

<Diode Modules>

# RM400DY-24S

HIGH POWER SWITCHING USE  
INSULATED TYPE



dual (Half-Bridge)

Forward current  $I_F$  ..... 4 0 0 A  
 Repetitive peak reverse voltage  $V_{RRM}$  ..... 1 2 0 0 V  
 Maximum junction temperature  $T_{jmax}$  ..... 1 5 0 °C

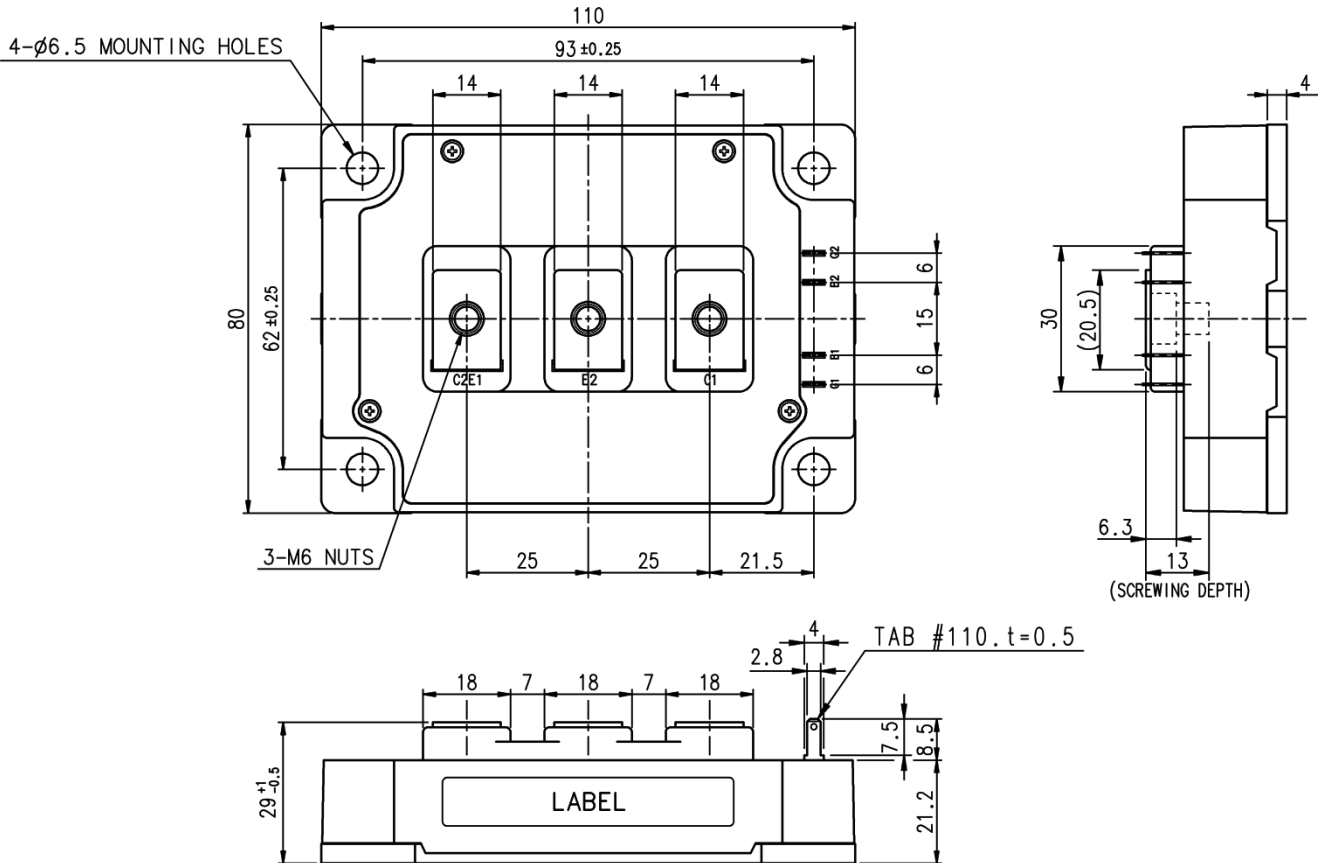
- Flat base Type
- Copper base plate
- RoHS Directive compliant
- Recognized under UL1557, File E323585

**APPLICATION**

AC Motor Control, Motion/Servo Control, Power supply, etc.

