

<Full SiC Power Modules>

# RMF400DU-24B

HIGH POWER SWITCHING USE  
INSULATED TYPE



Dual switch (Half-Bridge)

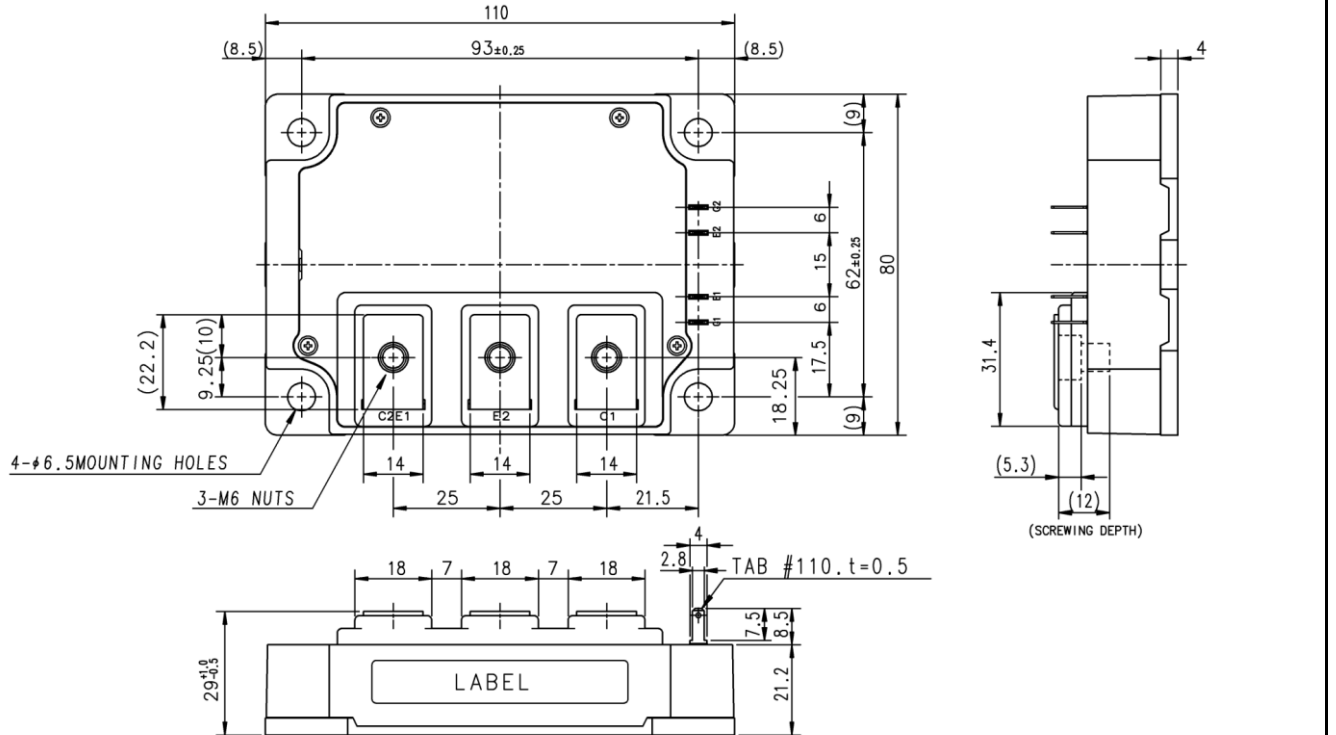
Forward current  $I_F$  ..... **400 A**  
 Reverse voltage  $V_{RRM}$  ..... **1200 V**  
 Maximum junction temperature  $T_{vjmax}$  ..... **150 °C**

- Silicon Carbide Schottky Barrier Diode
- Flat base Type
- Copper base plate
- RoHS Directive compliant
- Recognized under UL1557, File E323585

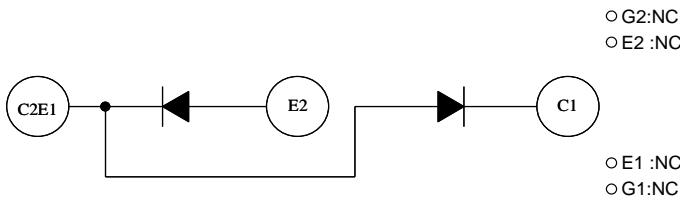
## APPLICATION

Power supply, etc.

