

SECURITY CODE		MITSUBISHI ELECTRIC CORPORATION							
Spec. NAME	Prepared by	K.Kurachi	R E V	A	K.Kurachiv				
Customer's	Checked by								
Std. Spec.	Approved by	I.Umezaki			I.Umezaki				
	DATE	11-May-2007			4-Feb.-2008				

HIGH VOLTAGE DIODE MODULE

1. **Type Number** RM300DG-90S
2. **Structure** Flat base type (Insulated package, AlSiC base plate)
3. **Application & Customer** High power converters & Inverters for traction application
4. **Outline** See Fig. 1
5. **Related Specifications**

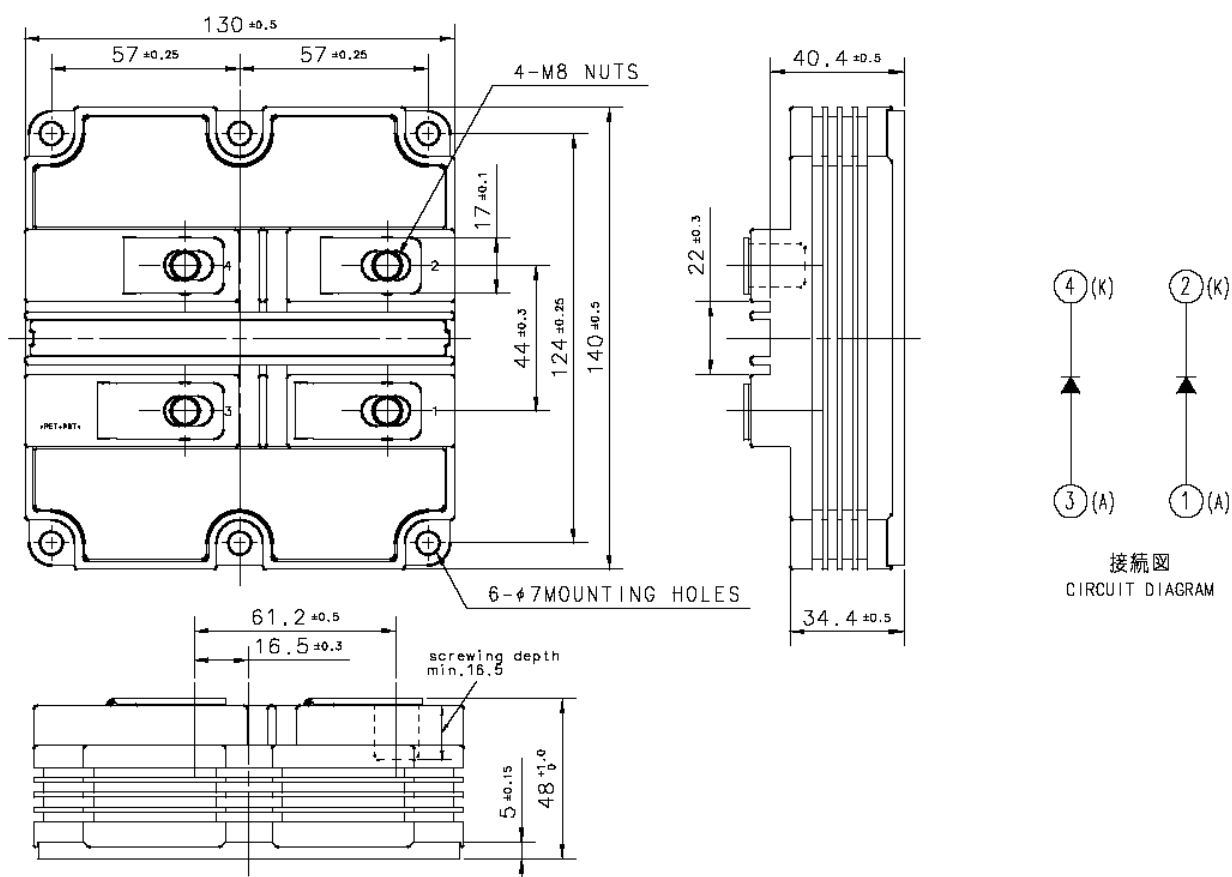


Fig. 1 - Outline drawing

6. Maximum Ratings

Item	Symbol	Conditions	Ratings	Unit
6.1 Repetitive peak reverse voltage	V_{RRM}	$T_j = 25\text{ }^{\circ}\text{C}$	4500	V
6.2 Non-repetitive peak reverse voltage	V_{RSM}	$T_j = 25\text{ }^{\circ}\text{C}$	4500	V
6.3 Reverse DC voltage	$V_{R(DC)}$	$T_j = 25\text{ }^{\circ}\text{C}$	3000	V
6.4 DC forward current	I_F	$T_c = 25\text{ }^{\circ}\text{C}$	300	A
6.5 Surge forward current	I_{FSM}	$T_j = 25\text{ }^{\circ}\text{C}$ start, $t_w = 8.3\text{ ms}$ Half sign wave	2400	A
6.6 Surge current load integral	I^2t	$T_j = 25\text{ }^{\circ}\text{C}$ start, $t_w = 8.3\text{ ms}$ Half sign wave	24	kA^2s
6.7 Isolation voltage	V_{iso}	Charged part to the baseplate RMS sinusoidal, 60Hz 1min.	10200	V
6.8 Junction temperature	T_j	—	$-40 \sim +150$	$^{\circ}\text{C}$
6.9 Storage temperature	T_{stg}	—	$-40 \sim +125$	$^{\circ}\text{C}$
