

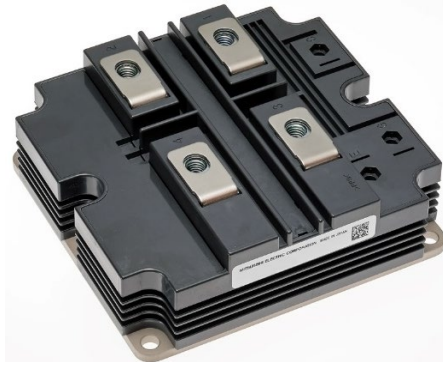
< HIGH VOLTAGE DIODE MODULES >

RM300DG-130X

HIGH POWER SWITCHING USE
INSULATED TYPE

High Voltage Diode Modules

RM300DG-130X



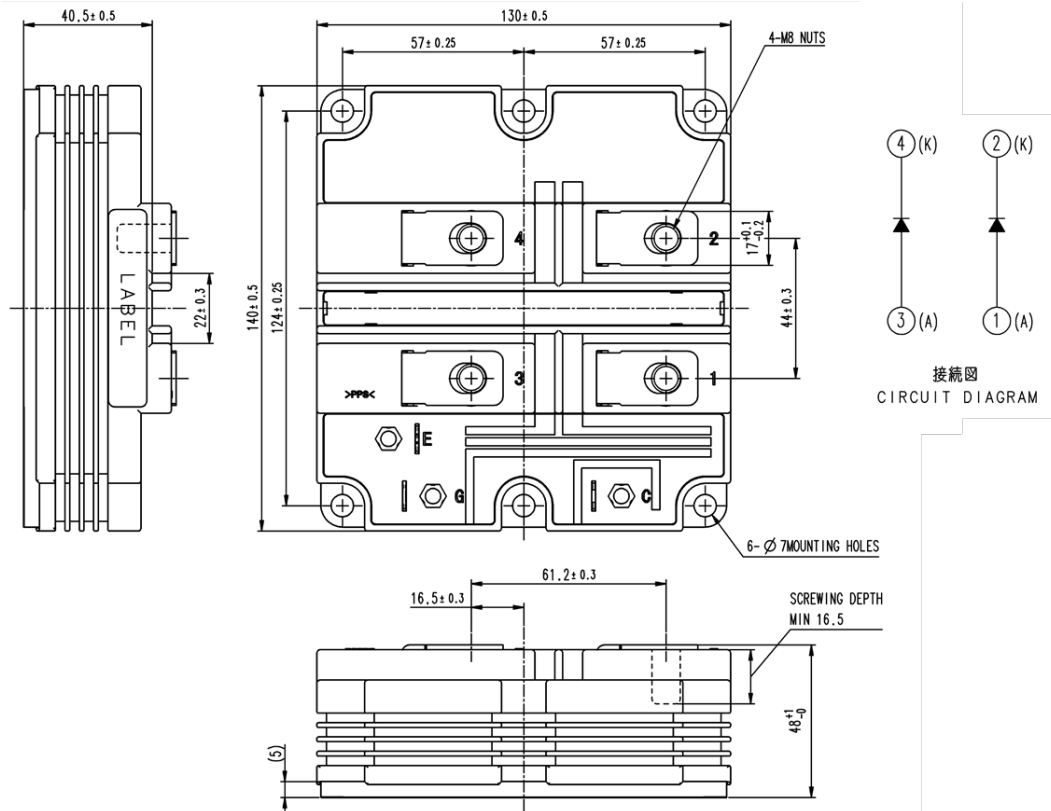
- I_F2 x 300A
- V_{RRM}6500V
- 2-element in a Pack
- High Insulated Type
- RFC Diode
- AISiC Baseplate

