MITSUBISHI ELECTRIC

<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

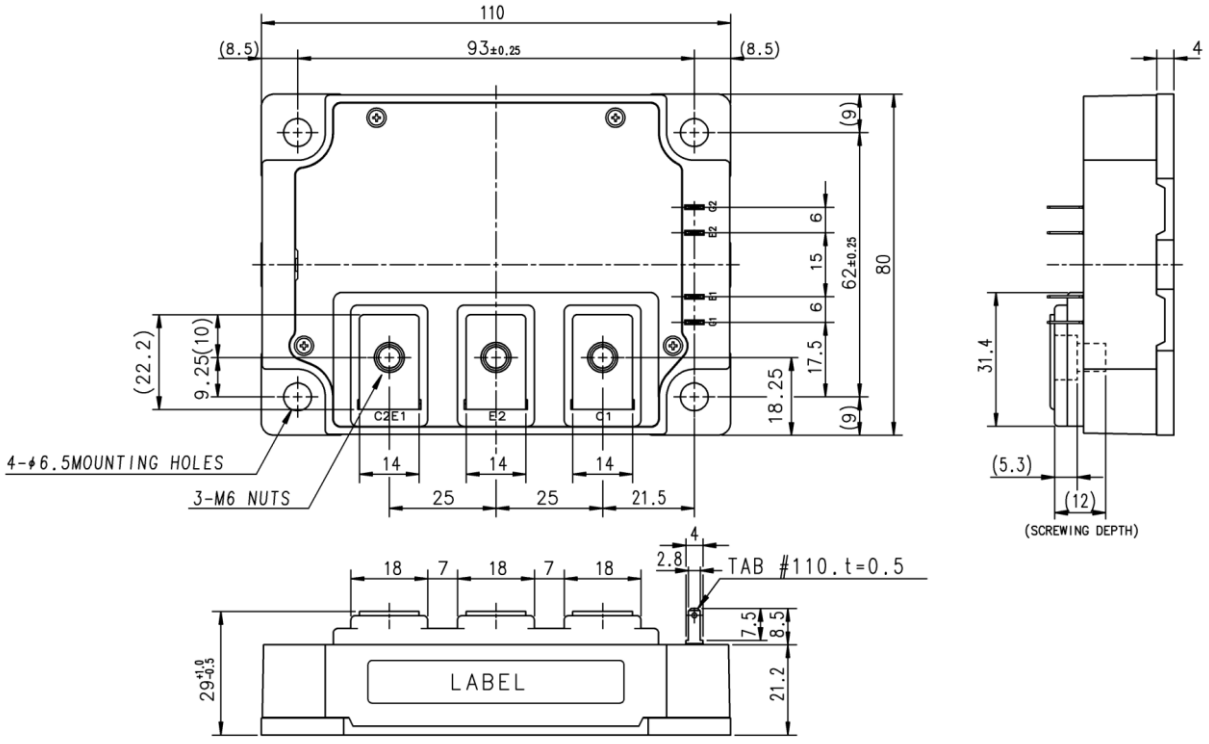
- ●Silicon Carbide Schottky Barrier Diode
- ●Flat base Type
- ●Copper base plate
- ●RoHS Directive compliant
- ●Recognized under UL1557, File E323585

APPLICATION

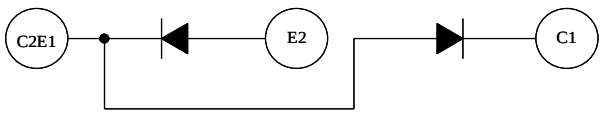
Power supply, etc.

OUTLINE DRAWING & INTERNAL CONNECTION

Dimension in mm



INTERNAL CONNECTION



○ G2:NC
○ E2 :NC
○ E1 :NC
○ G1:NC

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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RMF400DU-24B

HIGH POWER SWITCHING USE
INSULATED TYPE

MAXIMUM RATINGS (T_{vj} =25 °C, unless otherwise specified)

Symbol	Item	Conditions	Rating	Unit
V_{RRM}	Reverse voltage	T_C=25℃ (Note.1, 3)	1200	V
I_F	Forward current	DC, T_C=25℃ (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	°C
T_{cmax}	Maximum case temperature	(Note.1, 7)	125	°C
T_{stg}	Storage temperature	-	-40～+125	°C

ELECTRICAL CHARACTERISTICS (T_{vj}=25 °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 A (Note.4)	T_{vj}=25 °C	-	1.7	2.2	V
			T_{vj}=125 °C	-	2.2	-	
V_F (chip)	Forward voltage	I_F=400 A (Note.4)	T_{vj}=25 °C	-	1.4	-	V
			T_{vj}=125 °C	-	1.9	-	