6.10 Operating temperature	T_{op}	—	$-40 \sim +125$	$^{\circ}\text{C}$
6.11 Maximum reverse recovery instantaneous power	—	$V_R \leq 3200\text{ V}$ $di/dt \leq 1100\text{ A}/\mu\text{s}$, $T_j = 125\text{ }^{\circ}\text{C}$ [See Fig.1, Fig.2, 12-5]	800	kW

7. Electrical Characteristics

Item	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
7.1 Repetitive reverse current	I_{RRM}	$V_{RM} = V_{RRM}$ (Note 1)	$T_j = 25\text{ }^{\circ}\text{C}$	—	1	mA
			$T_j = 125\text{ }^{\circ}\text{C}$	0.5	10	
7.2 Forward voltage	V_{FM}	$I_F = 300\text{ A}$	$T_j = 25\text{ }^{\circ}\text{C}$	4.80	—	V
			$T_j = 125\text{ }^{\circ}\text{C}$	4.15	—	
7.3 Reverse recovery time	t_{rr}	$V_R = 2250\text{ V}$, $I_F = 300\text{ A}$ $di/dt = -800\text{ A}/\mu\text{s}$ $T_j = 125\text{ }^{\circ}\text{C}$ [See Fig.1, Fig.2]	—	1.0	—	μs
7.4 Reverse recovery current	I_{rr}		—	280	—	A
7.5 Reverse recovery charge	Q_{rr}		—	250	—	μC
7.6 Reverse recovery energy	E_{rec}		—	0.33	—	J/P

Note 1: It doesn't include the voltage drop by Internal lead resistance.

8. Thermal Characteristics

Item	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
8.1 Thermal resistance	$R_{th(j-c)R}$	Junction to case (per 1/2 module)	—	—	66.0	K/kW
8.2 Contact thermal resistance	$R_{th(c-f)}$	Case to fin (Note 2) Conductive grease applied (per 1/2 module)	—	48.0	—	K/kW

Note 2: Thermal conductivity is 1W/mK with a thickness of 100μm.