APPLICATION

Traction drives, High Reliability Converters / Inverters, DC choppers

OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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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 ² t	Surge current load integral		45	kA ² s
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		T _j = 25°C	—	1.60	—	μs
			T _j = 125°C	—	2.10	—	
			T _j = 150°C	—	2.15	—	
I _{rr}	Reverse recovery current	V _{CC} = 3600 V I _F = 300 A	T _j = 25°C	—	480	—	A
			T _j = 125°C	—	450	—	
			T _j = 150°C	—	450	—	
Q _{rr(10%)}	Reverse recovery charge ^(Note 2)	-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	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)	L _s = 450 nH Inductive load	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	—	

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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, $\lambda_{grease} = 1 \text{ W/m}\cdot\text{K}$ $D_{(c-s)} = 80 \text{ }\mu\text{m}$ (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
$L_{P\text{AK}}$	Parasitic stray inductance	1/2 module	—	41.0	—	nH
$R_{AA+KK'}$	Internal lead resistance	$T_c = 25^\circ\text{C}$, 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 $I_{rr} \times dt$ ($t(0A|F)-t(-0.1I_F)$)

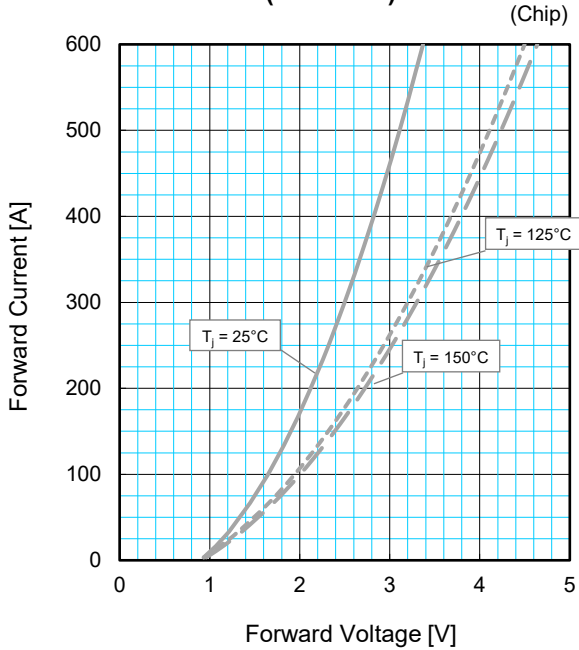
Note 3. $E_{rec(10\%)}$ is the integral of $0.1V_R \times 0.1I_F \times dt$.

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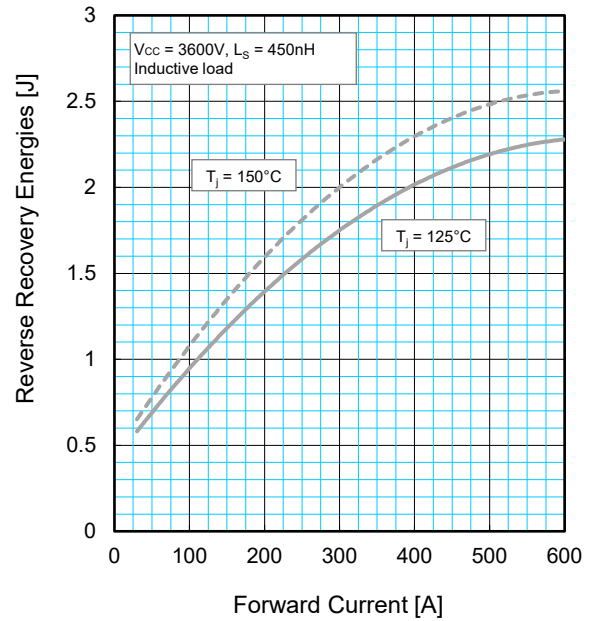
HIGH POWER SWITCHING USE
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PERFORMANCE CURVES

