

< HIGH VOLTAGE DIODE MODULES >

RM400DG-90F

HIGH POWER SWITCHING USE
INSULATED TYPE

High Voltage Diode Modules

RM400DG-90F



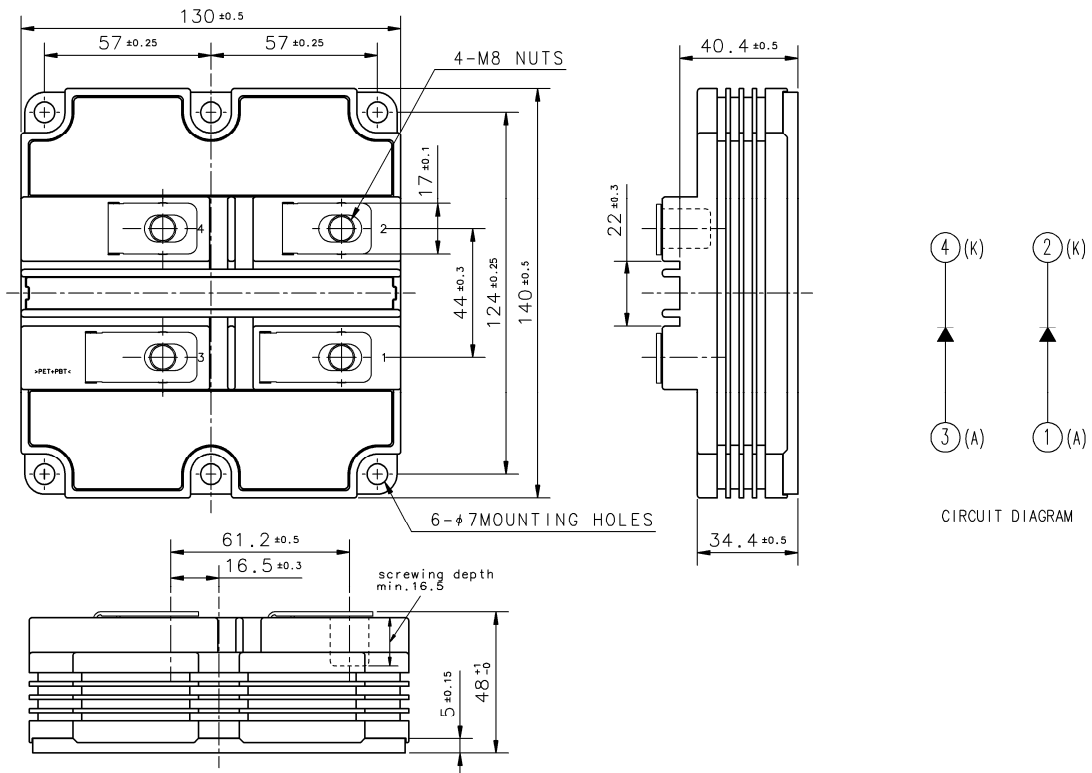
- I_F400A
- V_{RRM}4500V
- 2-element in a Pack
- High insulated Type
- Soft Recovery Diode
- AISiC Baseplate

