MITSUBISHI ELECTRIC

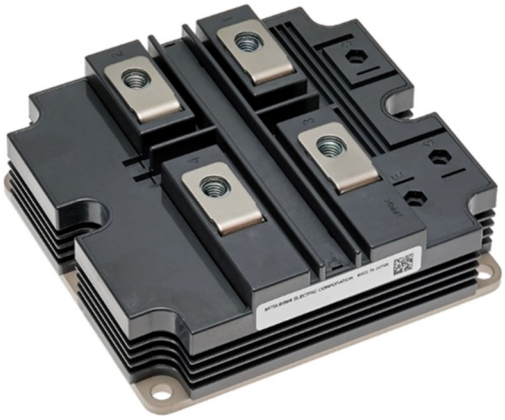
< HIGH VOLTAGE DIODE MODULES >

RM900DG-90X

HIGH POWER SWITCHING USE
INSULATED TYPE

High Voltage Diode Modules

RM900DG-90X

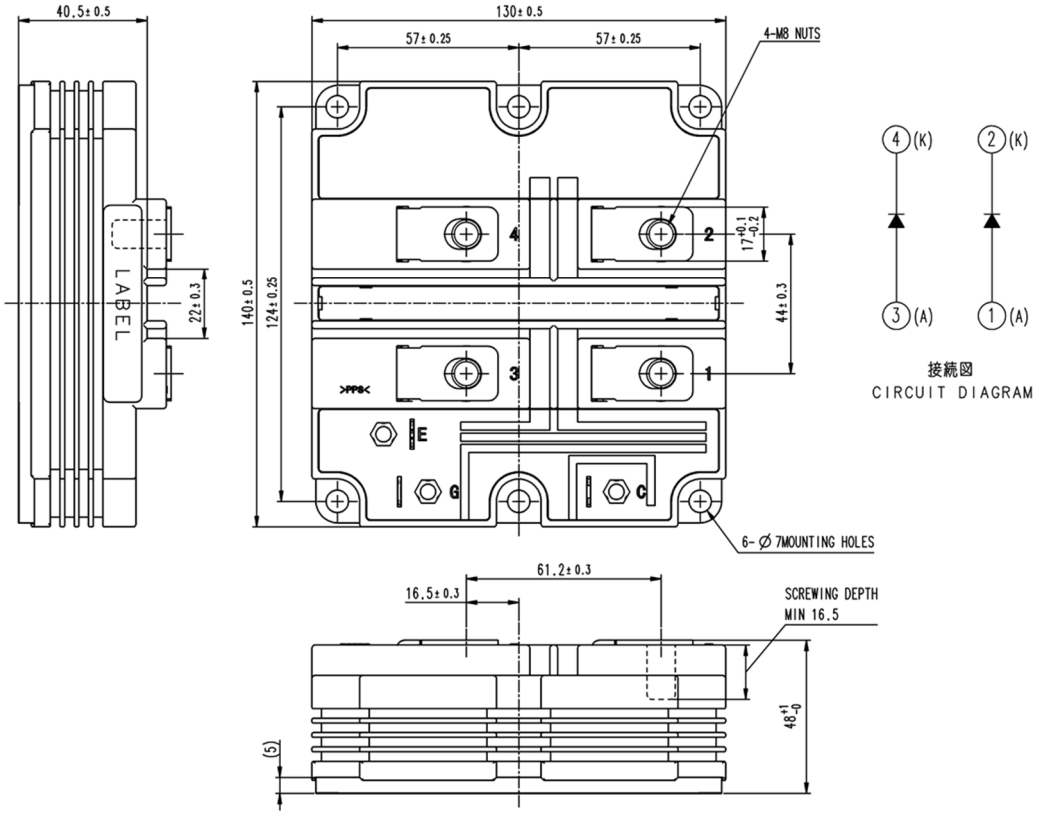


- I_F ..... 2 x 900A
- V_{RRM} 4500V
- 2-element in a Pack
- High Insulated Type
- RFC Diode
- AlSiC Baseplate

