MITSUBISHI ELECTRIC

< HIGH VOLTAGE DIODE MODULES >

RM1500HE-66X

HIGH POWER SWITCHING USE
INSULATED TYPE

High Voltage Diode Modules

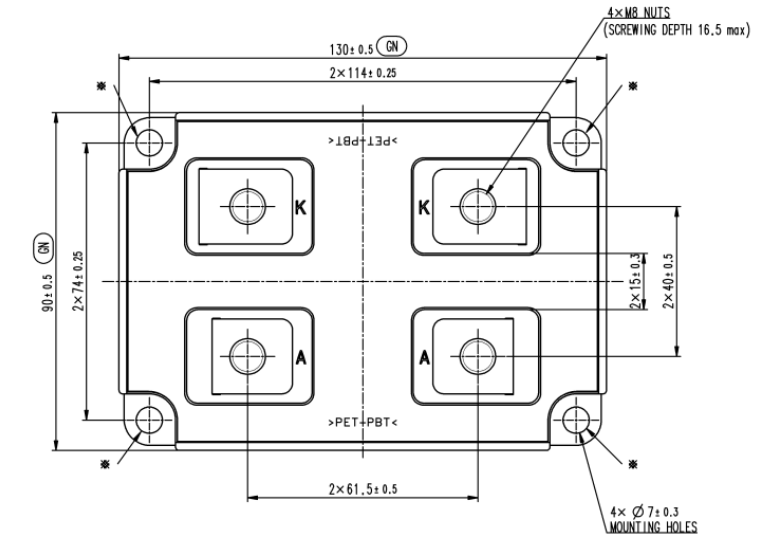
RM1500HE-66X

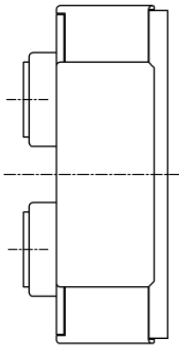
- I_F 1500A
- V_{RRM} 3300V
- 1-element in a Pack
- Insulated Type
- RFC Diode

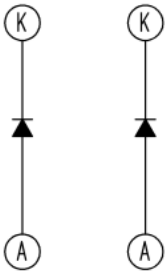
APPLICATION

Traction drives, High Reliability Converters / Inverters, DC choppers

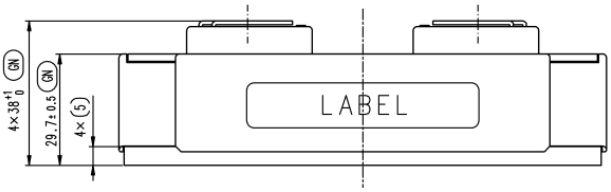
OUTLINE DRAWING & CIRCUIT DIAGRAM **Dimensions in mm**







接続図
CIRCUIT DIAGRAM



MAXIMUM RATINGS (Tj=25 °C, unless otherwise specified)

Item	Symbol	Condition		Ratings	Unit
Repetitive peak reverse voltage	V_{RRM}	-	T_j = 150 °C	3300	V
			T_j = 25 °C	3300	V
			T_j = -50 °C	3200	V
Non-repetitive peak reverse voltage	V_{RSM}	-	T_j = 25 °C	3300	V
Forward current	I_F	T_c = 85 °C The maximum effective current should be 1200Arms. Junction temperature (Tj) should not exceed Tjmax rating (150°C).		1500	A
Repetitive peak forward current	I_{FRM}	Pulse	T_j = 150 °C	3000	A
Isolation voltage	V_{isol}	Charged part to the baseplate RMS sinusoidal, 60Hz 1min. Tc = 25 °C		6000	V_{rms}
Partial discharge charge	Q_{pd}	Charged part to the baseplate, RMS sinusoidal, 60 Hz 1min V1 = 3500 V, V2 = 2600 V, (acc. to IEC 61287-1)		10	pC
Junction temperature	T_j	Maximum temperature range in off-state or on-state(non-switching)		-50~+150	°C
Storage temperature	T_{stg}	Maximum case temperature range in off-state		-55~+150	°C
Operating junction temperature	T_{jop}	Maximum junction temperature range for switching operation		-50~+150	°C
Reverse recovery power dissipation	P_{rr}	V_{CC}≤2500V, V_{RM}≤3300V L_S≤100nH, I_F≤3000A, d_{ion}/d_t≤8500A/us	T_j = 150 °C	3.75	MW
Non-repetitive surge forward current	I_{FSM}	t_p = 10ms, V_R=50V, F(t)weibull=1%, Half sine wave	T_j = 150 °C	15000	A
I2t value	I^2t	t_p = 10ms, V_R=50V, F(t)weibull=1%, Half sine wave	T_j = 150 °C	1100	kA^2s

