RM400DG-90F

HIGH POWER SWITCHING USE
INSULATED TYPE

RM400DG-90F

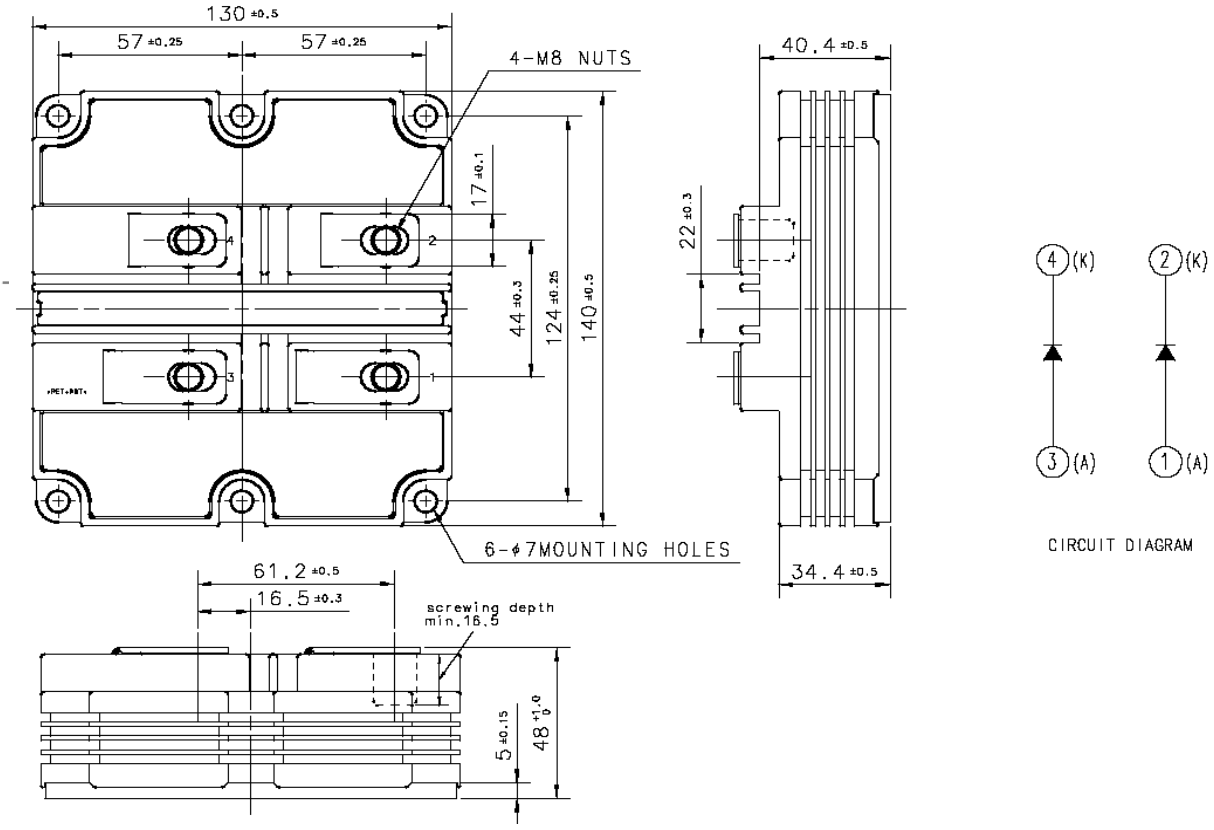
- I_F ..... 400 A
- V_{RRM} ..... 4500 V
- 2-element in a Pack
- High Insulated Type
- Soft Recovery Diode
- AlSiC Baseplate

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 = −40…+125°C	4500	V
		T_j = −50°C	4400	
V_{RSM}	Non-repetitive peak reverse voltage	T_j = −40…+125°C	4500	V
		T_j = −50°C	4400	
I_F	Collector current	DC, T_c = 25°C	400	A
I_{FRM}		Pulse (Note 1)	800	A
I_{FSM}	Surge (non-repetitive) forward current	T_j = 125°C, V_R = 0 V, t = 10 ms	3.4	kA
I^2t	Surge forward current integral	T_j = 125°C, V_R = 0 V, t = 10 ms	58	kA^2s
V_{iso}	Isolation voltage	RMS, sinusoidal, f = 60Hz, t = 1 min.	10200	V
V_e	Partial discharge extinction voltage	RMS, sinusoidal, f = 60Hz, Q_{PD} ≤ 10 pC	5100	V
T_j	Junction temperature		−50 ~ +150	°C
T_{jop}	Operating temperature		−50 ~ +125	°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	—	1.0	—	
V_{FM}	Forward voltage	I_F = 400 A (Note 2)	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_C = 400 A V_{GE} = ±15 V L_s = 150 nH −d_{iF}/d_t = 1350 A/µs @ T_j = 25°C 1250 A/µs @ T_j = 125°C Inductive load	T_j = 25°C	—	0.70	—	µs
			T_j = 125°C	—	0.90	—	
I_{rr}	Reverse recovery current		T_j = 25°C	—	400	—	A
			T_j = 125°C	—	440	—	
Q_{rr}	Reverse recovery charge		T_j = 25°C	—	370	—	µC
			T_j = 125°C	—	580	—	
$E_{rec(10\%)}$	Reverse recovery energy (Note 3)		T_j = 25°C	—	0.48	—	J/P
			T_j = 125°C	—	0.75	—	
E_{rec}	Reverse recovery energy (Note 4)		T_j = 25°C	—	0.55	—	J/P
			T_j = 125°C	—	0.85	—	

THERMAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
$R_{th(j-c)D}$	Thermal resistance	Junction to Case, 1/2 module	—	—	58.5	K/kW
$R_{th(c-s)}$	Contact thermal resistance	Case to Fin, λ_{grease} = 1W/m·K $D_{(c-s)}$ = 100 µm, 1/2 module	—	48.0	—	K/kW

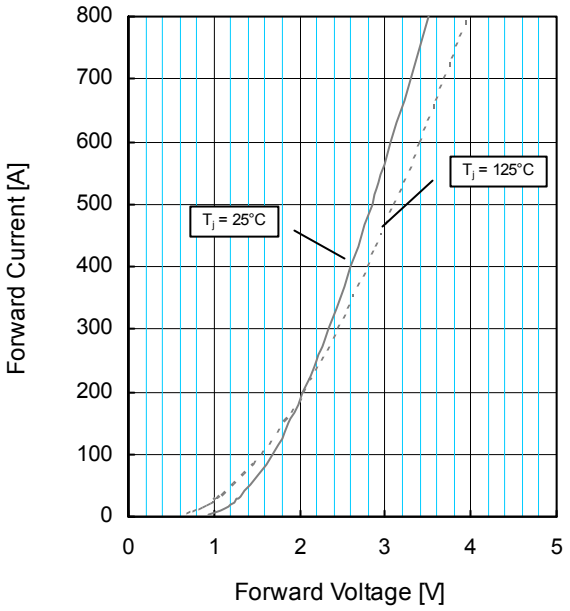
MECHANICAL CHARACTERISTICS

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
$L_{P\ AK}$	Parasitic stray inductance	1/2 module	—	44.0	—	nH
$R_{AA'+KK'}$	Internal lead resistance	T_c = 25°C, 1/2 module	—	0.27	—	mΩ

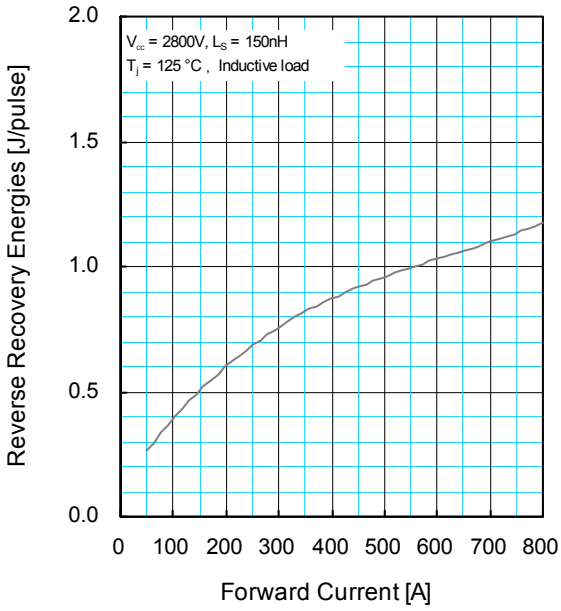
Note 1. Pulse width and repetition rate should be such that junction temperature (T_j) does not exceed T_{opmax} rating (125°C).
Note 2. Pulse width and repetition rate should be such as to cause negligible temperature rise.
Note 3. $E_{rec(10\%)}$ is the integral of $0.1V_R \times 0.1I_F \times dt$.
Note 4. The integration range of E_{rec} according to IEC 60747.