APPLICATION

Traction drives, High Reliability Converters / Inverters, DC choppers

OUTLINE DRAWING & CIRCUIT DIAGRAM **Dimensions in mm**



MAXIMUM RATINGS

Symbol	Item	Conditions	Ratings	Unit
V_{RRM}	Repetitive peak reverse voltage	V_{GE} = 0 V, T_j = -40…+150 °C	4500	V
		V_{GE} = 0 V, T_j = -50 °C	4400	
I_F	Forward current (Note 1)	DC, T_c = 85°C	900	A
I_{FSM}	Surge (non-repetitive) forward current	T_{j_start} = 150°C, t_p = 10 ms, Half-sine wave, V_R = 0 V	8.1	kA
I^2t	Surge current load integral		328	kA^2s
P_{tot}	Maximum power dissipation	T_c = 25°C	6400	W
V_{iso}	Isolation voltage	RMS, sinusoidal, f = 60 Hz, t = 1 min.	10200	V
V_e	Partial discharge extinction voltage	RMS, sinusoidal, f = 60 Hz, Q_{PD} ≤ 10 pC	5100	V
T_j	Junction temperature		−50 ~ +150	°C
T_{jop}	Operating junction temperature		−50 ~ +150	°C
T_{stg}	Storage temperature		−55 ~ +150	°C

ELECTRICAL CHARACTERISTICS

Symbol	Item	Conditions		Limits			Unit
				Min	Typ	Max	
I_{RRM}	Repetitive reverse current	V_{RM} = V_{RRM}	T_j = 25°C	—	—	1.6	mA
			T_j = 125°C	—	1.6	—	
			T_j = 150°C	—	—	32	
V_{FM} (Terminal)	Forward voltage (Note 1)	I_F = 900 A	T_j = 25°C	—	2.65	—	V
			T_j = 125°C	—	3.25	—	
			T_j = 150°C	—	3.40	—	
V_{FM} (Chip)	Forward voltage (Note 1)	I_F = 900 A	T_j = 25°C	—	2.35	—	V
			T_j = 125°C	—	2.90	—	
			T_j = 150°C	—	3.00	3.50	
t_{rr}	Reverse recovery time (Note 1)	V_{CC} = 2800 V I_F = 900 A $-d_{iF}/d_t \cong$ 3000 A/µs @ T_j = 25°C 2800A/µs @ T_j = 125°C 2700 A/µs @ T_j = 150°C L_s = 225 nH Inductive load	T_j = 125°C	—	1.60	—	µs
			T_j = 150°C	—	1.85	—	
I_{rr}	Reverse recovery current (Note 1)		T_j = 125°C	—	1300	—	A
			T_j = 150°C	—	1300	—	
$Q_{rr(10\%)}$	Reverse recovery charge (Note 1,2)		T_j = 125°C	—	1830	—	µC
			T_j = 150°C	—	1870	—	
Q_{rr}	Reverse recovery charge (Note 1,2)		T_j = 125°C	—	1910	—	µC
			T_j = 150°C	—	1930	—	
$E_{rec(10\%)}$	Reverse recovery energy per pulse (Note 1,3)		T_j = 25°C	—	2.30	—	J
			T_j = 125°C	—	3.00	—	
			T_j = 150°C	—	3.10	—	
E_{rec}	Reverse recovery energy per pulse (Note 1,3)		T_j = 25°C	—	2.35	—	J
			T_j = 125°C	—	3.20	—	
			T_j = 150°C	—	3.25	—	

THERMAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
$R_{th(j-c)}$	Thermal resistance	Junction to Case (per 1/2 module)	—	—	19.5	K/kW
$R_{th(c-s)}$	Contact thermal resistance	Case to heat sink, λ_{grease} = 1 W/m·K $D_{(c-s)}$ = 80 μm (per 1/2 module)	—	15.0	—	K/kW