9. Mechanical Characteristics

Item	Symbol	Conditions	Limits			Unit
			Min.	Typ.	Max.	
9.1 Mounting torque	—	Main terminal screw : M8	7.0	—	15.0	N·m
9.2 Mounting torque	—	Mounting screw : M6	3.0	—	6.0	N·m
9.3 Mass	—	—	—	1.0	—	kg
9.4 Comparative tracking index	CTI	—	600	—	—	—
9.5 Clearance	—	—	26	—	—	mm
9.6 Creepage distance	—	—	56	—	—	mm
9.7 Internal inductance	$L_{A-K(int)}$	—	—	44	—	nH
9.8 Internal lead resistance	$R_{A-K(int)}$	$T_c = 25\text{ }^{\circ}\text{C}$	—	0.27	—	mΩ

10. Shipping Inspection Report Item ^(note 3)

Static characteristics : I_{RRM} [7.1], V_{FM} [7.2]

Dynamic characteristics : t_{rr} [7.3], Q_{rr} [7.5]

Note 3: One shipping inspection report with the above item values is submitted when modules are delivered. The test conditions are defined in bracket.

11. Test Circuit & Definition of Switching Characteristics

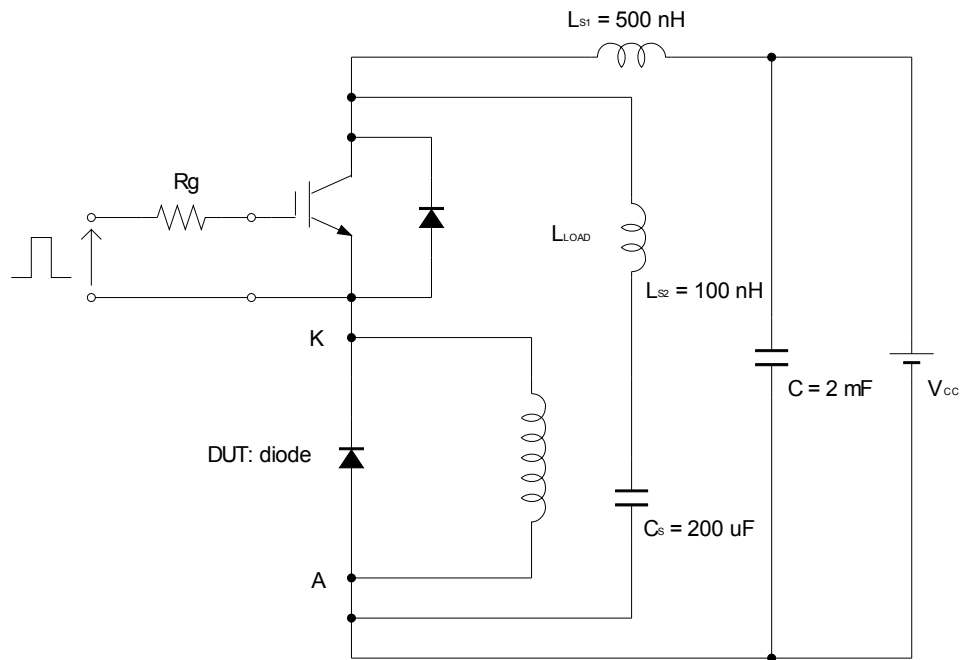


