MITSUBISHI ELECTRIC

< HIGH VOLTAGE DIODE MODULES >

RM300DG-130X

HIGH POWER SWITCHING USE
INSULATED TYPE

High Voltage Diode Modules

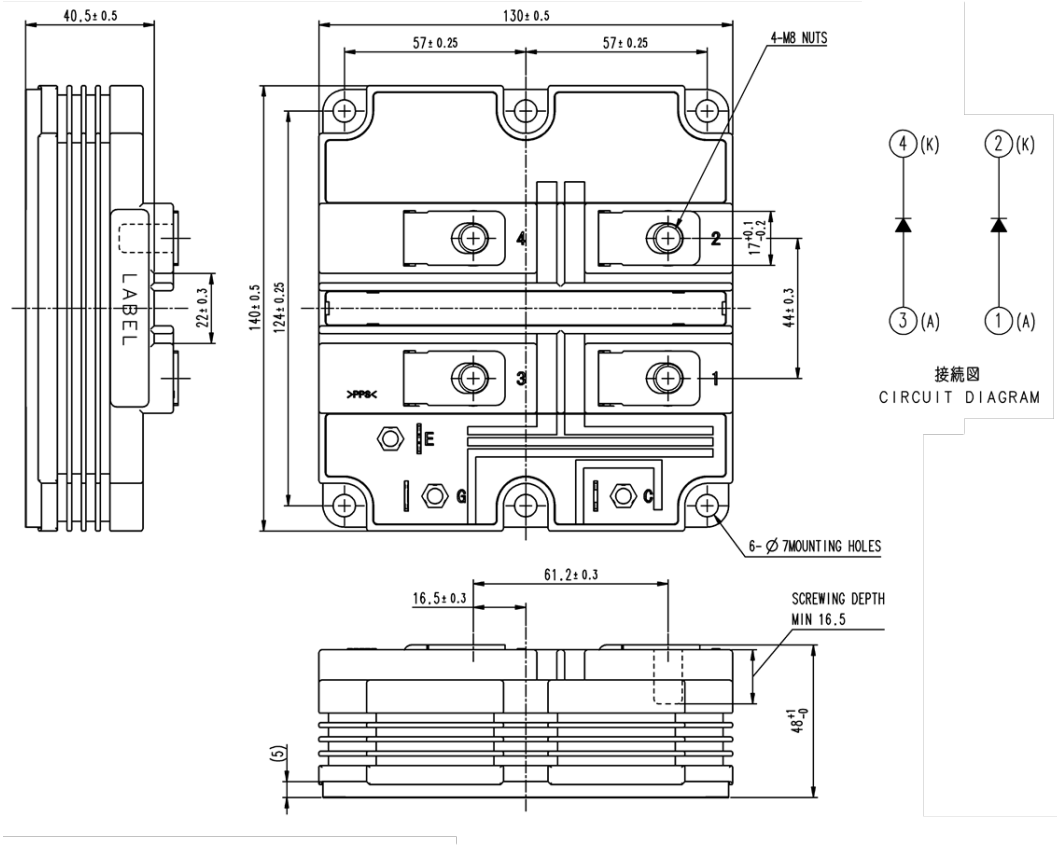
RM300DG-130X

- I_F ..... 2 x 300A
- V_{RRM} 6500V
- 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	T_j = +150 °C	6500	V
		T_j =+ 25 °C	6300	
		T_j = −50 °C	5700	
I_F	Forward current	DC, T_c = 95°C	300	A
I_{FRM}		Pulse (Note 1)	600	A
I_{FSM}	Surge (non-repetitive) forward current	T_{j_start} = 150°C, t_p = 10 ms, Half-sine wave, V_R = 0 V	3.0	kA
I^2t	Surge current load integral		45	kA^2s
P_{tot}	Maximum power dissipation	T_c = 25°C	2600	W
V_{iso}	Isolation voltage	RMS, sinusoidal, f = 60 Hz, t = 1 min.	10200	V
Q_{pd}	Partial discharge	V_1 = 6900 V, V_2 = 5100 V, 60 Hz	10	pC
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	—	—	1.0	mA
			T_j = 125°C	—	0.8	—	
			T_j = 150°C	—	—	25.0	
V_{FM} (Terminal)	Forward voltage	I_F = 300 A	T_j = 25°C	—	2.60	—	V
			T_j = 125°C	—	3.35	—	
			T_j = 150°C	—	3.45	—	
V_{FM} (Chip)	Forward voltage	I_F = 300 A	T_j = 25°C	—	2.50	—	V
			T_j = 125°C	—	3.20	—	
			T_j = 150°C	—	3.30	3.80	
t_{rr}	Reverse recovery time	V_{CC} = 3600 V I_F = 300 A $-d_{iF}/d_t$ = 1250 A/µs @ T_j = 25°C 1075 A/µs @ T_j = 125°C 1000 A/µs @ T_j = 150°C L_s = 450 nH Inductive load	T_j = 25°C	—	1.60	—	µs
			T_j = 125°C	—	2.10	—	