### OUTLINE DRAWING & INTERNAL CONNECTION



### 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 ( $T_{vj} = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Symbol	Item	Conditions	Rating	Unit
$V_{RRM}$	Reverse voltage	$T_C = 25\text{ }^\circ\text{C}$ (Note.1, 3)	1200	V
$I_F$	Forward current	DC, $T_C = 25\text{ }^\circ\text{C}$ (Note.1, 3)	400	A
$I_{FRM}$		Pulse, Repetitive (Note.2)	800	
$V_{isol}$	Isolation voltage	Terminals to base plate, RMS, f=60 Hz, AC 1 min	4000	V
$T_{vj}$	Junction temperature	Continuous operation (Note.7)	-40~+150	$^\circ\text{C}$
$T_{cmax}$	Maximum case temperature	(Note.1, 7)	125	$^\circ\text{C}$
$T_{stg}$	Storage temperature	-	-40~+125	$^\circ\text{C}$

## ELECTRICAL CHARACTERISTICS ( $T_{vj} = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

Symbol	Item	Conditions (note9)	Limits			Unit	
			Min.	Typ.	Max.		
$I_{RRM}$	Reverse current	$V_{RM} = V_{RRM}$	-	-	4.0	mA	
$V_F$ (terminal)	Forward voltage	$I_F = 400\text{ A}$ (Note.4)	$T_{vj} = 25\text{ }^\circ\text{C}$	-	1.7	2.2	V
			$T_{vj} = 125\text{ }^\circ\text{C}$	-	2.2	-	
$V_F$ (chip)	Forward voltage	$I_F = 400\text{ A}$ (Note.4)	$T_{vj} = 25\text{ }^\circ\text{C}$	-	1.4	-	V
			$T_{vj} = 125\text{ }^\circ\text{C}$	-	1.9	-	

## THERMAL RESISTANCE CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
$R_{th(j-c)D}$	Thermal resistance (Note.2)	Junction to case, per Diode (Note.1)	-	-	123	K/kW
$R_{th(c-s)}$	Contact thermal resistance (Note.2)	Case to heat sink, per 1 module, Thermal grease applied (Note.1, 5, 7)	-	20	-	K/kW

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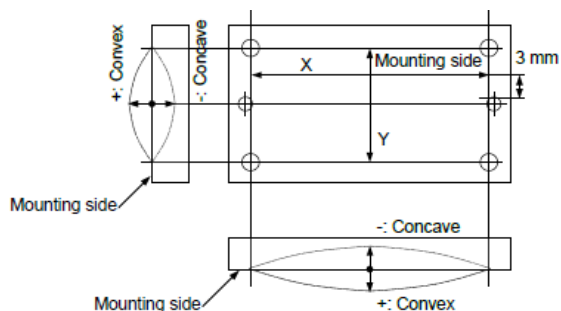
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## MECHANICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
$M_t$	Mounting torque	Main terminals M 6 screw	3.5	4.0	4.5	N·m
$M_s$		Mounting to heat sink M 6 screw	3.5	4.0	4.5	
$m$	mass	-	-	580	-	g
$d_a$	Clearance	Terminals to terminal	11.0	-	-	mm
		Terminals to base plate	28.1	-	-	
$d_s$	Creepage distance	Terminals to terminal	17.0	-	-	
		Terminals to base plate	32.0	-	-	
$e_c$	Flatness of base plate	On the centerline X, Y <small>(Note.6)</small>	-100	-	+100	$\mu\text{m}$

\*: This product is compliant with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) directive 2011/65/EU and (EU)2015/863.

- Case temperature ( $T_c$ ) and heat sink temperature ( $T_s$ ) 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.
- Pulse width and repetition rate should be such that the device junction temperature ( $T_{vj}$ ) does not exceed  $T_{vjmax}$  rating.
- Junction temperature ( $T_{vj}$ ) should not increase beyond  $T_{vjmax}$  rating.
- Pulse width and repetition rate should be such as to cause negligible temperature rise.
- Reference value. Thermally conductive grease of  $\lambda=0.9 \text{ W/(m}\cdot\text{K)}$
- The base plate (mounting side) flatness measurement points (X, Y) are as follows of the following figure.



- Long term performance related to thermal conductive grease (including but not limited to aspects such as the increase of thermal resistance due to pumping out, etc.) should be verified under your specific application conditions. Each temperature condition ( $T_{vjmax}$ ,  $T_{vjop}$ ,  $T_{Cmax}$ ) must be maintained below the maximum rated temperature throughout consideration of the temperature rise even for long term usage.