Fig. 1 – Switching test circuit

Diode part: reverse recovery

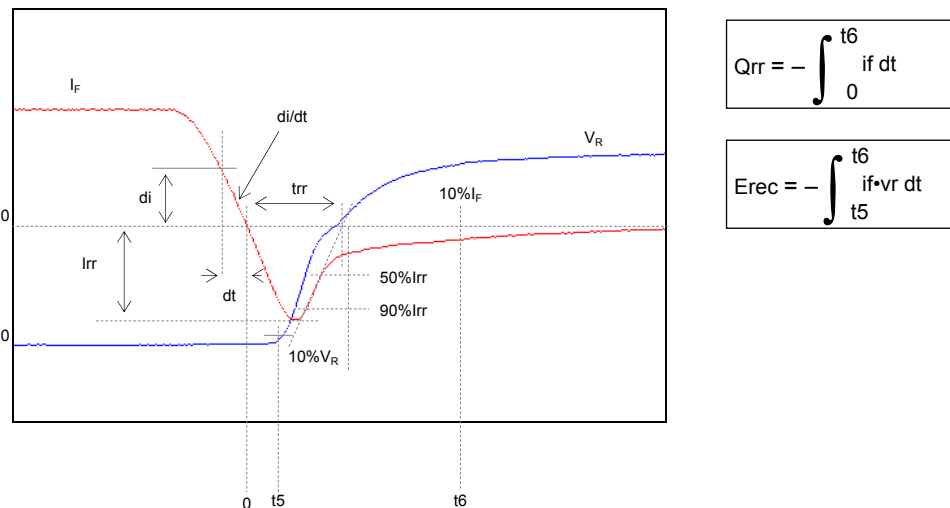


Fig. 2 – Definitions of reverse recovery charge & energy

12. Performance curves

12-1 Forward characteristics6

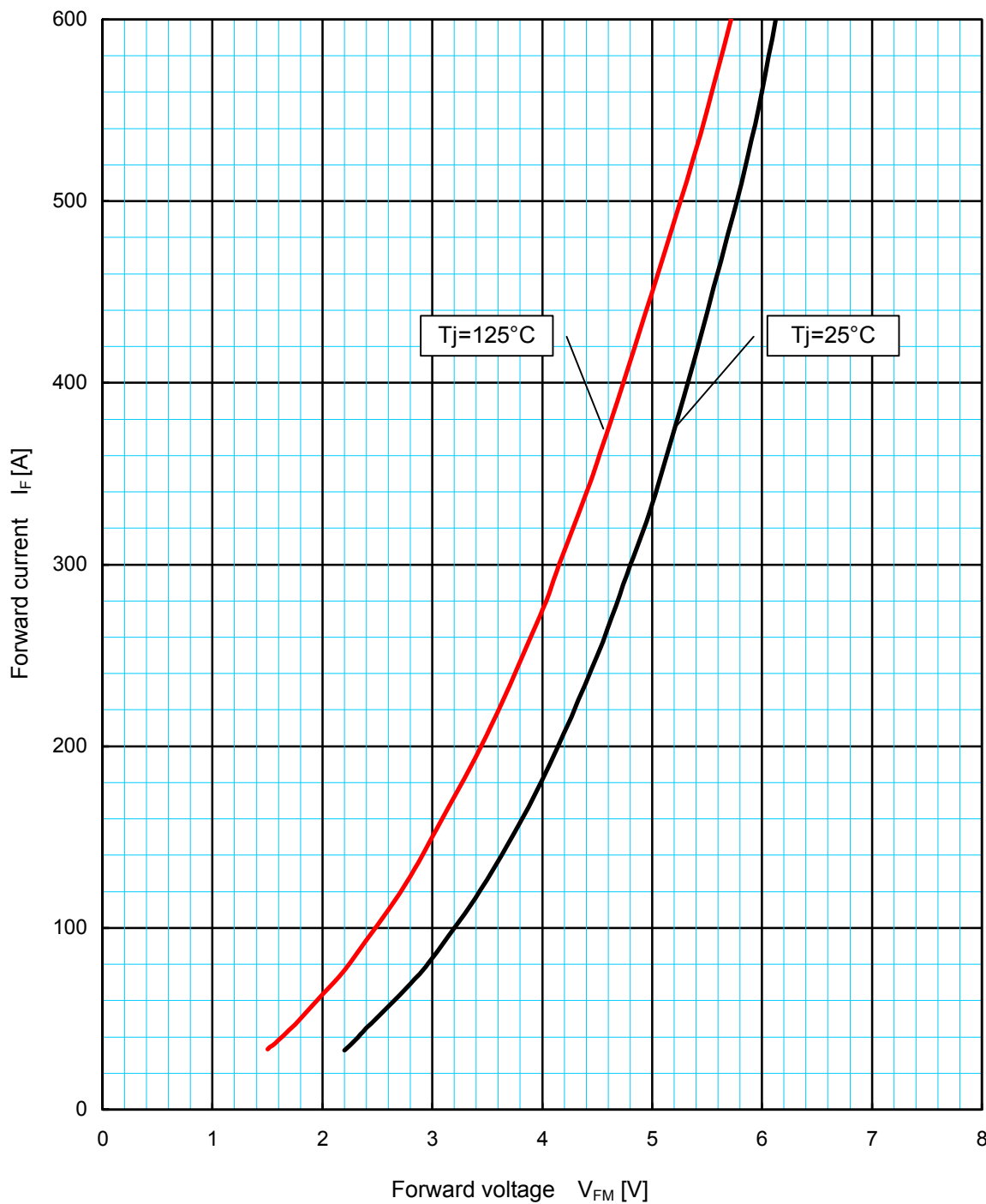
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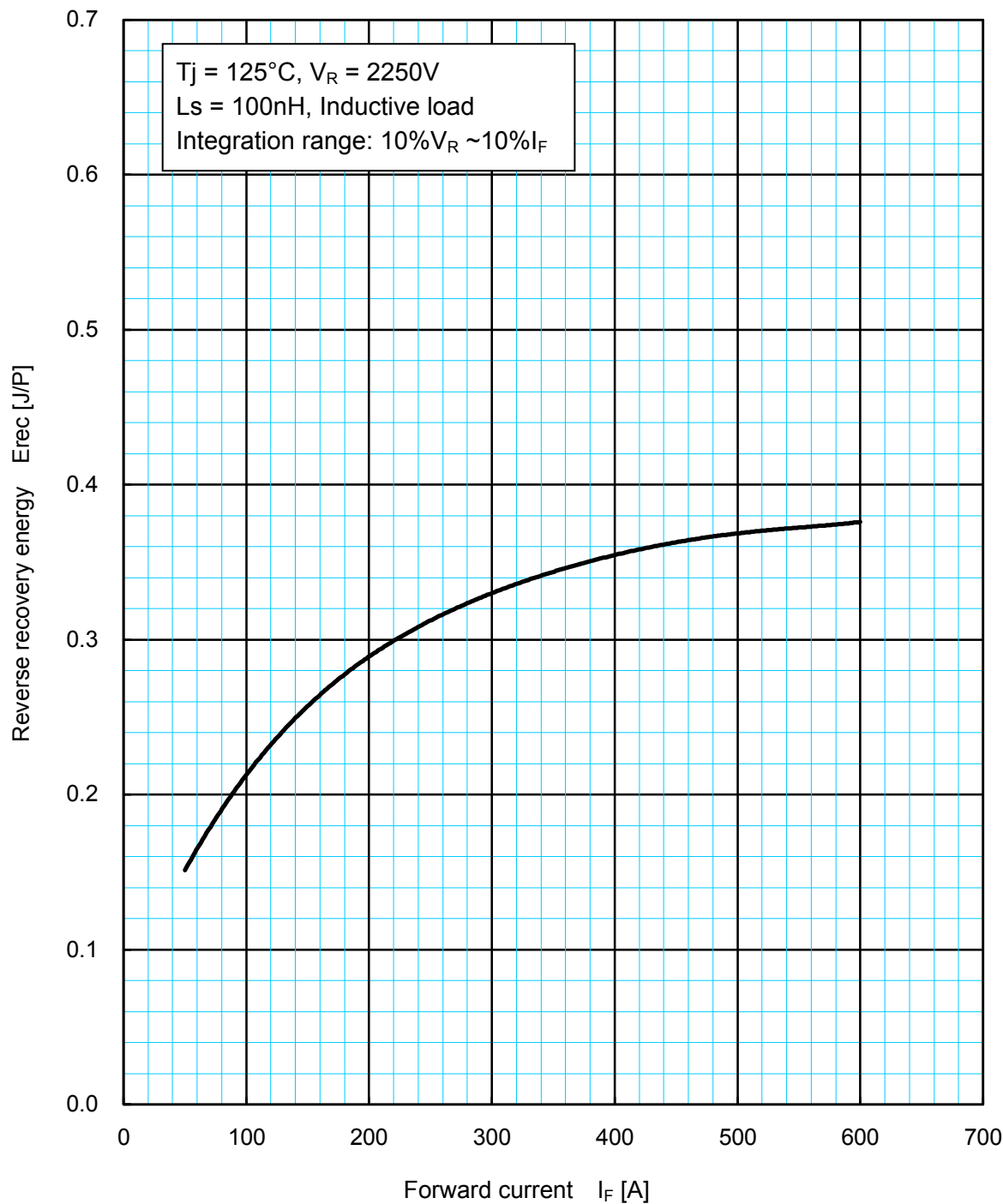
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12-1 Forward characteristics



