MDM250H65E2

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).

ABSOLUTE MAXIMUM RATINGS (T_C=25°C)

Item			Symbol	Unit	MDM250H65E2
Repetitive Peak Reverse Voltage		T_{vj} = 125°C	V_{RRM}	V	6,500
		T_{vj} = 25°C			6,500
		T_{vj} = -40°C			6,000
Forward Current	DC		I_F	A	250
	1ms		I_{FM}		500
Junction Temperature			$T_{vj\ op}$	°C	-40 ~ +125
Storage Temperature			T_{stg}	°C	-50 ~ +125
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 (1)
	Mounting (M6)		-		6 (2)

Notes: (1) Recommended Value 9±1N·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	-	3.5	25	V_R=6,500V, T_{vj}=150°C
Forward Voltage Drop	V_F	V	-	3.7	-	I_F=250A, T_{vj}=25°C
			3.7	4.1	4.6	I_F=250A, T_{vj}=125°C
Reverse Recovery Time	t_{rr}	µs	-	0.6	-	V_R=3,600V, I_F=250A, L_S=200nH T_{vj}=125°C, Rg=12Ω (3)
Reverse Recovery Loss	$E_{rr(10\%)}$	J/P	-	0.85	-	
	$E_{rr(full)}$	J/P	-	0.9	-	

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	$R_{th(j\text{-}c)}$	K/W	-	-	0.051	Junction to case (per arm)
Comparative tracking index	CTI		-	600	-	
Contact Thermal Impedance	$R_{th(c\text{-}f)}$	K/W	-	0.024	-	Case to fin (per arm)

Notes: (3) Counter arm; MBN500H65E2 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.
* ELECTRICAL CHARACTERISTIC items shown in above table are according to IEC 60747–2.

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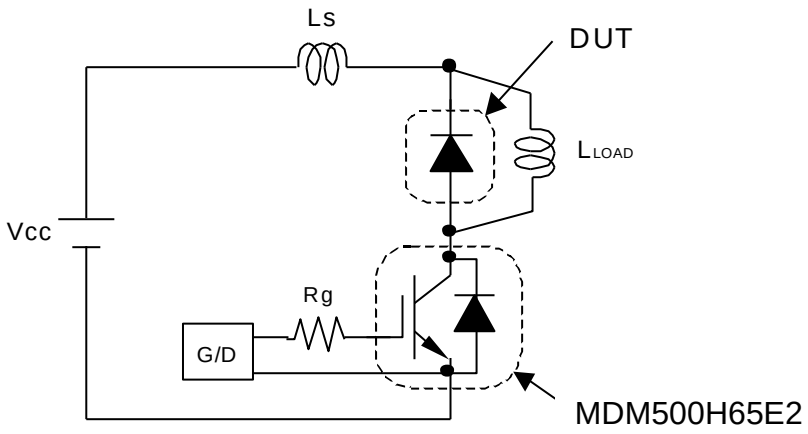
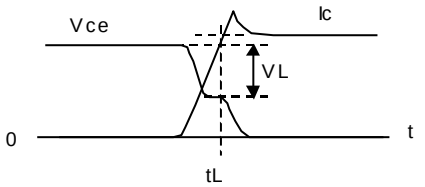
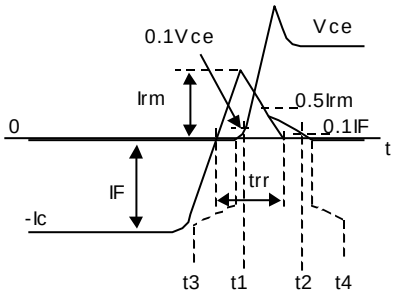


