MITSUBISHI ELECTRIC

< HIGH VOLTAGE DIODE MODULES >

RM250DG-130F

HIGH POWER SWITCHING USE
INSULATED TYPE

High Voltage Diode Modules

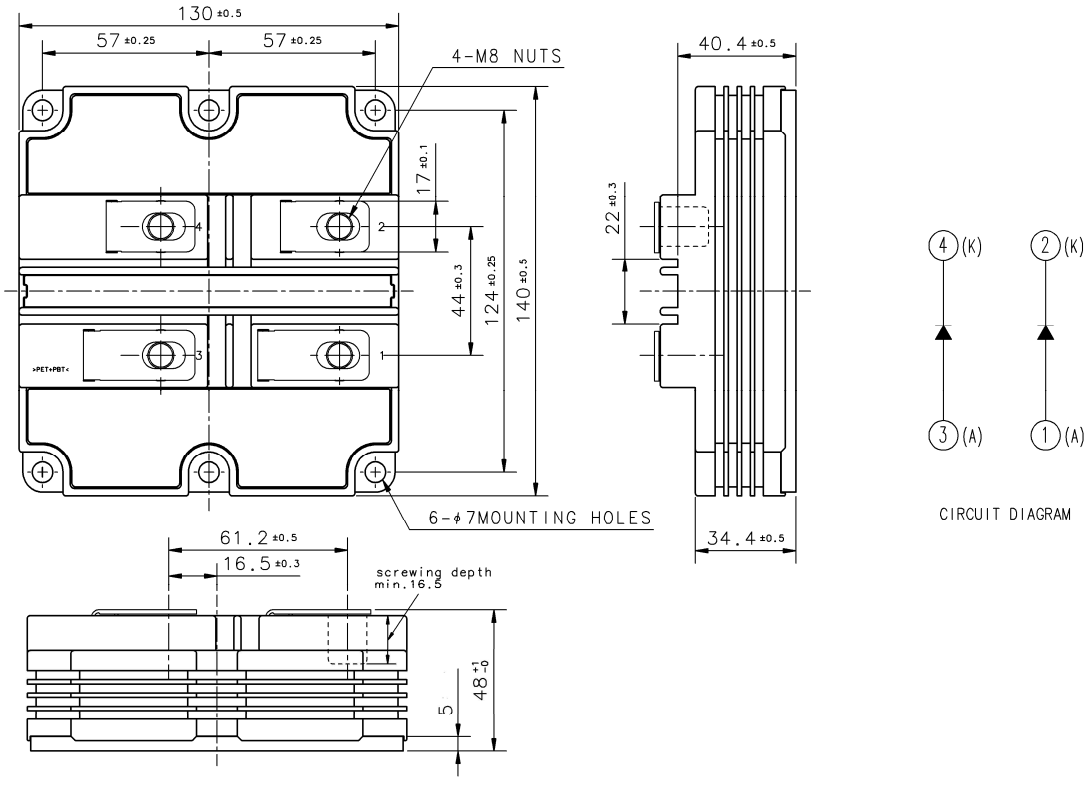
RM250DG-130F

- I_F 250A
- V_{RRM} 6500V
- 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 = +125°C	6500	V
		T_j = +25°C	6300	
		T_j = −50°C	5700	
V_{RSM}	Non-repetitive peak reverse voltage	T_j = +125°C	6500	V
		T_j = +25°C	6300	
		T_j = −50°C	5700	
I_F	Collector current	DC, T_c = 65°C	250	A
I_{FRM}		Pulse (Note 1)	500	A
I_{FSM}	Surge (non-repetitive) forward current	T_{j_start} = 125°C, t_p = 10 ms, Half-sine wave, V_R = 0 V	2350	A
I^2t	Surge current load integral		28	kA^2s
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 ~ +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	—	—	2.0	mA
			T_j = 125°C	—	2.0	10.0	
V_{FM}	Forward voltage	I_F = 250 A (Note 2)	T_j = 25°C	—	3.30	—	V
			T_j = 125°C	—	3.40	4.30	
t_{rr}	Reverse recovery time	V_{CC} = 3600 V I_F = 250 A L_s = 150 nH −d_i/d_t = 1250 A/µs @ T_j = 25°C 1100 A/µs @ T_j = 125°C Inductive load	T_j = 25°C	—	0.55	—	µs
			T_j = 125°C	—	0.60	—	
I_{rr}	Reverse recovery current		T_j = 25°C	—	260	—	A
			T_j = 125°C	—	290	—	
Q_{rr}	Reverse recovery charge		T_j = 25°C	—	240	—	µC
			T_j = 125°C	—	340	—	
$E_{rec(10\%)}$	Reverse recovery energy (Note 3)		T_j = 25°C	—	0.30	—	J
			T_j = 125°C	—	0.60	—	
E_{rec}	Reverse recovery energy (Note 4)		T_j = 25°C	—	0.40	—	J
			T_j = 125°C	—	0.80	—	