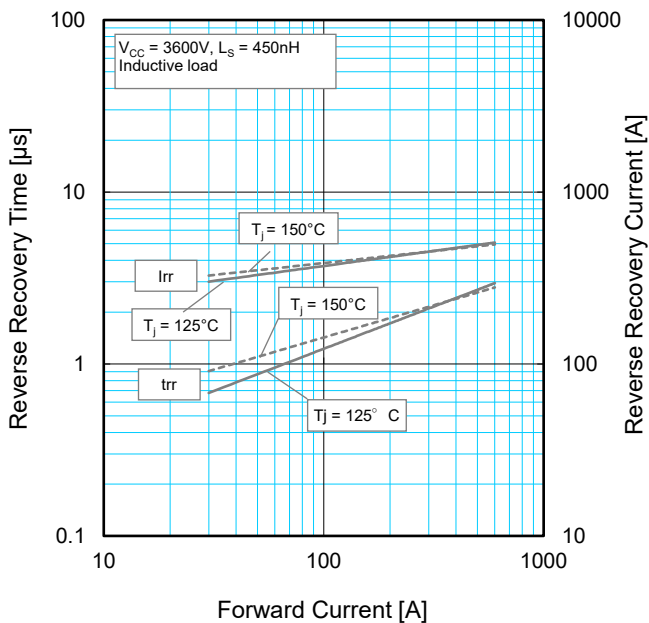
FORWARD CHARACTERISTICS (TYPICAL)



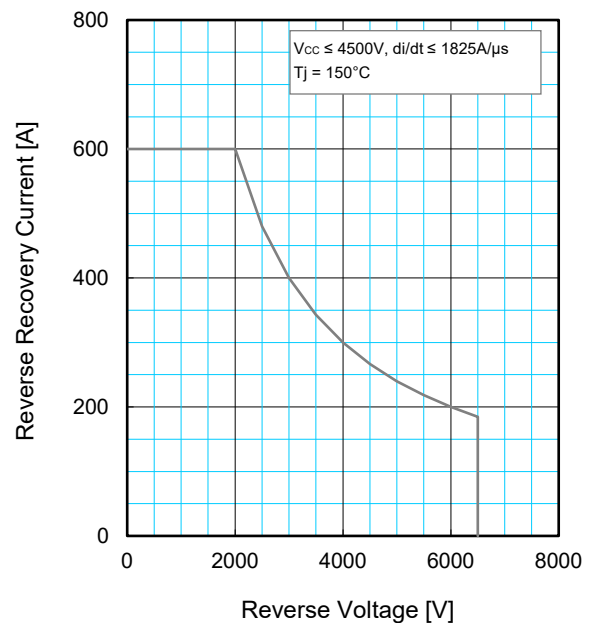
REVERSE RECOVERY ENERGY CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

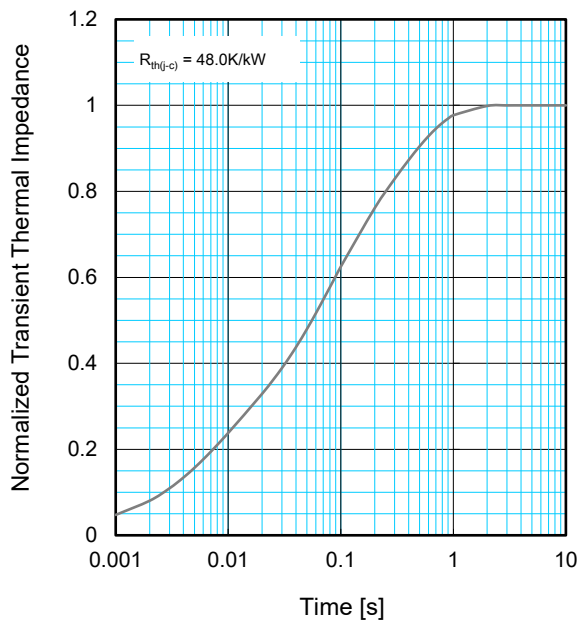


REVERSE RECOVERY SAFE OPERATING AREA (RRSOA)



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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