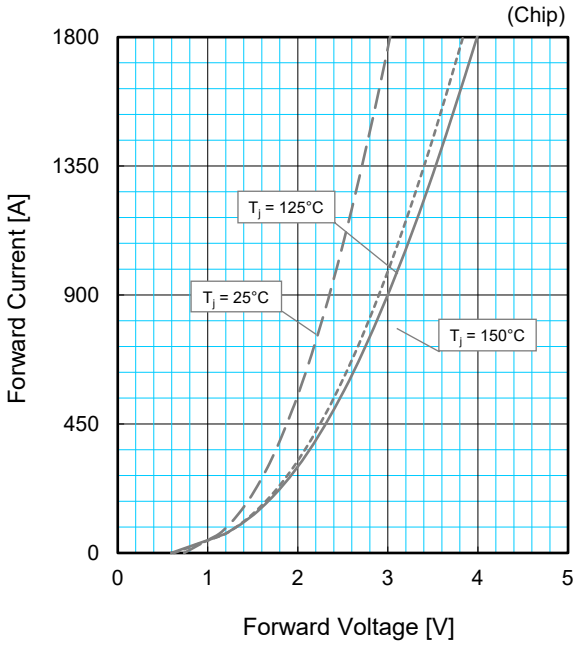
MECHANICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
M_t	Mounting torque	M8 : Main terminals screw	7.0	—	19.0	N·m
M_s		M6 : Mounting screw	3.0	—	6.0	N·m
m	Mass		—	1.0	—	kg
CTI	Comparative tracking index		600	—	—	—
d_a	Clearance		26.0	—	—	mm
d_s	Creepage distance		56.0	—	—	mm
$L_{P\,AK}$	Parasitic stray inductance	1/2 module	—	41	—	nH
$R_{AA'+KK'}$	Internal lead resistance	T_c = 25°C, 1/2 module	—	0.36	—	mΩ

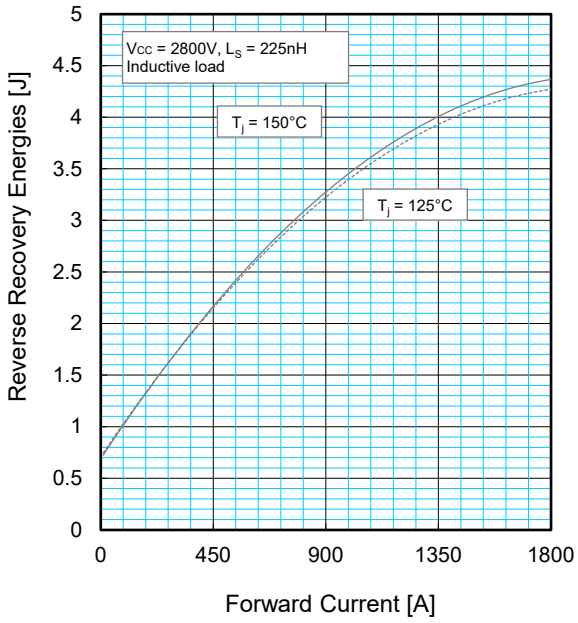
Note 1. The symbols represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWD_i).
Note 2. $Q_{rr(10\%)}$ is the integral of I_{rr} x dt (t(0AI_F)-t(-0.1I_F))
Note 3. $E_{rec(10\%)}$ is the integral of 0.1V_R x 0.1I_F x dt.