THERMAL CHARACTERISTICS

Symbol	Item	Conditions	Limits			Unit
			Min	Typ	Max	
$R_{th(j-c)}$	Thermal resistance	Junction to Case (per 1/2 module)	—	—	75.0	K/kW
$R_{th(c-s)}$	Contact thermal resistance	Case to heat sink, λ_{grease} = 1 W/m・k $D_{(c-s)}$ = 100 µm (per 1/2 module)	—	48.0	—	K/kW

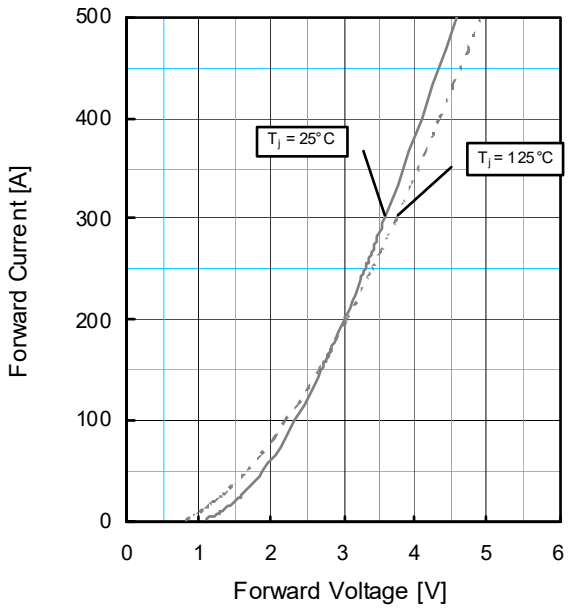
MECHANICAL CHARACTERISTICS

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
$L_{P\,AK}$	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

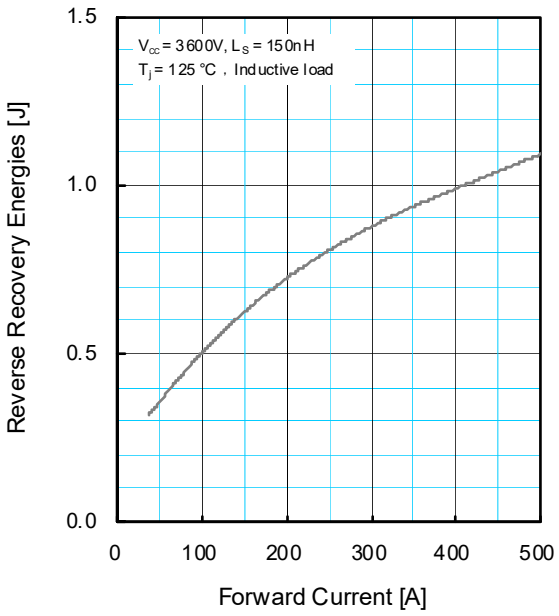
Note 1. Pulse width and repetition rate should be such that junction temperature (T_j) does not exceed T_{opmax} rating (125°C).
Note 2. Pulse width and repetition rate should be such as to cause negligible temperature rise.
Note 3. $E_{rec(10\%)}$ is the integral of $0.1V_R \times 0.1I_F \times dt$.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

PERFORMANCE CURVES

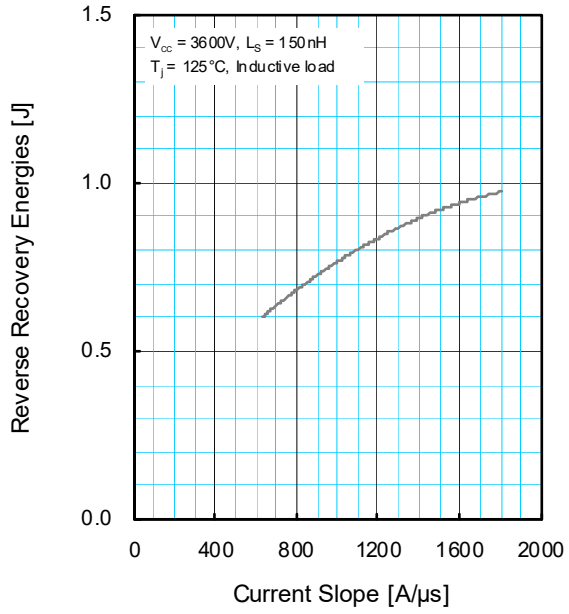
FORWARD CHARACTERISTICS (TYPICAL)