Fig.1 Switching test circuit



$$Ls = \frac{V_L}{\left(\frac{dIc}{dt}\right)_{t=tL}}$$

Fig.2 Definition of stray inductance



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

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

Fig.3 Definition of switching loss

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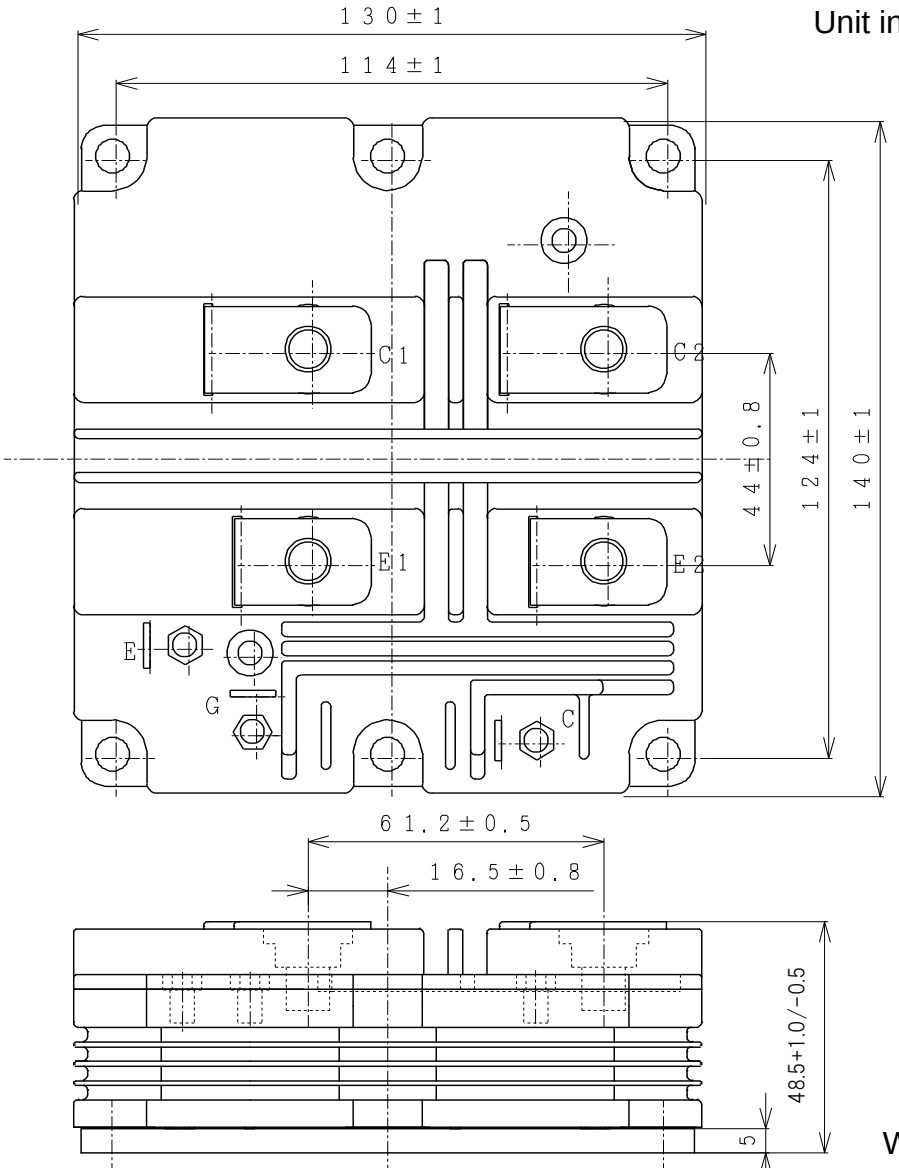
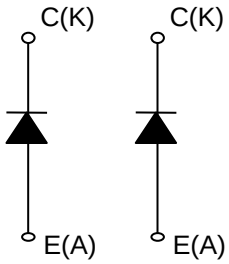
OUTLINE DRAWING