**OUTLINE DRAWING & INTERNAL CONNECTION**

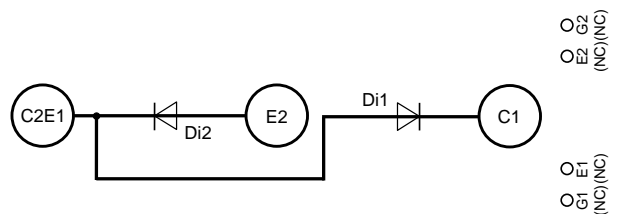
Dimension in mm



**INTERNAL CONNECTION**

Tolerance otherwise specified

Division of Dimension	Tolerance
0.5 to 3	±0.2
over 3 to 6	±0.3
over 6 to 30	±0.5
over 30 to 120	±0.8
over 120 to 400	±1.2



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## MAXIMUM RATINGS (T<sub>j</sub>=25 °C, unless otherwise specified)

Symbol	Item	Conditions	Rating	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage	-	1200	V
V <sub>RSM</sub>	Non-repetitive peak reverse voltage	-	1200	V
V <sub>R(DC)</sub>	Reverse DC blocking voltage	-	960	V
I <sub>DC</sub>	DC forward current	DC, T <sub>c</sub> =68 °C (Note1, 2)	400	A
I <sub>FSM</sub>	Surge non-repetitive forward current	1 cycle of half wave at 60Hz, peak value, T <sub>j</sub> =25°C start, V <sub>RM</sub> =0 V	2000	
I <sup>2</sup> t	Current square time for fusing	t <sub>w</sub> =8.3 ms, T <sub>j</sub> =25 °C start, Value for one cycle of surge current	1.66 × 10 <sup>4</sup>	A <sup>2</sup> s
V <sub>isol</sub>	Isolation voltage	Terminals to base plate, RMS, f=60 Hz, AC 1 min	2500	V
T <sub>j</sub>	Junction temperature	-	-40 ~ +150	°C
T <sub>stg</sub>	Storage temperature	-	-40 ~ +125	

## ELECTRICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
I <sub>RRM</sub>	Reverse current	V <sub>R</sub> =V <sub>RRM</sub> , T <sub>j</sub> =125 °C	-	-	10	mA
V <sub>F</sub>	Forward voltage	I <sub>F</sub> =400 A, T <sub>j</sub> =25 °C (Note3)	-	2.6	3.3	V
t <sub>rr</sub>	Reverse recovery time	V <sub>R</sub> =600 V, I <sub>F</sub> =400 A, T <sub>j</sub> =25 °C,	-	-	250	ns
Q <sub>rr</sub>	Reverse recovery charge	di/dt=-3500 A/μs, Inductive load	-	16	-	μC
E <sub>rr</sub>	Reverse recovery energy per pulse	T <sub>j</sub> =125 °C, Inductive load	-	23.5	-	mJ
R <sub>AA-KK</sub>	Internal lead resistance	Main terminal-chip, per Diode, T <sub>c</sub> =25 °C	-	0.75	-	mΩ

## THERMAL RESISTANCE CHARACTERISTICS

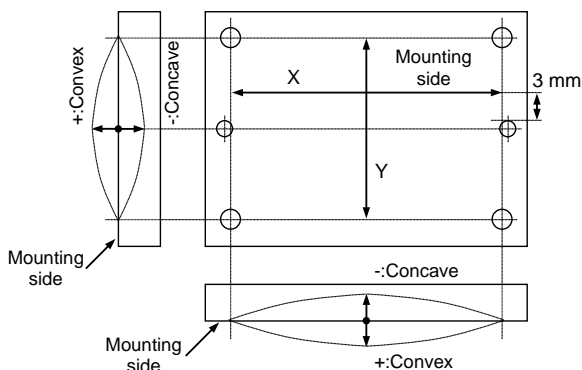
Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
R <sub>th(j-c)</sub>	Thermal resistance	Junction to case, per Diode (Note2)	-	-	62	K/kW
R <sub>th(c-s)</sub>	Contact thermal resistance	Case to heat sink, per 1/2 module, Thermal grease applied (Note2, 4)	-	18	-	K/kW

## MECHANICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
M <sub>t</sub>	Mounting torque	Main terminals M 6 screw	3.5	4.0	4.5	N·m
M <sub>s</sub>		Mounting to heat sink M 6 screw	3.5	4.0	4.5	N·m
m	mass	-	-	580	-	g
e <sub>c</sub>	Flatness of base plate	On the centerline X, Y (Note5)	-100	-	+100	μm

Note1. Junction temperature (T<sub>j</sub>) should not increase beyond T<sub>jmax</sub> rating.