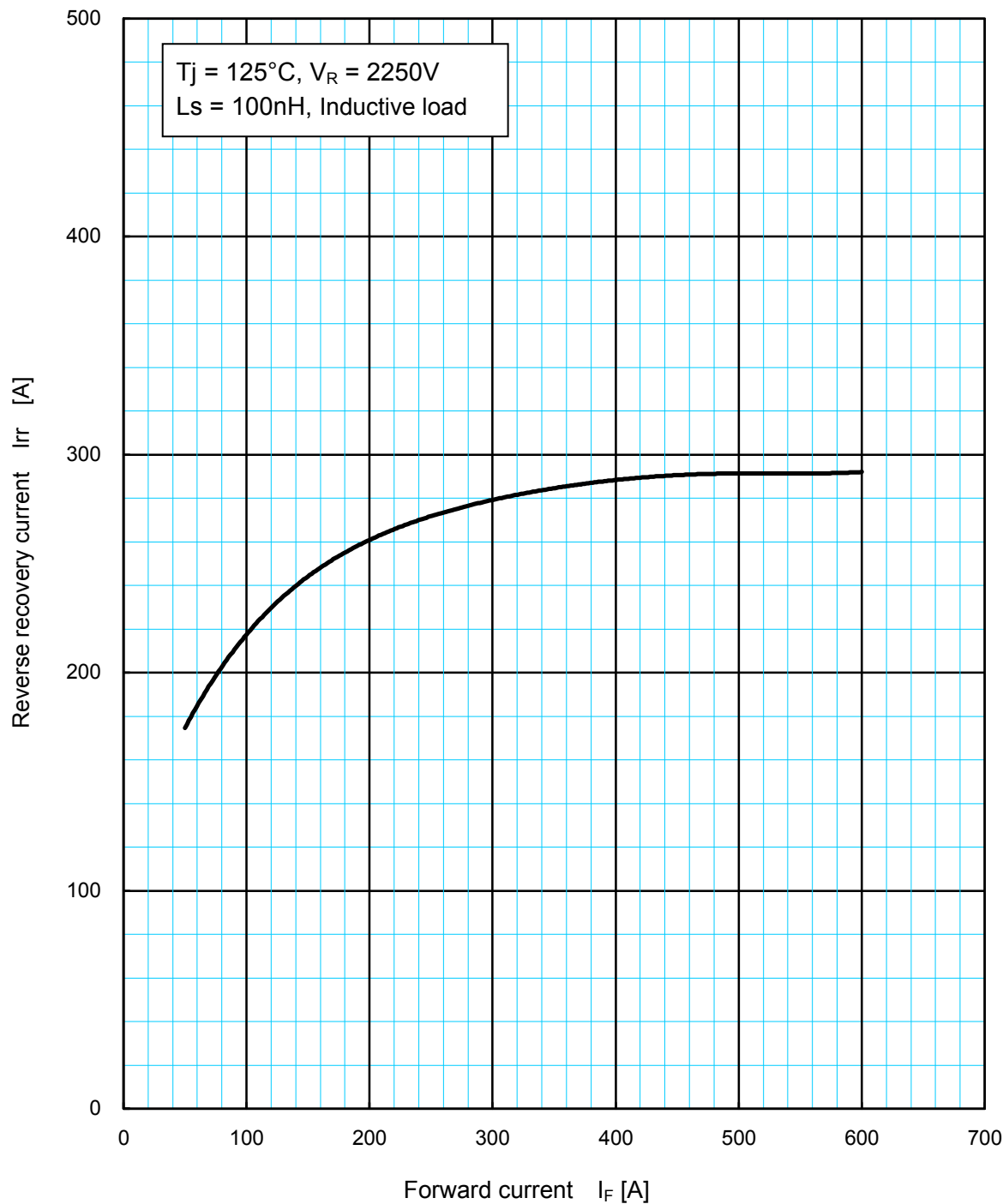
Forward voltage characteristics (typical)