## RECOMMENDED OPERATING CONDITIONS

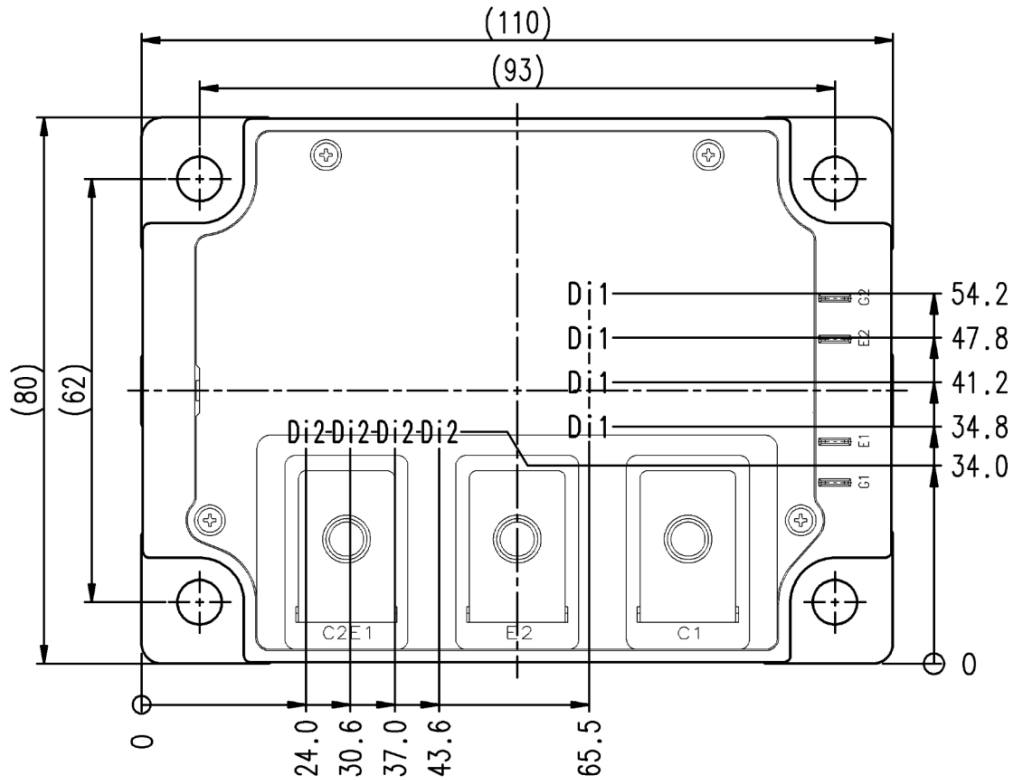
Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{DD}$	$V_{DD}$ Supply voltage	-	-	600	850	V

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## CHIP LOCATION (Top view)

Dimension in mm, tolerance:  $\pm 1$  mm



Di1,Di2: SiC-SBD

## TEST CIRCUIT



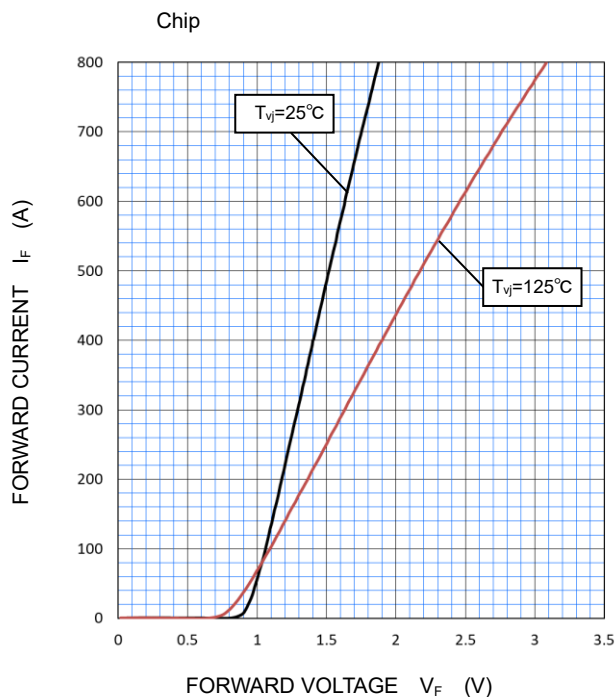
$V_F$  test circuit

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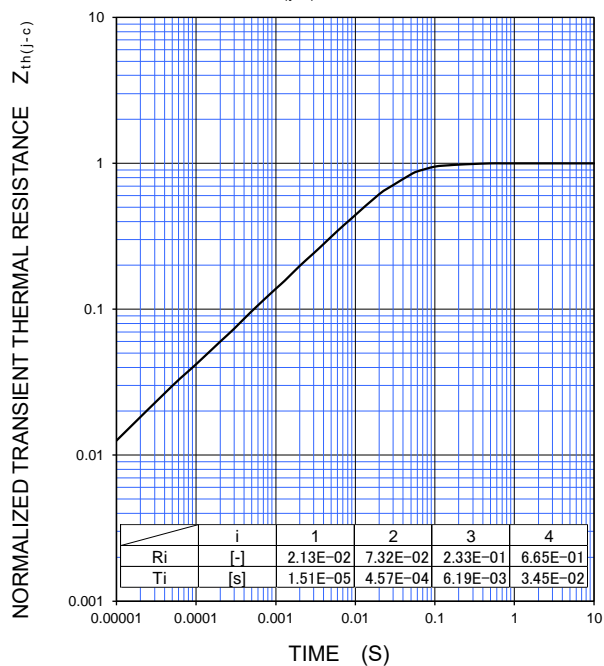
## PERFORMANCE CURVES

DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS  
(MAXIMUM)

Single pulse,  $T_c=25^\circ\text{C}$   
 $R_{th(j-c)D}=123\text{K/kW}$



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

### **Important Notice**

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