PERFORMANCE CURVES

FORWARD CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



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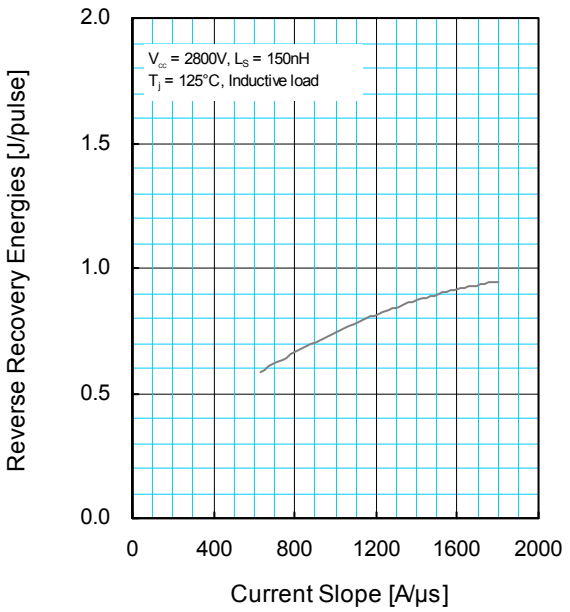
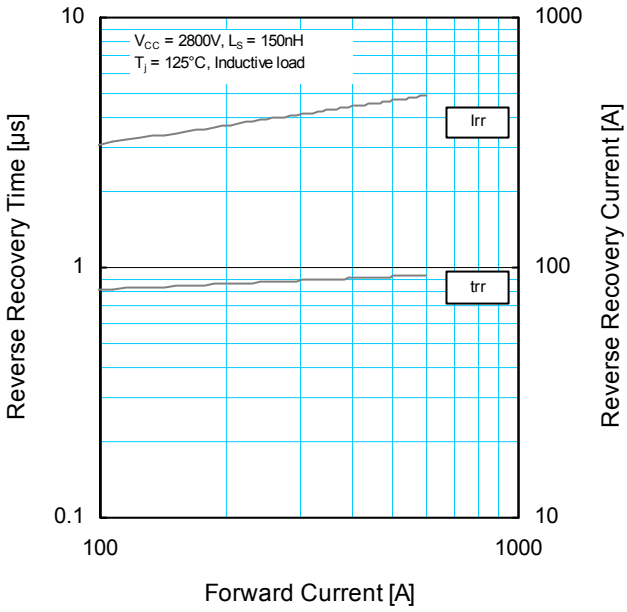
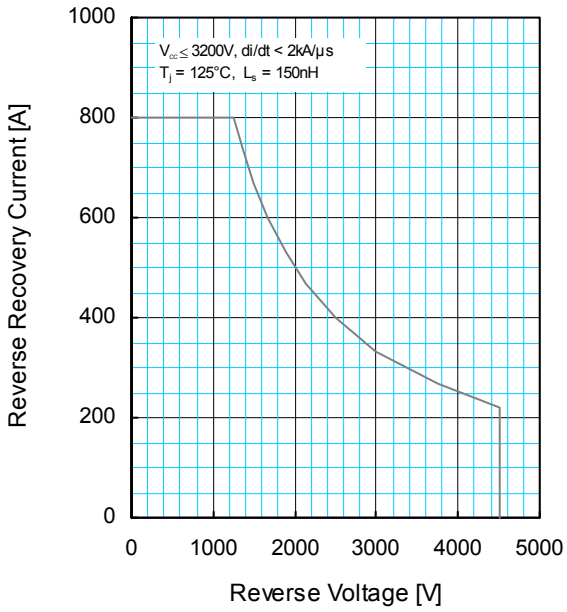


PERFORMANCE CURVES

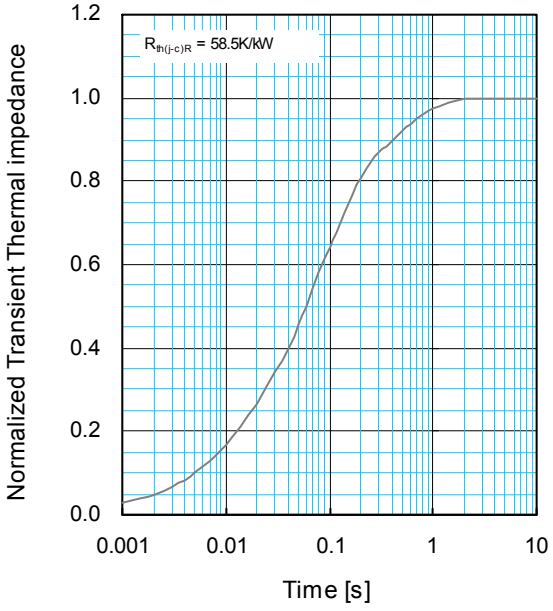
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY SAFE OPERATING AREA (TYPICAL)



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] :	0.0059	0.0978	0.6571	0.2392
τ_i [sec] :	0.0002	0.0074	0.0732	0.4488