Unit in mm



Weight: 1,050g

CIRCUIT DIAGRAM



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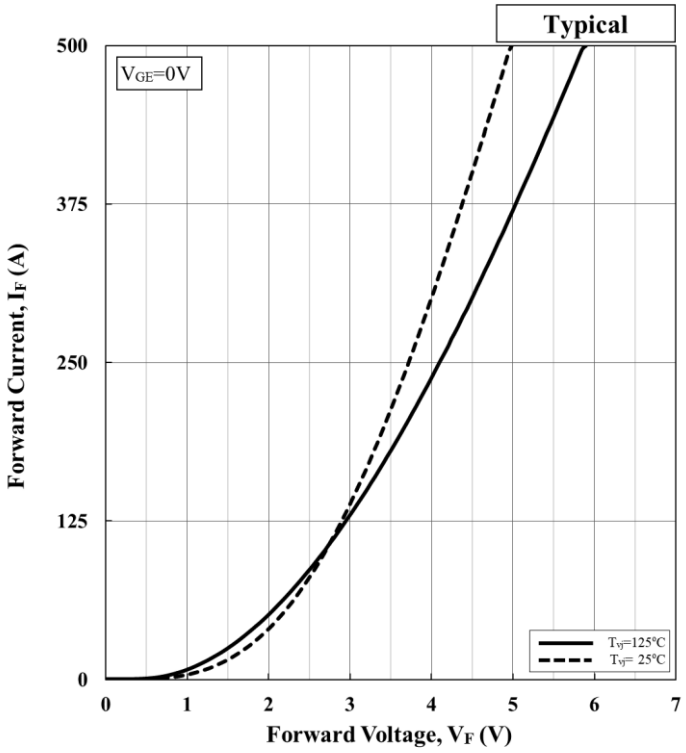
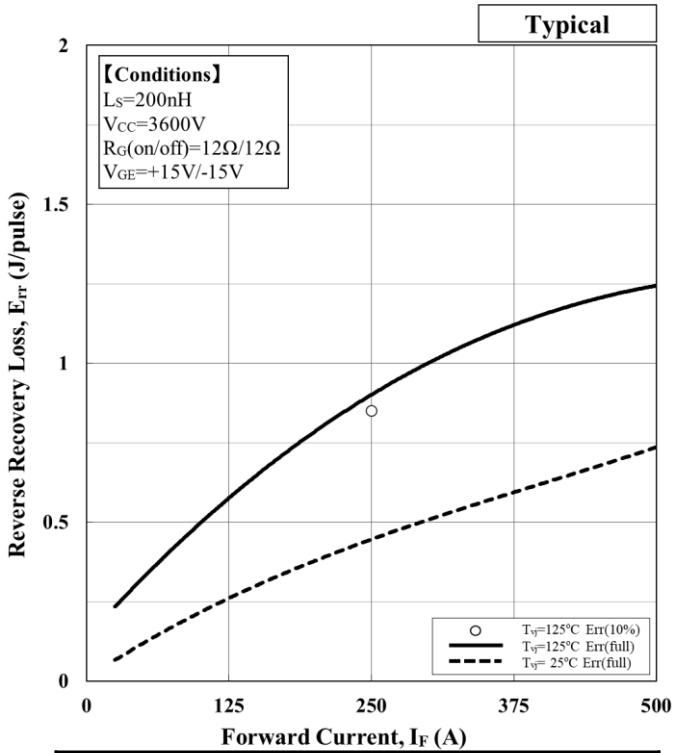


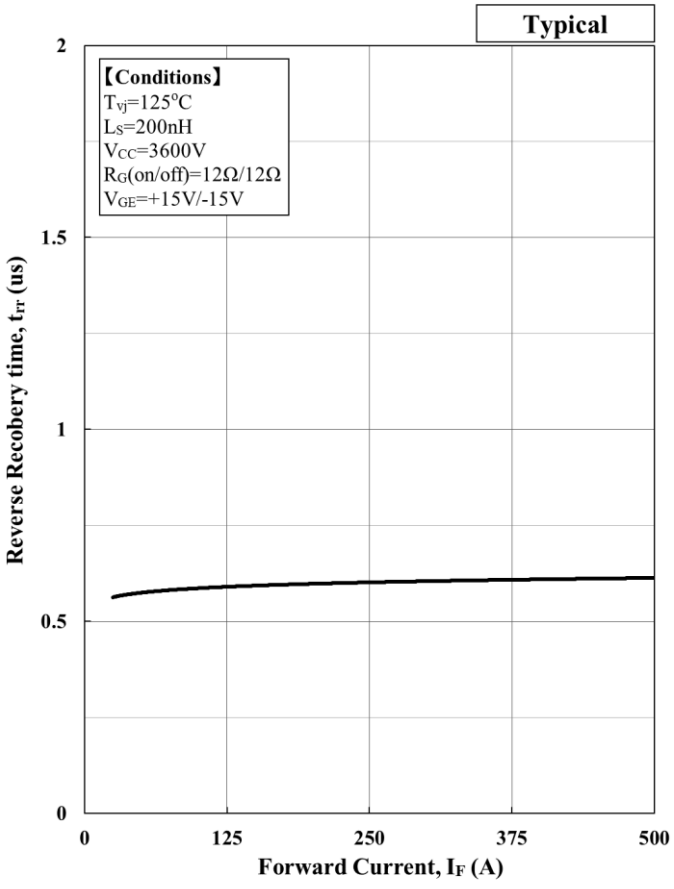
$V_F[V] = a_3 \cdot \lvert I_F \rvert^3 + a_2 \cdot \lvert I_F \rvert^2 + a_1 \cdot \lvert I_F \rvert + a_0$				
Temp.[°C]	a_3	a_2	a_1	a_0
25	2.35E-08	-2.54E-05	1.38E-02	1.50E+00
125	2.31E-08	-2.65E-05	1.69E-02	1.19E+00