THERMAL RESISTANCE CHARACTERISTICS

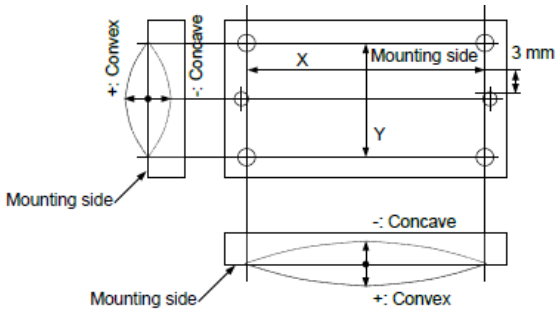
Symbol	Item	Conditions	Limits			Unit
			Min.	Typ.	Max.	
$R_{th(j-c)D}$	Thermal resistance(Note. 2)	Junction to case, per Diode(Note.1)	-	-	123	K/kW
$R_{th(c-s)}$	Contact thermal resistance(Note.2)	Case to heat sink, per 1 module, Thermal grease applied (Note.1, 5 ,7)	-	20	-	K/kW

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 (Note.6)	-100	-	+100	μm

*: 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.

1. 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.
2. Pulse width and repetition rate should be such that the device junction temperature (T_{vj}) does not exceed T_{vjmax} rating.
3. Junction temperature (T_{vj}) should not increase beyond T_{vjmax} rating.
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.
5. Reference value. Thermally conductive grease of λ=0.9 W/(m·K)
6. The base plate (mounting side) flatness measurement points (X, Y) are as follows of the following figure.



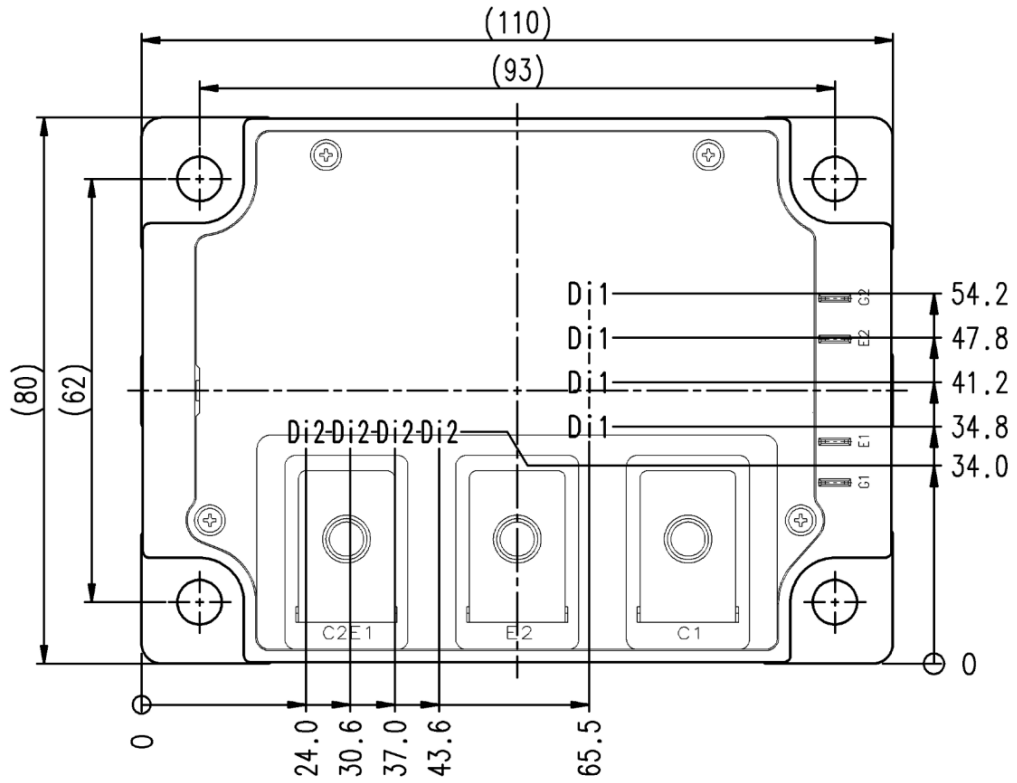
7. Long term performance related to thermal conductive grease (including but not limited to aspects such as the increase of thermal resistance due to pumping out, etc.) should be verified under your specific application conditions. Each temperature condition ($T_{vj\,max}$, $T_{vj\,op}$, $T_{C\,max}$) 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

