

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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E.S.D NOISE CLIPPING DIODES

NNCD3.3A to NNCD12A

ELECTROSTATIC DISCHARGE NOISE CLIPPING DIODES

Phase-out/Discontinued (400 mW TYPE)

This product series is a diode developed for E.S.D (Electrostatic Discharge) noise protection. Based on the IEC1000-4-2 test on electromagnetic interference (EMI), the diode assures an endurance of no less than 30 kV.

Type NNCD2.0A to NNCD12A Series is into DO-34 Package (Body length 2.4 mm MAX.) with DHD (Double Heatsink Diode) construction having allowable power dissipation of 400 mW.

FEATURES

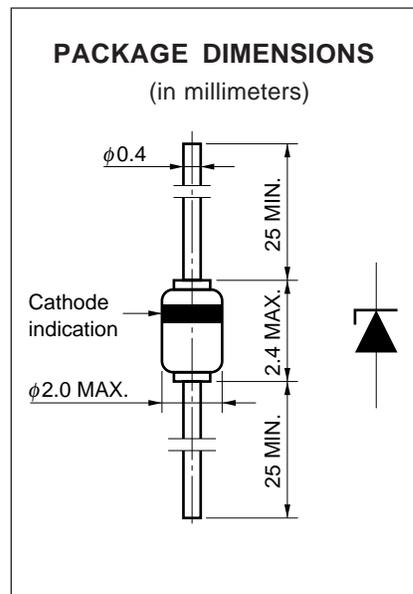
- Based on the electrostatic discharge immunity test (IEC1000-4-2), the product assures the minimum endurance of 30 kV.
- Based on the reference supply of the set, the product achieves a series over a wide range (15 product name lined up).
- DHD (Double Heatsink Diode) construction.

APPLICATIONS

- Circuit E.S.D protection.
- Circuits for Waveform clipper, Surge absorber.

MAXIMUM RATINGS ($T_A = 25\text{ }^\circ\text{C}$)

Power Dissipation	P	400 mW	
Surge Reverse Power	P_{RSM}	100 W ($t_T = 10\ \mu\text{s}$ 1 pulse)	Fig. 7
Junction Temperature	T_j	175 $^\circ\text{C}$	
Storage Temperature	T_{stg}	-65 $^\circ\text{C}$ to +175 $^\circ\text{C}$	



ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

Type Number	Breakdown Voltage ^{Note 1} V _{BR} (V)			Dynamic Impedance ^{Note 2} Z _z (Ω)		Reverse Leakage I _R (μA)		Capacitance C _t (pF)		E.S.D Voltage (kV)	
	MIN.	MAX.	I _T (mA)	MAX.	I _T (mA)	MAX.	V _R (V)	TYP.	TEST CONDITION	MIN.	TEST CONDITION
NNCD3.3A	3.16	3.53	5	120	5	20	1.0	220	V _R = 0 V f = 1 MHz	30	C = 150 pF R = 330 Ω (IEC1000 -4-2)
NNCD3.6A	3.47	3.83	5	120	5	10	1.0	210		30	
NNCD3.9A	3.77	4.14	5	120	5	5	1.0	200		30	
NNCD4.3A	4.05	4.53	5	120	5	5	1.0	180		30	
NNCD4.7A	4.47	4.91	5	120	5	5	1.0	170		30	
NNCD5.1A	4.85	5.35	5	100	5	5	1.5	160		30	
NNCD5.6A	5.29	5.88	5	70	5	5	2.5	140		30	
NNCD6.2A	5.81	6.40	5	40	5	5	3.0	120		30	
NNCD6.8A	6.32	6.97	5	30	5	2	3.5	110		30	
NNCD7.5A	6.88	7.64	5	25	5	0.5	4.0	90		30	
NNCD8.2A	7.56	8.41	5	20	5	0.5	5.0	90		30	
NNCD9.1A	8.33	9.29	5	20	5	0.5	6.0	90		30	
NNCD10A	9.19	10.3	5	20	5	0.2	7.0	80		30	
NNCD11A	10.18	11.26	5	20	5	0.2	8.0	70	30		
NNCD12A	11.13	12.30	5	25	5	0.2	9.0	70	30		

- Notes**
1. Tested with pulse (40 ms)
 2. Z_z is measured at I_T give a small A.C. signal.