12-2 Reverse recovery energy characteristics



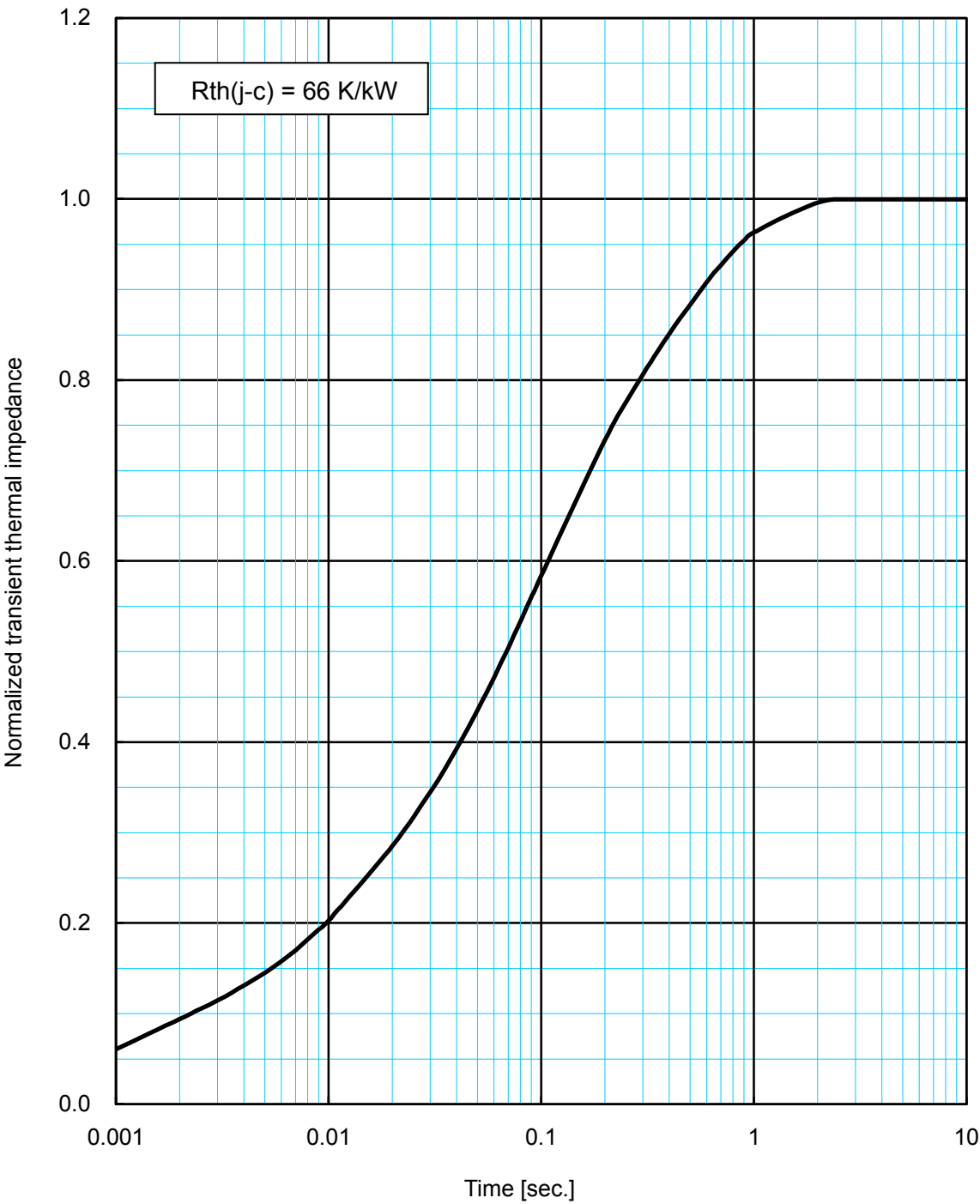
Reverse recovery energy characteristics (typical)