ELECTRICAL CHARACTERISTICS (Tj=25 °C, unless otherwise specified)

Item	Symbol	Condiiton		Limits			Unit
				Min.	Typ.	Max.	
Peak reverse recovery current	I_{RRM}	V_{RM} = 3300 V	T_j = 25 °C	-	-	2.0	mA
			T_j = 125 °C	-	2.0	-	mA
			T_j = 150 °C	-	-	30.0	mA
Forward voltage	V_F (Terminal)	I_F = 1500 A	T_j = 25 °C	-	2.20	-	V
			T_j = 125 °C	-	2.50	-	V
			T_j = 150 °C	-	2.60	-	V
Forward voltage	V_F (Chip)	I_F = 1500 A	T_j = 25 °C	-	1.90	-	V
			T_j = 125 °C	-	2.20	-	V
			T_j = 150 °C	-	2.30	2.90	V
Reverse recovery time	t_{rr}	V_{CC} = 1800 V , I_F = 1500 A , L_s = 100 nH −diF/dt = 6200 A/μs@ T_j= 25 °C 5500 A/μs@ T_j= 125 °C 5100 A/μs@ T_j= 150 °C	T_j = 25 °C	-	0.90	-	μs
			T_j = 125 °C	-	1.05	-	μs
			T_j = 150 °C	-	1.10	-	μs
Reverse recovery current	I_{rr}		T_j = 25 °C	-	1900	-	A
			T_j = 125 °C	-	1800	-	A
			T_j = 150 °C	-	1800	-	A
Reverse recovered charge	Q_{rr}		T_j = 25 °C	-	1400	-	μC
			T_j = 125 °C	-	1850	-	μC
			T_j = 150 °C	-	1950	-	μC
Reverse recovery charge 10% integral	$Q_{rr(10\%)}$		T_j = 25 °C	-	1300	-	μC
			T_j = 125 °C	-	1700	-	μC
			T_j = 150 °C	-	1800	-	μC
Reverse recovery energy	E_{rec}		T_j = 25 °C	-	1.50	-	J
			T_j = 125 °C	-	2.00	-	J
			T_j = 150 °C	-	2.20	-	J
Reverse recovery energy per pulse 10% integral	$E_{rec(10\%)}$		T_j = 25 °C	-	1.30	-	J
			T_j = 125 °C	-	1.80	-	J
			T_j = 150 °C	-	1.90	-	J

THERMAL CHARACTERISTICS

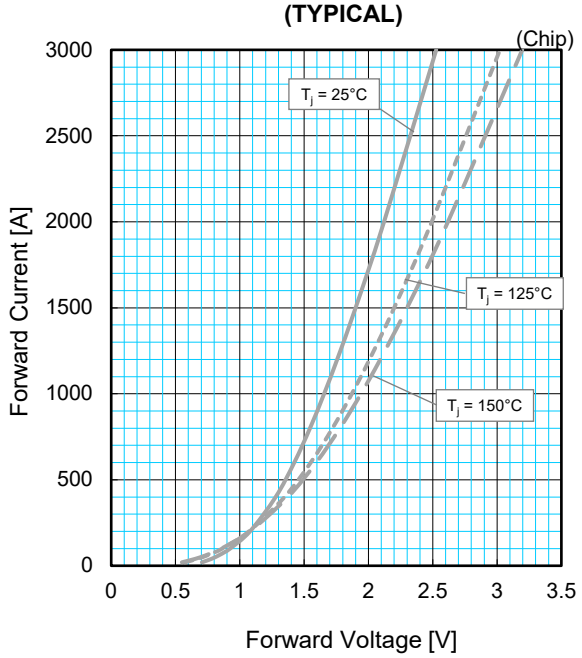
Item	Symbol	Condition	Limits			Unit
			Min.	Typ.	Max.	
Thermal resistance Junction to case, DIODE	$R_{th(j-c)D}$	Junction to Case	-	-	13.1	K/kW
Contact thermal resistance case to heatsink	$R_{th(c-s)}$	Case to heatsink λ_{grease} = 1W/m·K, $D_{(c-s)}$ = 100 μm	-	14.1	-	K/kW