TYPICAL CHARACTERISTICS (T_A = 25 °C)

Fig. 1 POWER DISSIPATION vs. AMBIENT TEMPERATURE

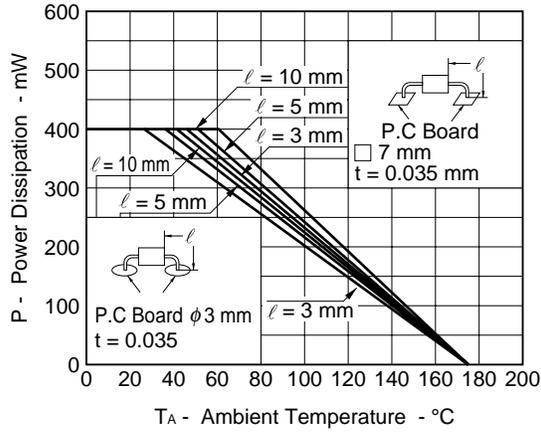


Fig. 2 THERMAL RESISTANCE vs. SIZE OF P.C. BOARD

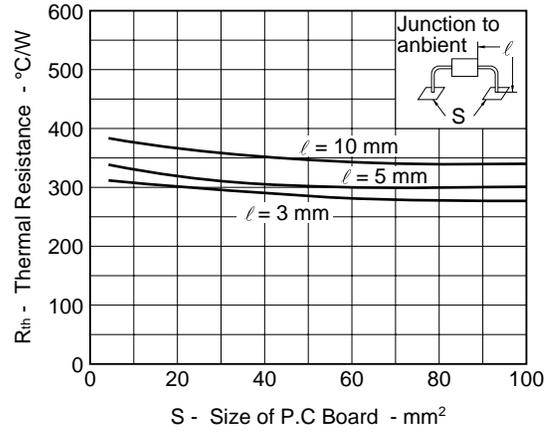


Fig. 3 I_T - V_{BR} CHARACTERISTICS

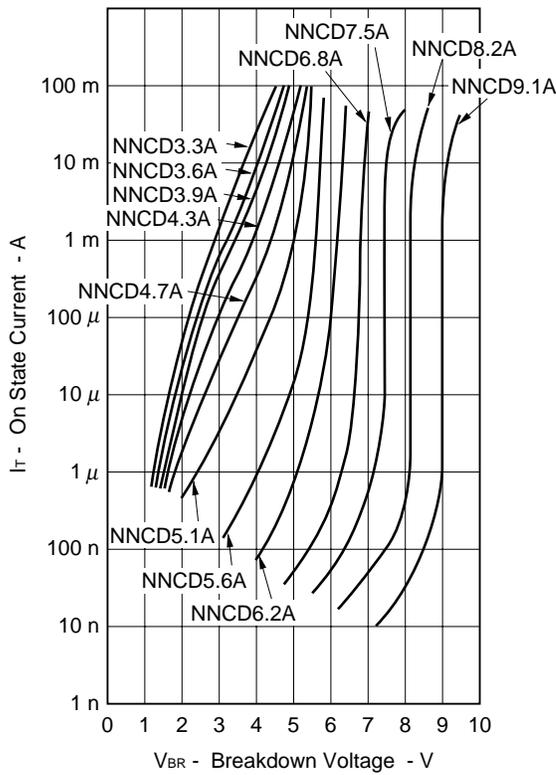


Fig. 4 I_T - V_{BR} CHARACTERISTICS