			T_j = 150°C	—	2.15	—	
I_{rr}	Reverse recovery current		T_j = 25°C	—	480	—	A
			T_j = 125°C	—	450	—	
			T_j = 150°C	—	450	—	
$Q_{rr(10\%)}$	Reverse recovery charge (Note 2)		T_j = 25°C	—	625	—	µC
			T_j = 125°C	—	750	—	
			T_j = 150°C	—	800	—	
Q_{rr}	Reverse recovery charge		T_j = 25°C	—	655	—	µC
			T_j = 125°C	—	750	—	
			T_j = 150°C	—	850	—	
$E_{rec(10\%)}$	Reverse recovery energy (per pulse) (Note 3)		T_j = 25°C	—	1.30	—	J
			T_j = 125°C	—	1.60	—	
			T_j = 150°C	—	1.85	—	
E_{rec}	Reverse recovery energy (per pulse)		T_j = 25°C	—	1.35	—	J
			T_j = 125°C	—	1.75	—	
			T_j = 150°C	—	2.00	—	

THERMAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
$R_{th(j-c)}$	Thermal resistance	Junction to Case (per 1/2 module)	—	—	48.0	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)	—	25.6	—	K/kW

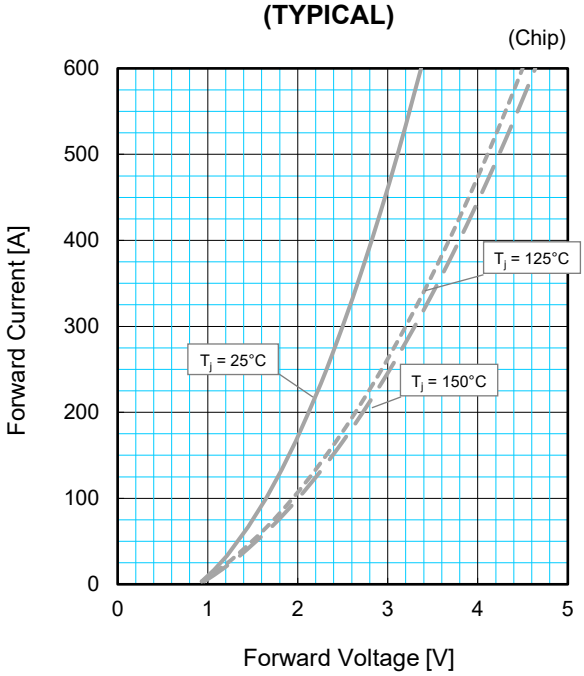
MECHANICAL CHARACTERISTICS

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	—	41.0	—	nH
$R_{AA'+KK'}$	Internal lead resistance	T_c = 25°C, 1/2 module	—	0.36	—	mΩ

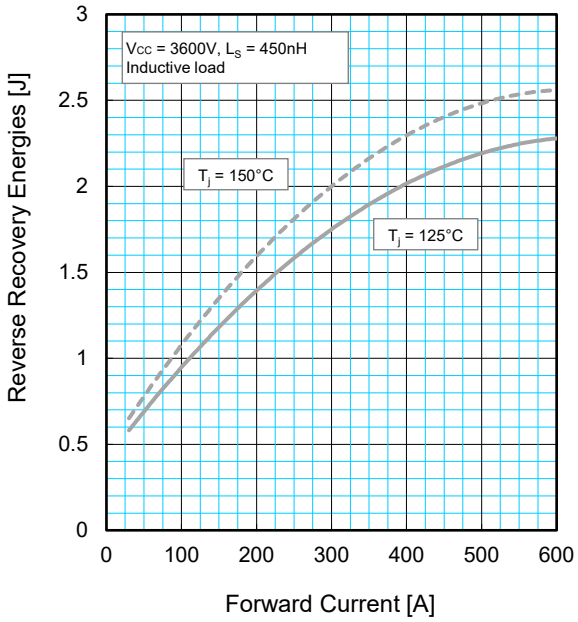
Note 1. Pulse width and repetition rate should be such that junction temperature (T_j) does not exceed T_{opmax} rating (150°C)
Note 2. $Q_{rr(10\%)}$ is the integral of I_{rr} x dt ($t(0AI_F)$-$t(-0.1I_F)$)
Note 3. $E_{rec(10\%)}$ is the integral of $0.1V_R$ x $0.1I_F$ x dt.