Forward Voltage of diode



$E\ [J] = a_3 \cdot \lvert I_F \rvert^3 + a_2 \cdot \lvert I_F \rvert^2 + a_1 \cdot \lvert I_F \rvert + a_0$				
Temp.[°C]	a_3	a_2	a_1	a_0
25	2.58E-09	-3.11E-06	2.36E-03	8.59E-03
125	8.14E-10	-3.99E-06	4.01E-03	1.36E-01

Recovery loss vs. Forward current



Reverse Recovery time vs. Forward Current

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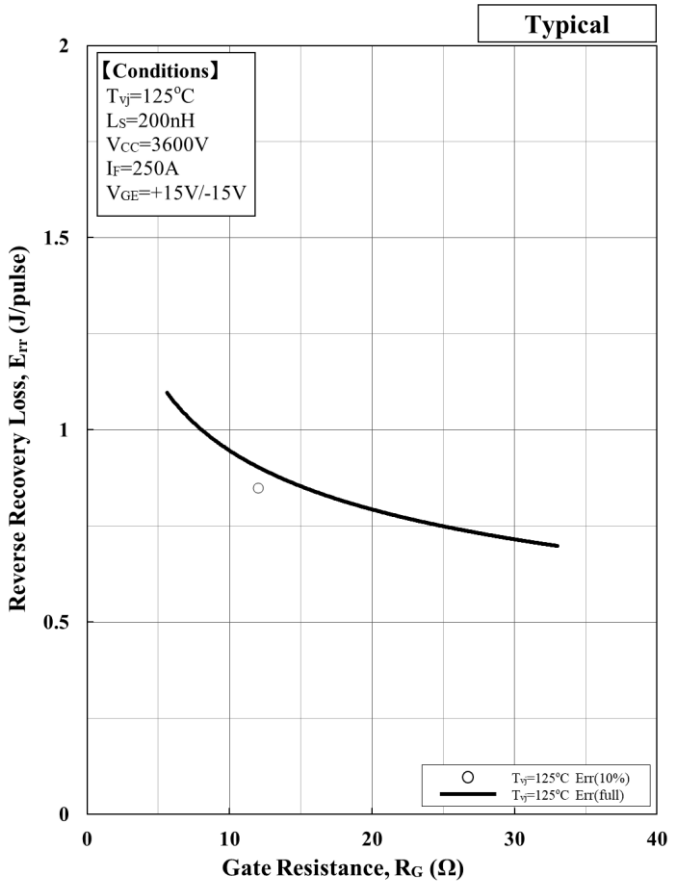
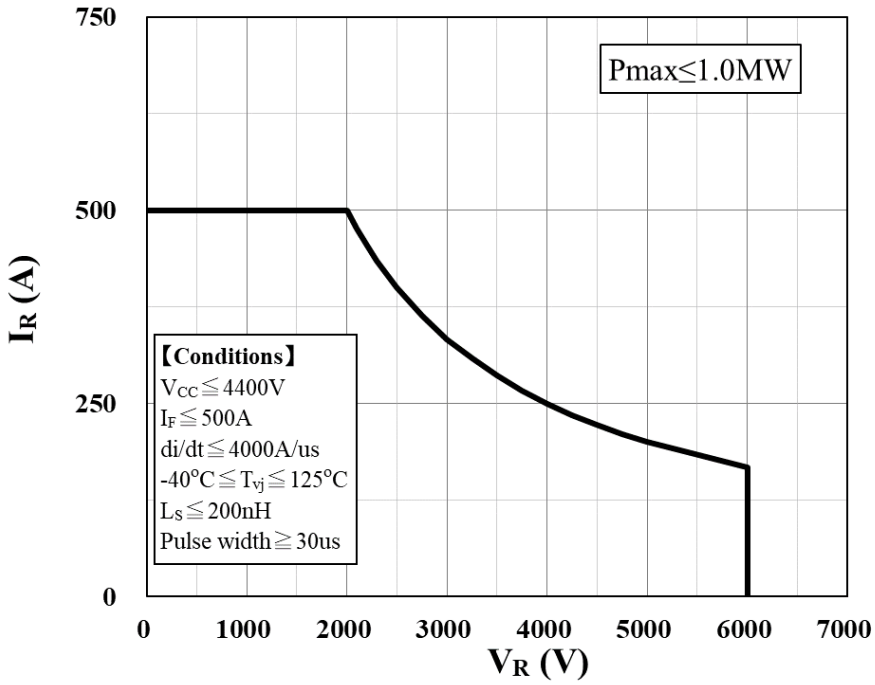
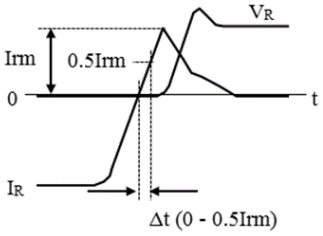