- Case temperature (T<sub>c</sub>) and heat sink temperature (T<sub>s</sub>) are defined on the each surface (mounting side) of base plate and heat sink just under the chips. Refer to the figure of chip location. The heat sink thermal resistance should measure just under the chips.
- Pulse width and repetition rate should be such as to cause negligible temperature rise.
- Typical value is measured by using thermally conductive grease of λ=0.9 W/(m·K).
- Base plate (mounting side) flatness measurement points (X, Y) are as follows of the following figure.

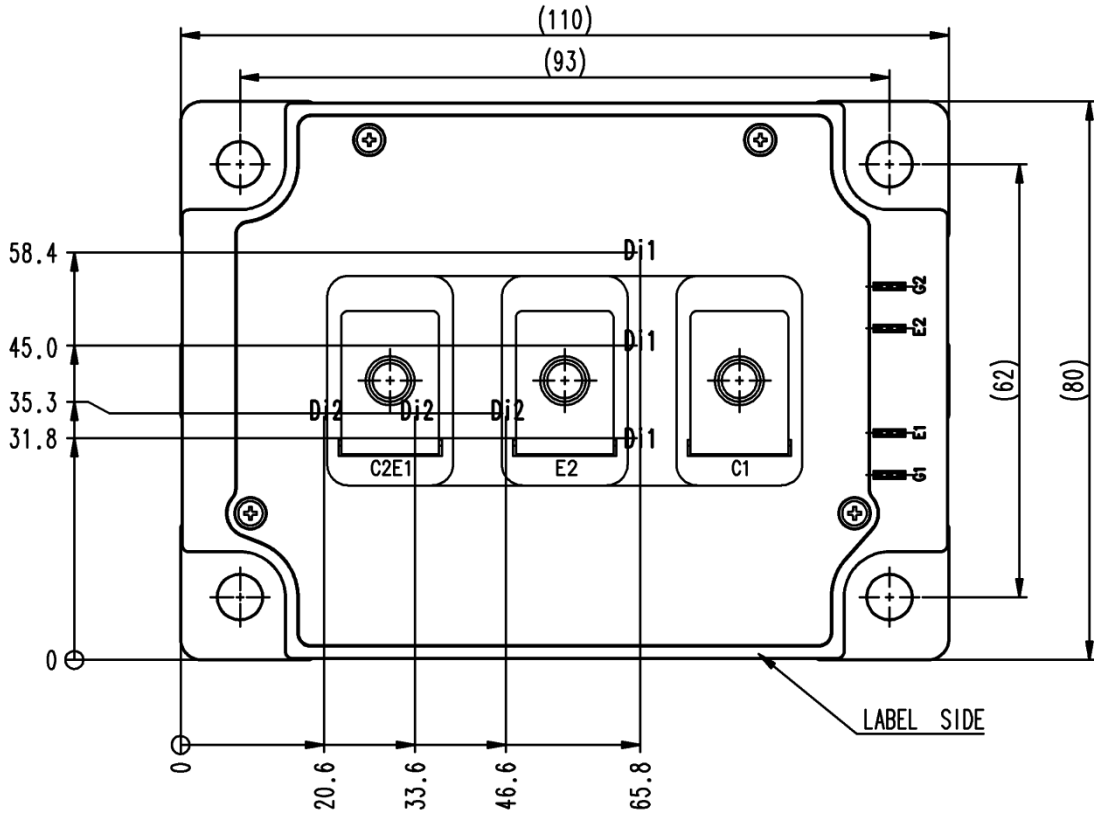


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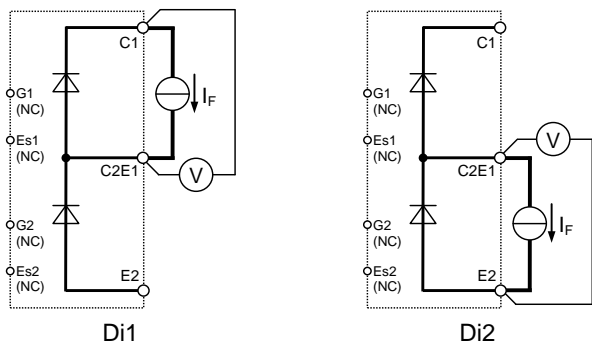
CHIP LOCATION (Top view)