12-3 Reverse recovery current characteristics



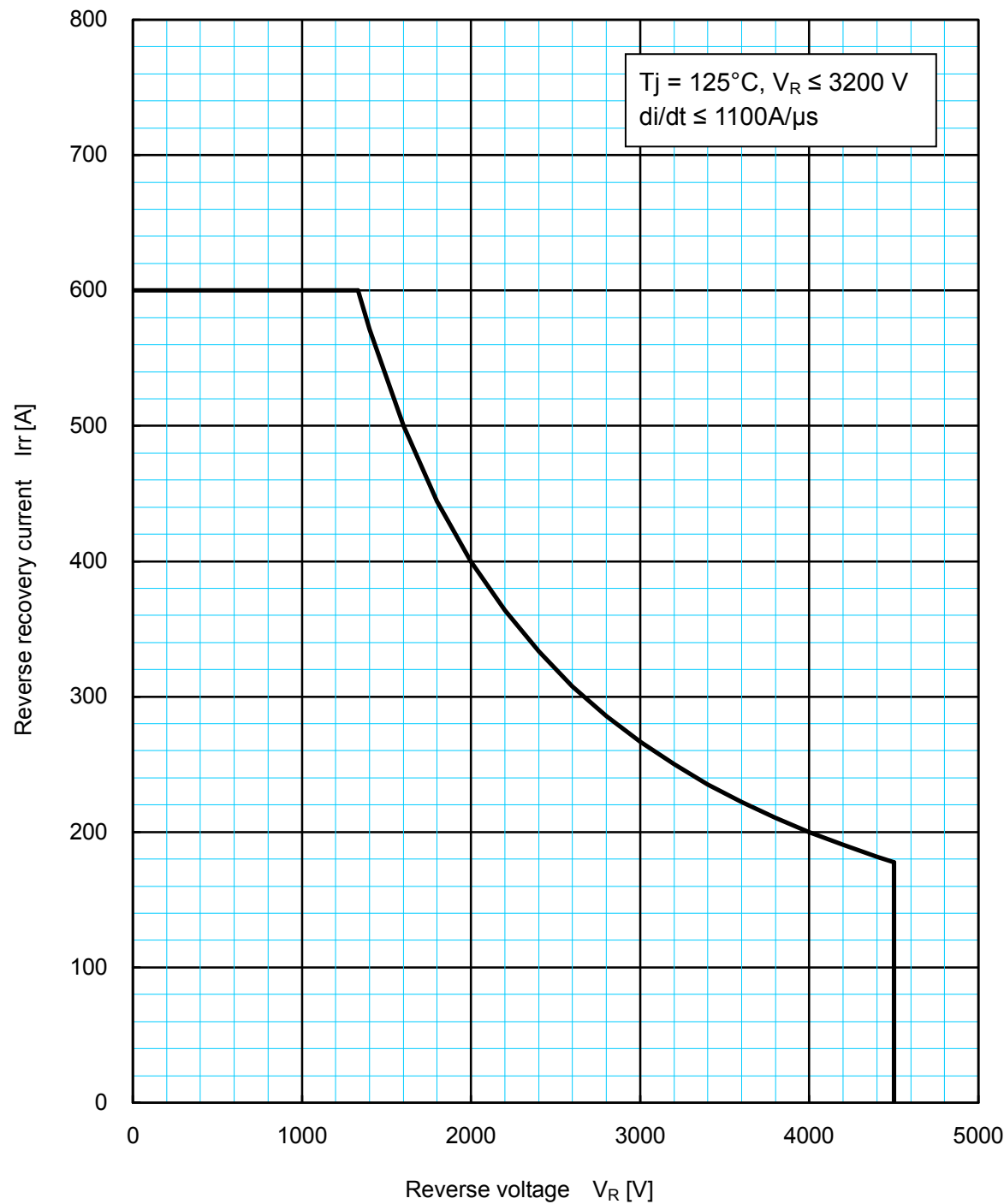
Reverse recovery current characteristics (typical)

12-4 Transient thermal impedance characteristics



Transient thermal impedance characteristics

12-5 Reverse recovery safe operating area



Reverse recovery safe operating area (RRSOA)

mitsubishi electric corporation

Rev. No.	Summary of changes	Signature & date
-	Original	K.Kurachi 31-Jan.-2008