PERFORMANCE CURVES

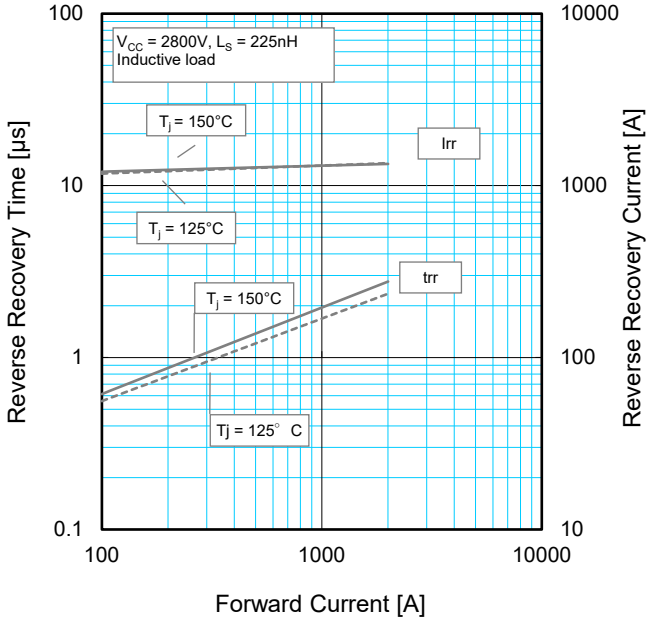
FORWARD CHARACTERISTICS (TYPICAL)



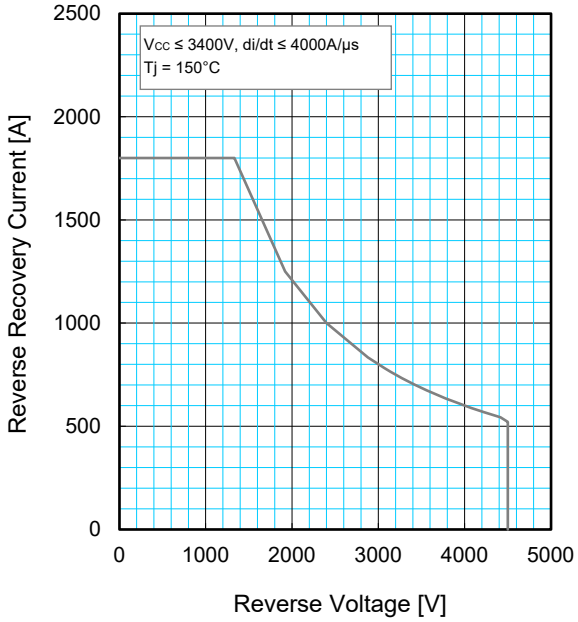
REVERSE RECOVERY ENERGY CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

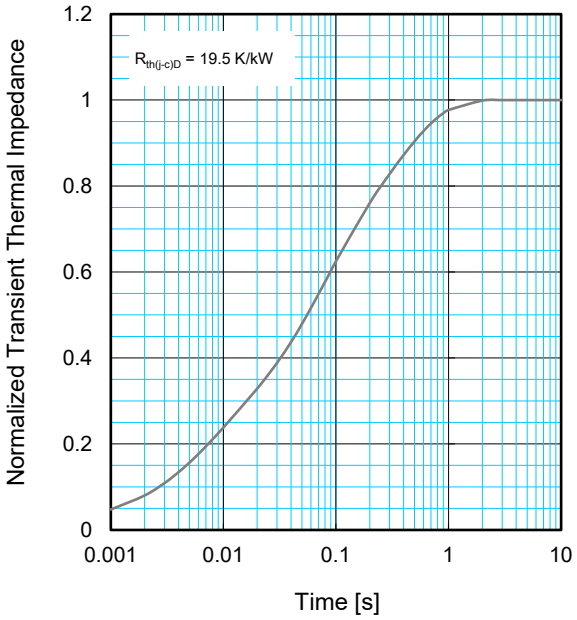


REVERSE RECOVERY SAFE OPERATING AREA (RRSOA)



PERFORMANCE CURVES

TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS



$$Z_{th(j-c)}(t) = \sum_{i=1}^{n} R_i \left\{ 1 - exp\left(-\frac{t}{\tau_i}\right) \right\}$$

	1	2	3	4
R_i / $R_{th(j-c)}$:	0.0096	0.1893	0.4044	0.3967
τ_i [sec] :	0.0001	0.0058	0.0602	0.3512

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