Dimension in mm, tolerance: ±1 mm



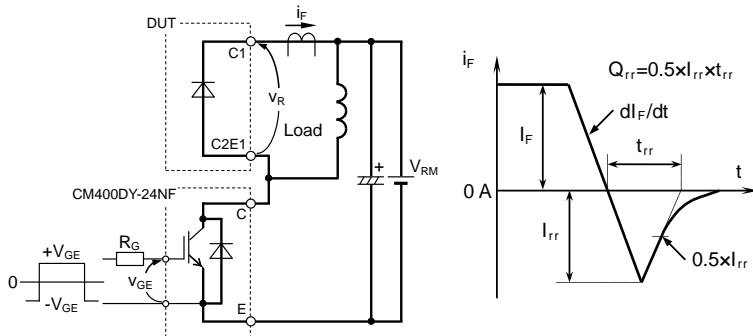
Di1/Di2: DIODE

### TEST CIRCUIT

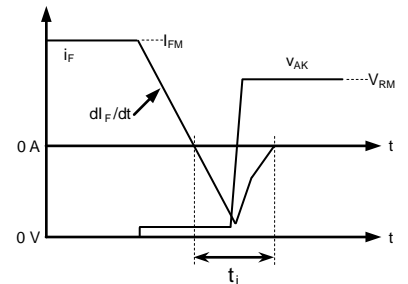


$V_{EC}$  test circuit

### TEST CIRCUIT AND WAVEFORMS



Reverse recovery characteristics test circuit and waveforms



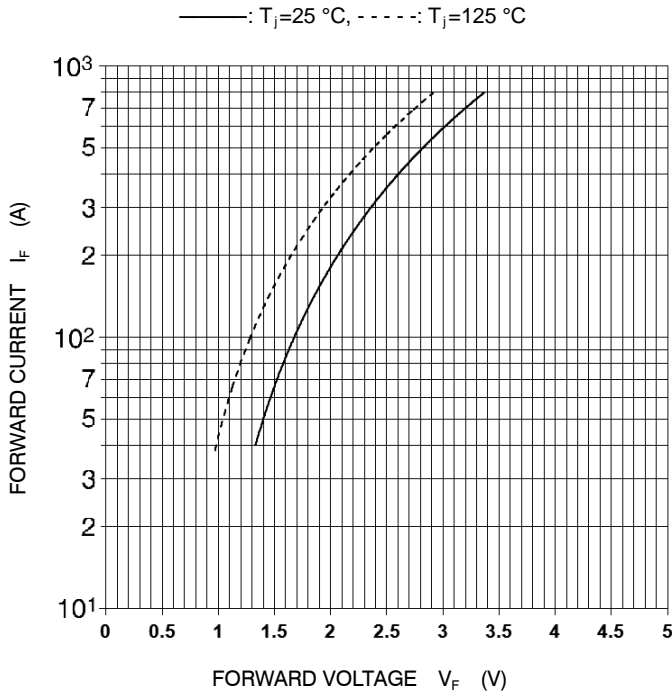
Reverse recovery energy test waveforms  
(Integral time instruction drawing)

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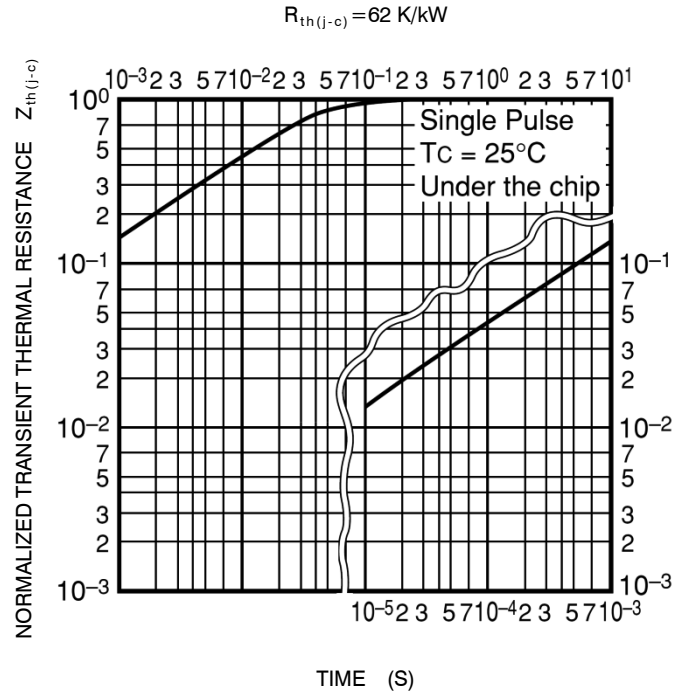
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## PERFORMANCE CURVES