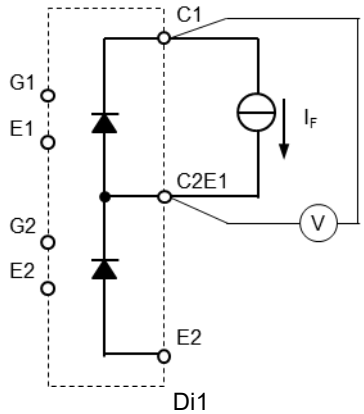
CHIP LOCATION (Top view)

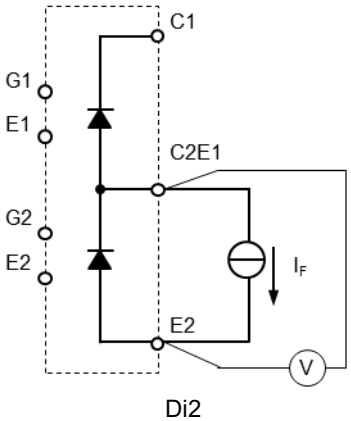
Dimension in mm, tolerance: ±1 mm



Di1,Di2: SiC-SBD

TEST CIRCUIT



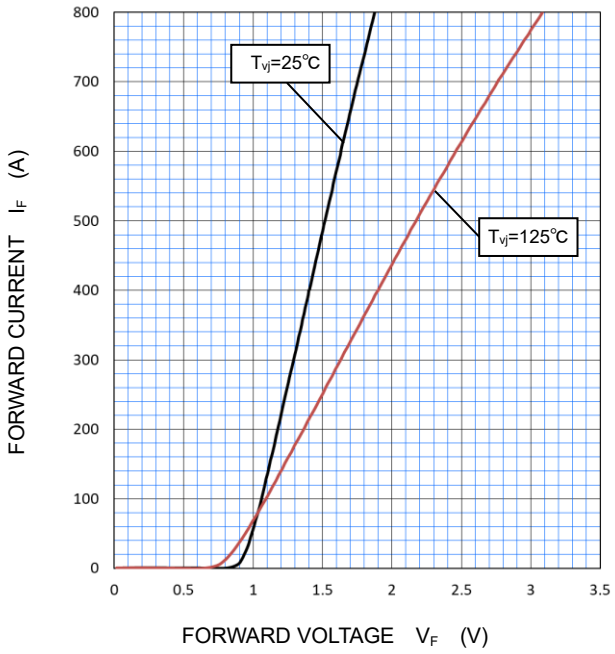


V_F test circuit

PERFORMANCE CURVES

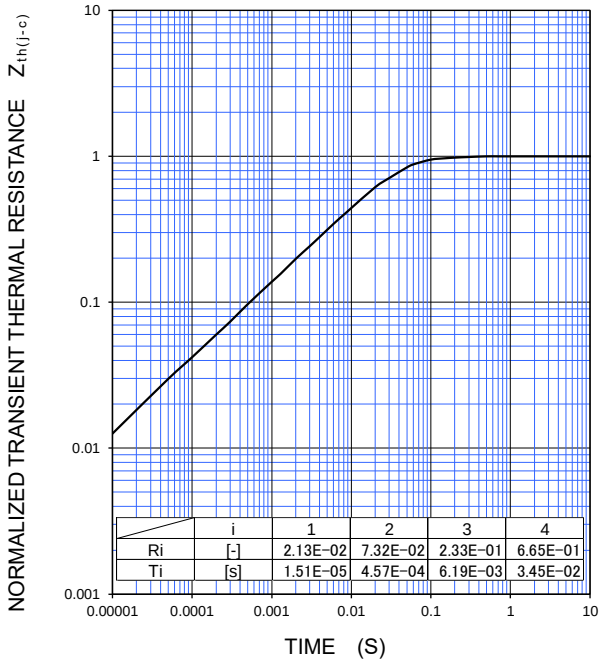
DIODE
FORWARD CHARACTERISTICS
(TYPICAL)

Chip



TRANSIENT THERMAL IMPEDANCE
CHARACTERISTICS
(MAXIMUM)

Single pulse, T_C=25 °C
$R_{th(j-c)D}$=123K/kW



i		1	2	3	4
Ri	[-]	2.13E−02	7.32E−02	2.33E−01	6.65E−01
Ti	[s]	1.51E−05	4.57E−04	6.19E−03	3.45E−02

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

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