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 = -40...+125°C	4500	V
		T _j = -50°C	4400	
I _F	Forward current	DC, T _c = 65°C	400	A
I _{FSM}	Surge forward current	T _{j_start} = 125°C, t _p = 10 ms, Half-sine wave, V _R = 0 V	3.2	kA
I _t ²	Surge current load integral		51	kA ² s
P _{tot}	Maximum power dissipation	T _c = 25°C	2080	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	3500	V
T _j	Junction temperature		-50 ~ +150	°C
T _{jop}	Operating junction temperature		-50 ~ +125	°C
T _{stg}	Storage temperature		-55 ~ +125	°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	—	3.0	—	
V _{FM}	Forward voltage	I _F = 400 A	T _j = 25°C	—	2.55	—	V
			T _j = 125°C	—	2.85	3.45	
t _{rr}	Reverse recovery time	V _{CC} = 2800 V I _F = 400 A	T _j = 25°C	—	0.70	—	μs
			T _j = 125°C	—	0.90	—	
I _{rr}	Reverse recovery current	V _{CC} = 2800 V I _F = 400 A	T _j = 25°C	—	350	—	A
			T _j = 125°C	—	380	—	
Q _{rr}	Reverse recovery charge	-d _i /d _t = 1300 A/μs @ T _j = 25°C -d _i /d _t = 1200 A/μs @ T _j = 125°C	T _j = 25°C	—	330	—	μC
			T _j = 125°C	—	520	—	
E _{rec(10%)}	Reverse recovery energy ^(Note 1)	L _s = 150 nH Inductive load	T _j = 25°C	—	0.48	—	J
E _{rec}	Reverse recovery energy		T _j = 125°C	—	0.75	—	
			T _j = 25°C	—	0.55	—	J
			T _j = 125°C	—	0.85	—	

THERMAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
R _{th(j-c)}	Thermal resistance	Junction to Case (per 1/2 module)	—	—	60.0	K/kW
R _{th(c-s)}	Contact thermal resistance	Case to heat sink, λ _{grease} = 1 W/m ² ·k D _(c-s) = 100 μm (per 1/2 module)	—	48.0	—	K/kW

MECHANICAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
M _t	Mounting torque	M8 : Main terminals screw	7.0	—	22.0	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 _{PAK}	Parasitic stray inductance		—	44.0	—	nH
R _{AA+KK}	Internal lead resistance	T _c = 25°C	—	0.27	—	mΩ

Note 1. E_{rec(10%)} are the integral of 0.1V_R × 0.1I_F × dt.

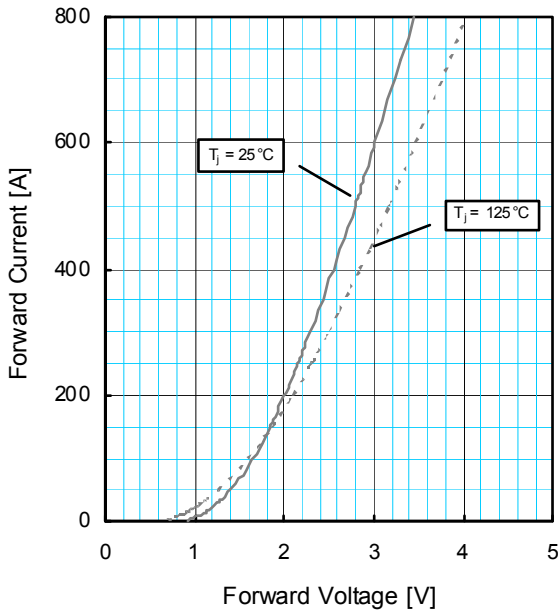
Note 2. Definition of all items is according to IEC 60747, unless otherwise specified.

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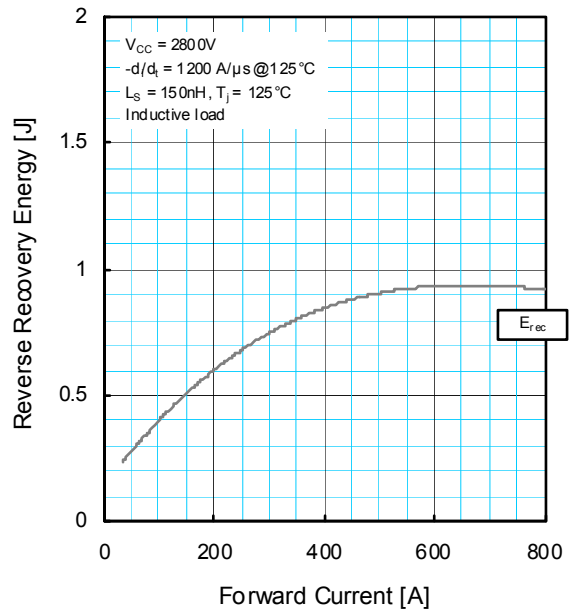
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PERFORMANCE CURVES