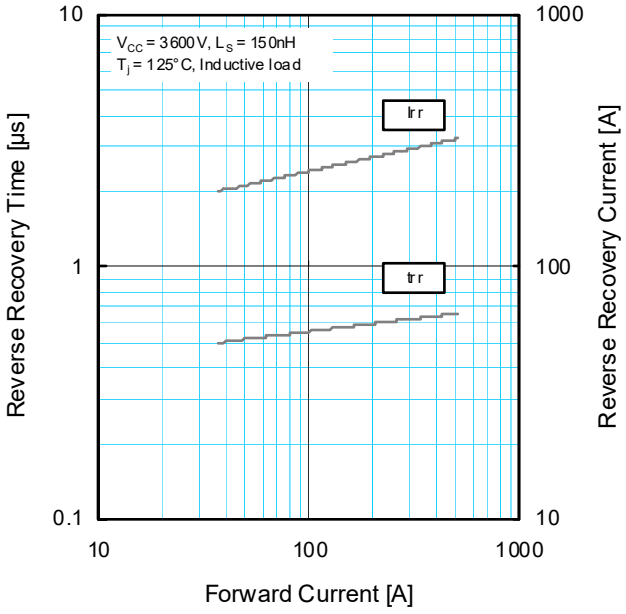
REVERSE RECOVERY ENERGY CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

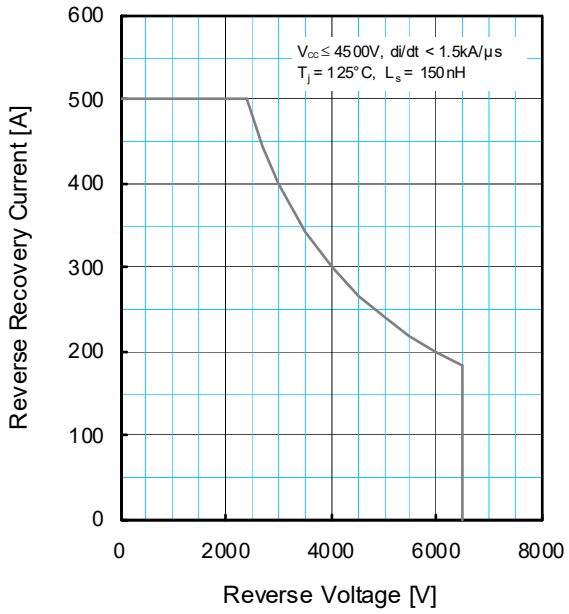


REVERSE RECOVERY CHARACTERISTICS (TYPICAL)

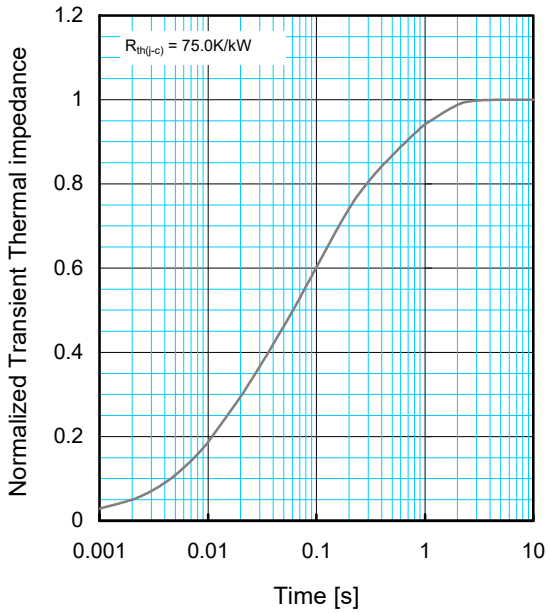


PERFORMANCE CURVES

REVERSE RECOVERY SAFE OPERATING AREA (RRSOA)



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
t_i [sec]	0.0001	0.0131	0.0878	0.6247

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