FORWARD CHARACTERISTICS  
(TYPICAL)

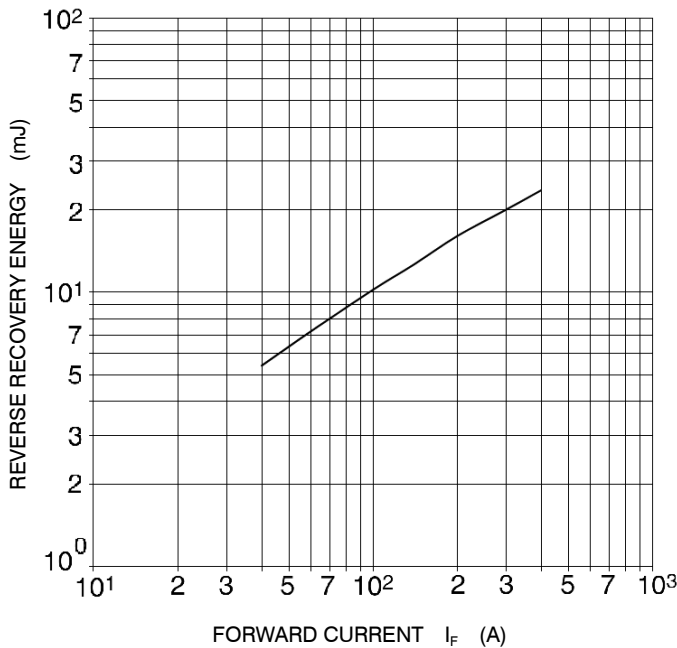


TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS  
(MAXIMUM)



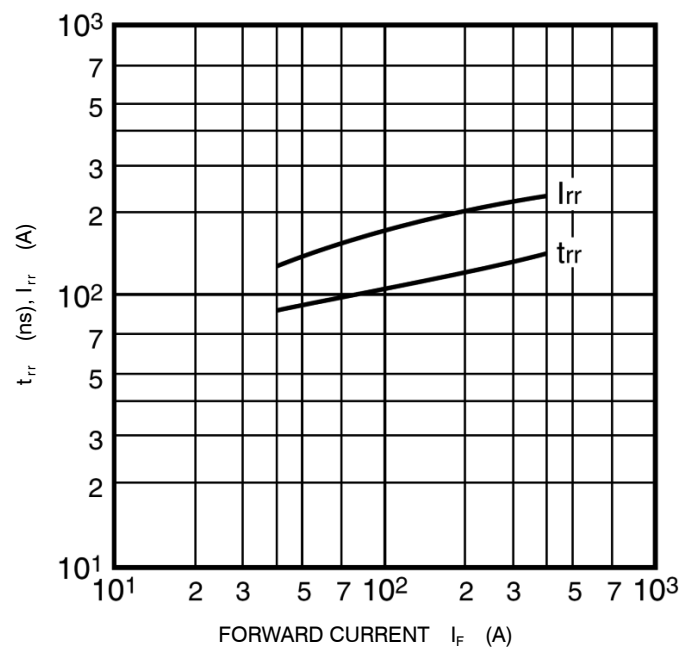
REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)

$V_R=600\text{ V}$ ,  $di/dt=-3500\text{ A}/\mu\text{s}$ ,  $T_j=125\text{ }^\circ\text{C}$ ,  
INDUCTIVE LOAD, PER PULSE



REVERSE RECOVERY CHARACTERISTICS  
(TYPICAL)

$V_R=600\text{ V}$ ,  $di/dt=-3500\text{ A}/\mu\text{s}$ ,  $T_j=25\text{ }^\circ\text{C}$ ,  
INDUCTIVE LOAD



Note: The characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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