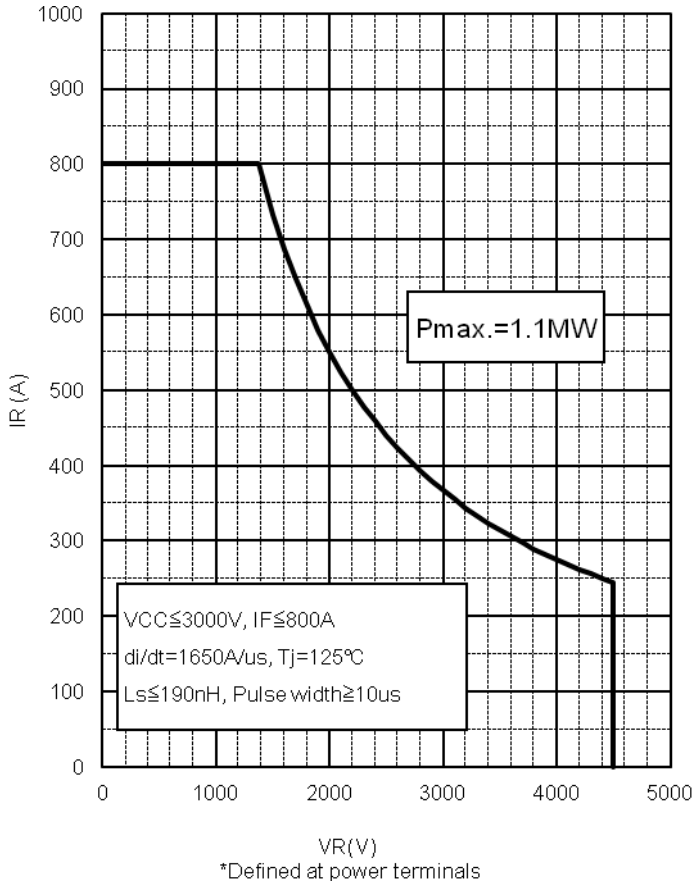
Safe Operating Area



Reverse Recovery Safe Operation Area (RRSOA)

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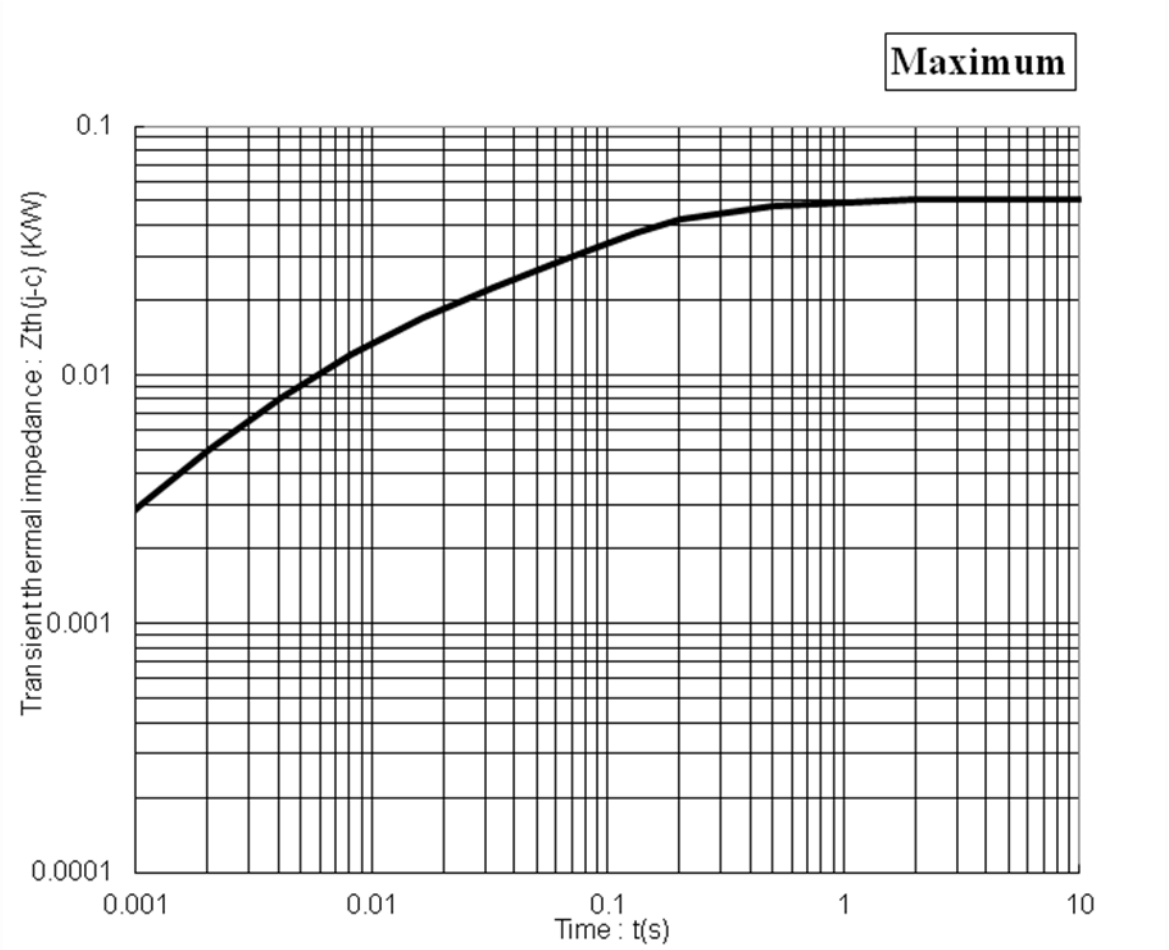
TRANSIENT THERMAL IMPEDANCE