MECHANICAL CHARACTERISTICS

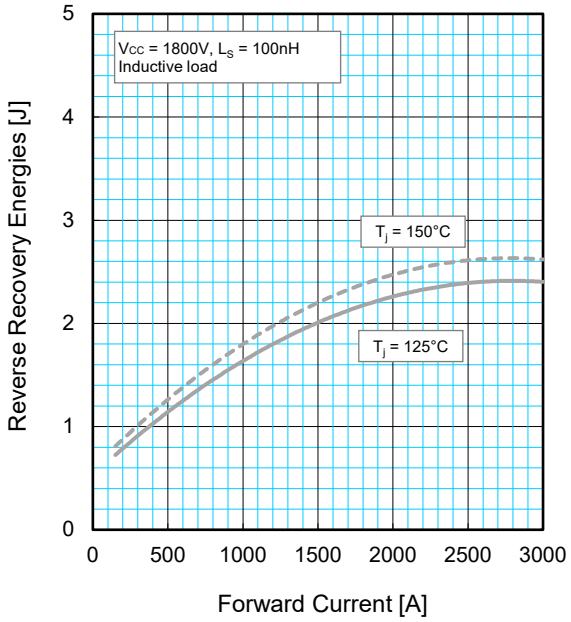
Item	Symbol	Condition	Limits			Unit
			Min.	Typ.	Max.	
Mounting torque	M_t	Main terminal screw : M8	6.7	-	10.8	N·m
Mounting torque	M_s	Mounting screw : M6	3.0	-	6.0	N·m
mass, Mass(IEC)	m	-	-	0.52	-	kg
Comparative tracking index	CTI	-	600	-	-	-
Clearance distance in air	d_a	Anode teminal -Cathode terminal	19.5	-	-	mm
Creepage distance along surface	d_s	Anode teminal -Cathode terminal	32.0	-	-	mm
Internal inductance (a-K)	$L_{P(A-K)}$	T_C=25°C	-	17.0	-	nH
Internal lead resistance	$R_{AA'+KK'}$	T_C=25°C	-	0.16	-	mΩ

PERFORMANCE CURVES

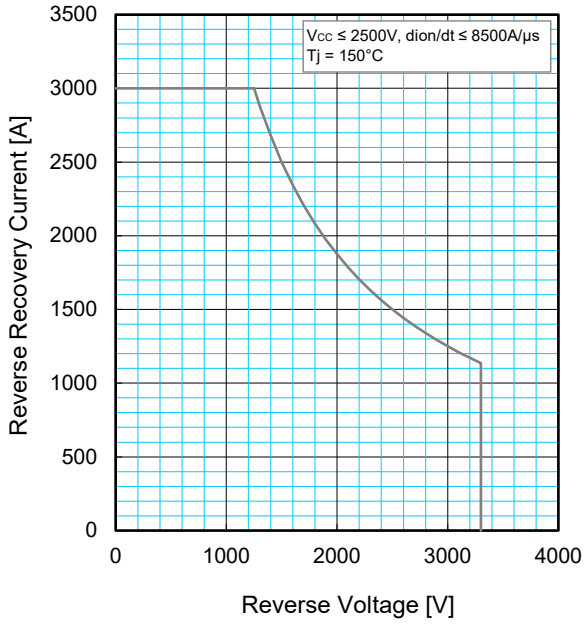
FORWARD CHARACTERISTICS (TYPICAL)



REVERSE RECOVERY ENERGY CHARACTERISTICS (TYPICAL)

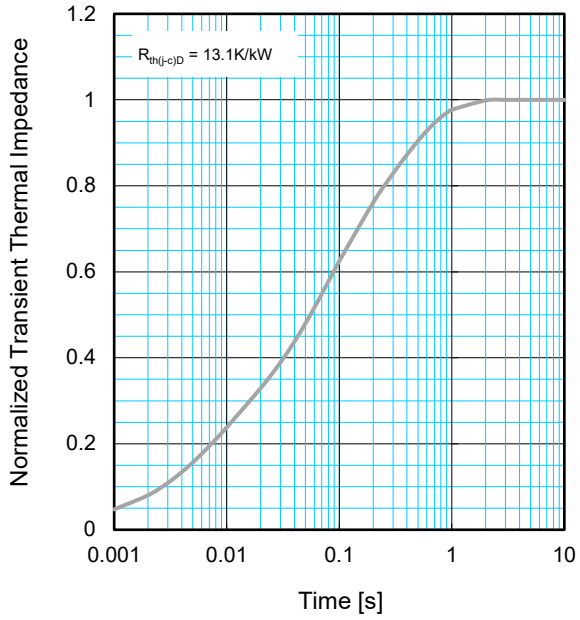


REVERSE RECOVERY SAFE OPERATING AREA (RRSOA)



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]	0.0096	0.1893	0.4044	0.3967
τ_i [sec]	0.0001	0.0058	0.0602	0.3512

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