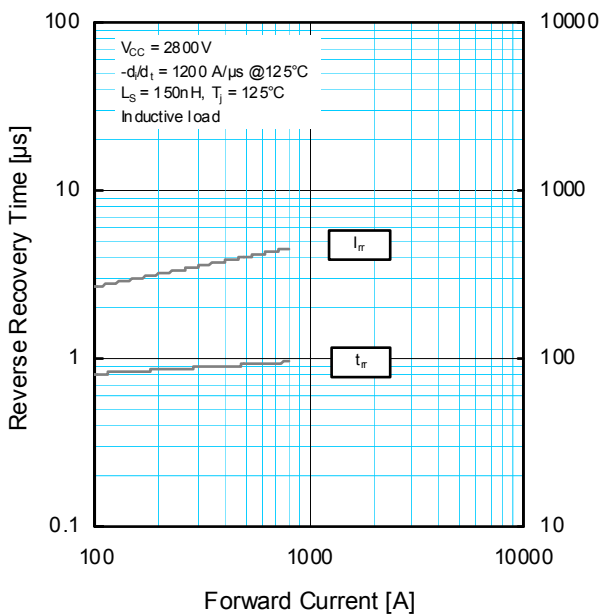
FORWARD CHARACTERISTICS (TYPICAL)



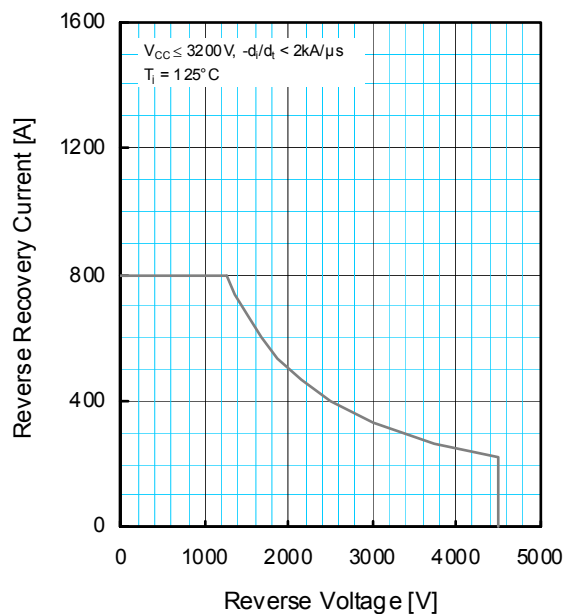
REVERSE RECOVERY ENERGY CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

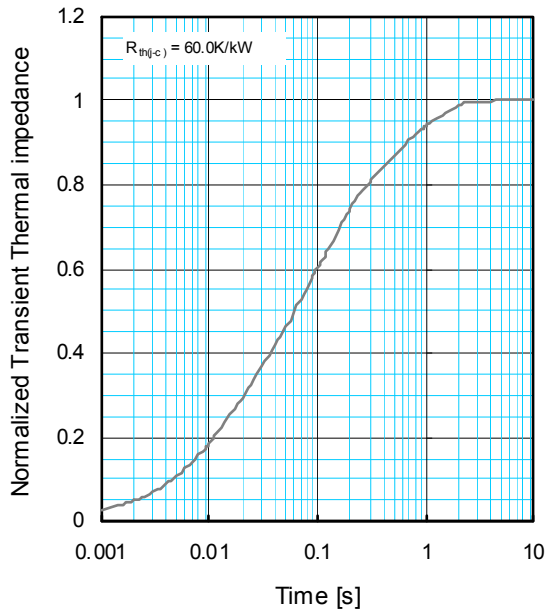


REVERSE RECOVERY SAFE OPERATING AREA (RRSOA)



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 [K/kW]	0.0055	0.2360	0.4680	0.2905
τ_i [sec]	0.0001	0.0131	0.0878	0.6247

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