Transient Thermal Impedance Curve

Curve Approximation Model
Σ rth[n]*(1-exp(-t/τth[n]))

n	1	2	3	4	Unit
τ th[n]	3.98E-01	9.61E-02	7.65E-03	3.16E-04	sec
rth[n,Diode]	8.82E-03	2.89E-02	1.30E-02	1.34E-03	K/W

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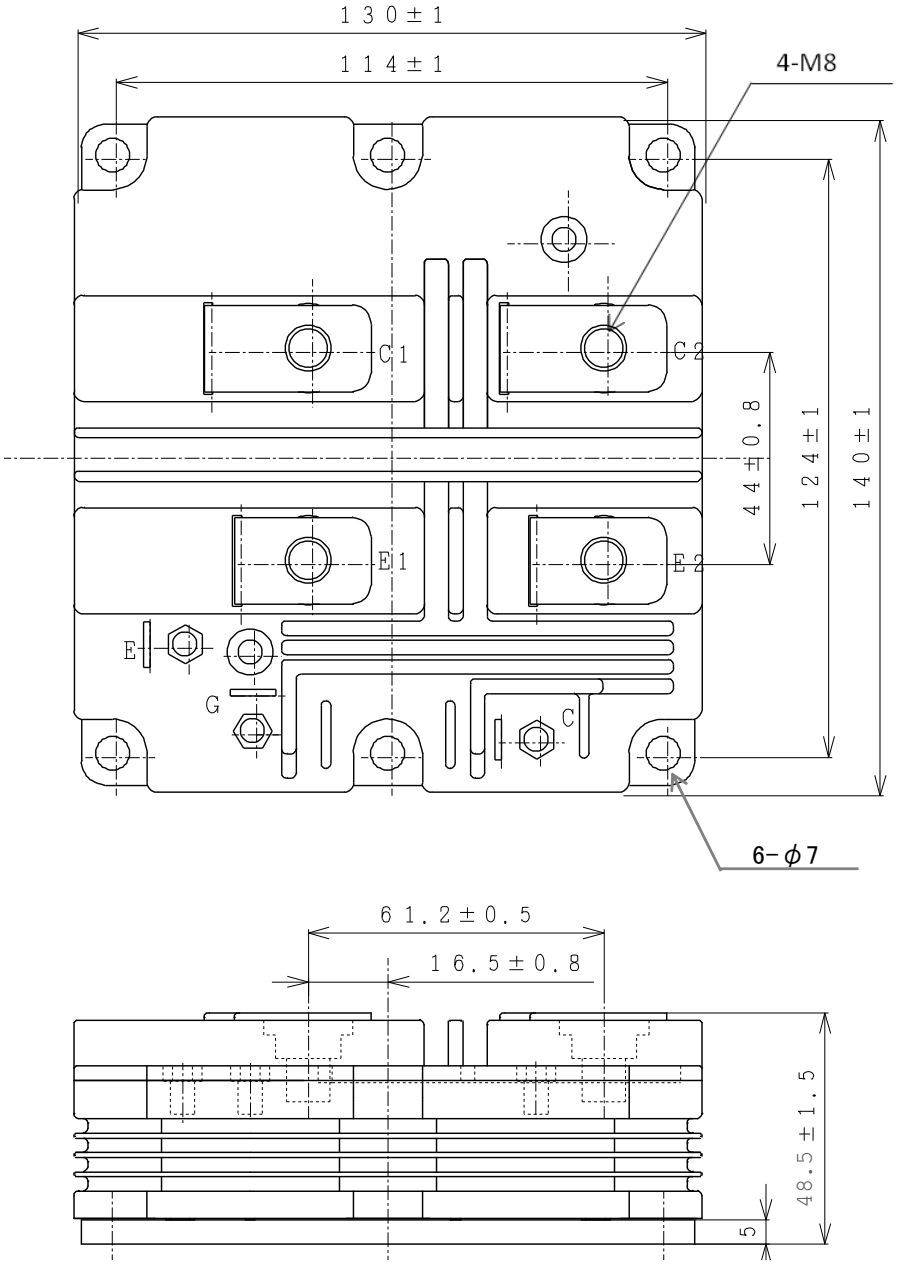
OUTLINE DRAWING

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

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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.
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