Reverse Recovery loss vs. Gate Resistance



(Deined at power terminal)

Reverse Recovery Safe Operation Area (RRSOA)



$$di/dt = \frac{0.5Irm}{\Delta t}$$

Definition of Recovery di/dt

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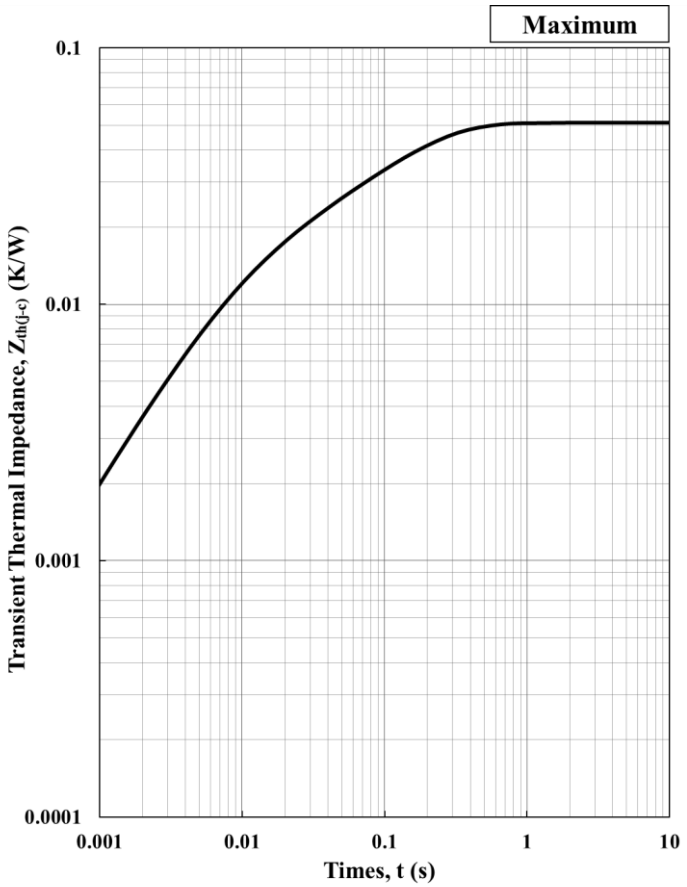

Transient Thermal Ipedance Curve

Foster model lumped circuit constant

n	1	2	3	4
R th, Diode [n]	3.17E-02	9.84E-03	9.14E-03	3.88E-04
C th, Diode [n]	5.19E+00	2.92E+00	7.65E-01	2.40E+00

Cauer model lumped circuit constant

n	1	2	3	4
R th, Diode [n]	7.89E-03	1.03E-02	1.60E-02	1.67E-02
C th, Diode [n]	4.43E-01	2.55E-01	2.13E+00	5.83E+00

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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HITACHI 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 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.
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 Hitachi 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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