PERFORMANCE CURVES

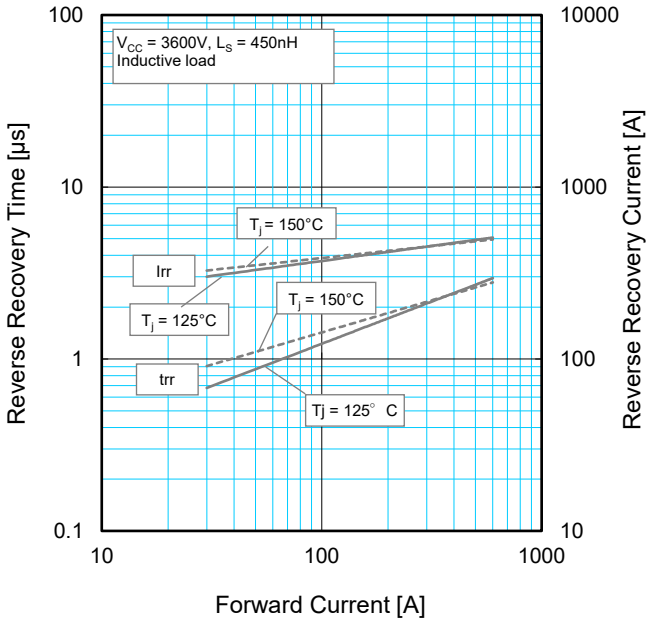
FORWARD CHARACTERISTICS (TYPICAL)



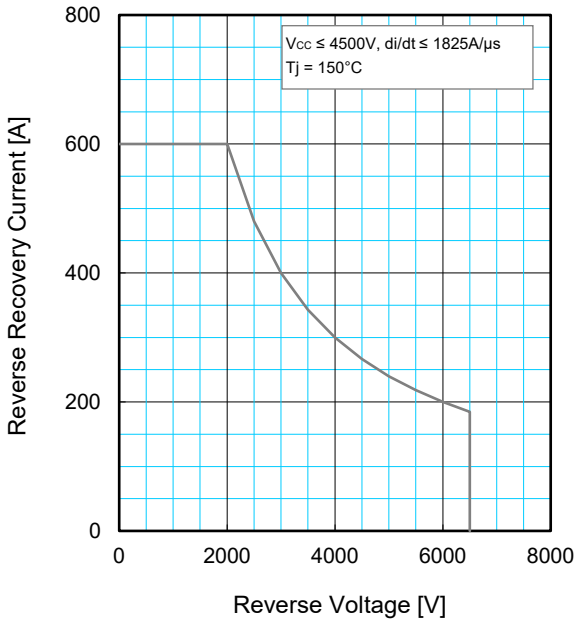
REVERSE RECOVERY ENERGY CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

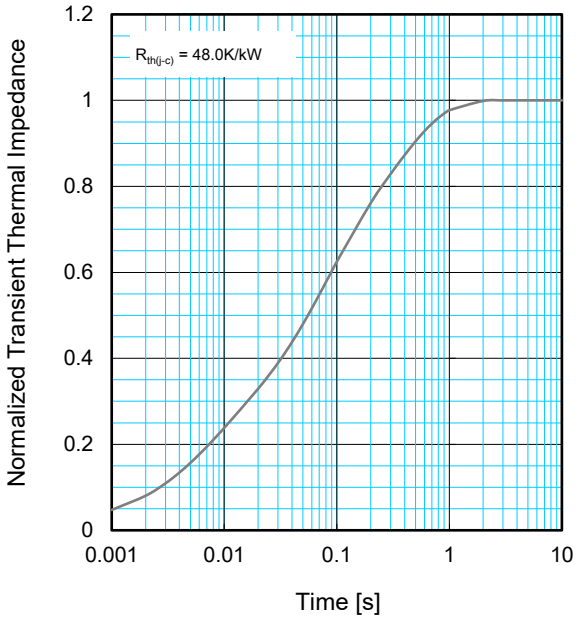


REVERSE RECOVERY SAFE OPERATING AREA (RRSOA)



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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