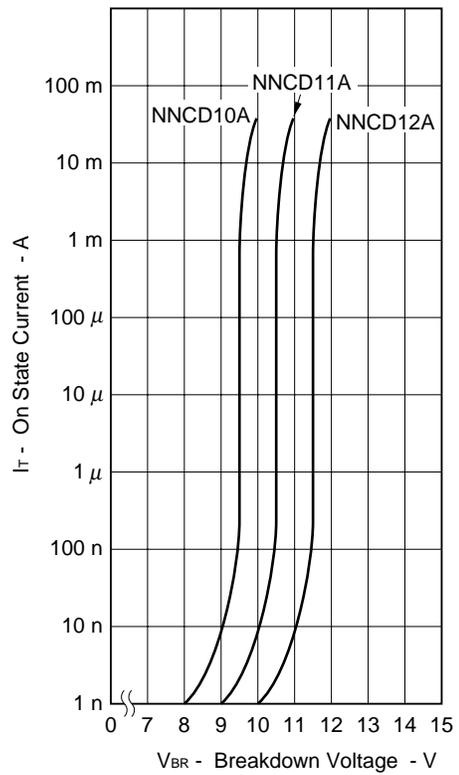


Fig. 5 $Z_z - I_T$ CHARACTERISTICS

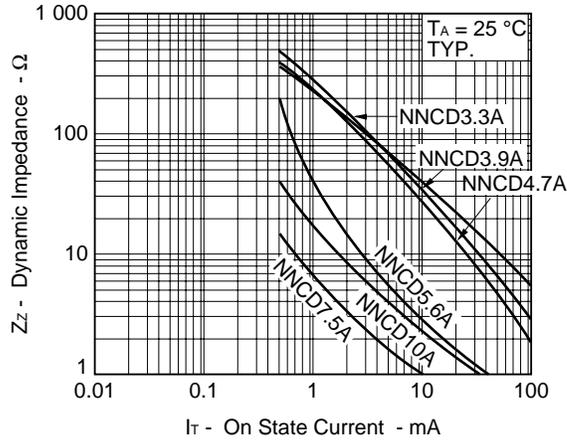


Fig. 6 TRANSIENT THERMAL IMPEDANCE

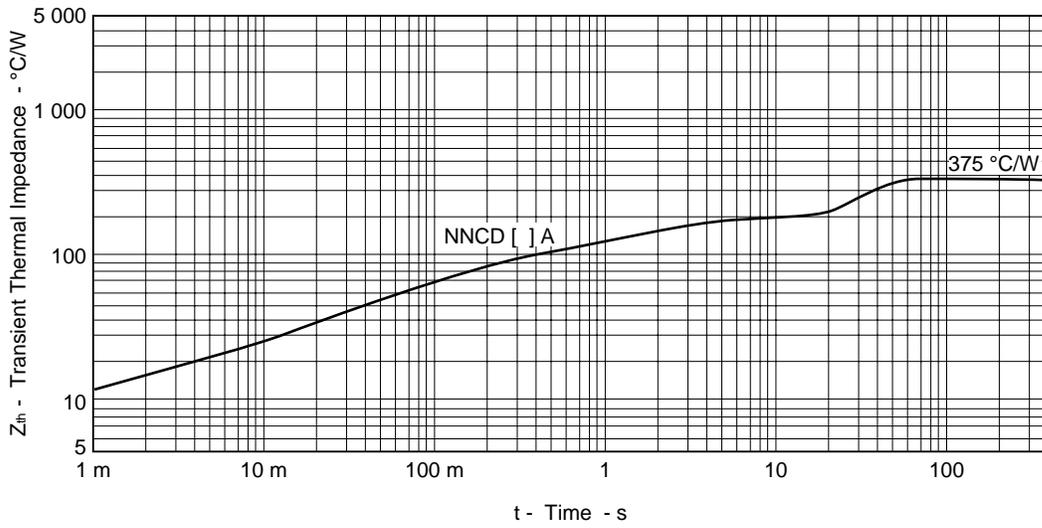
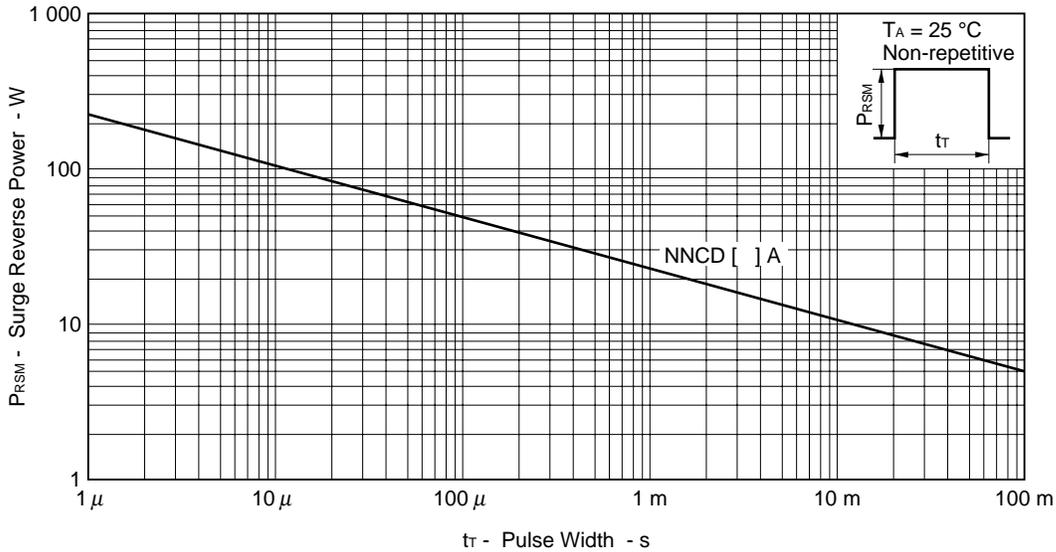


Fig. 7 SURGE REVERSE POWER RATING



REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system	C11745E
NEC semiconductor device reliability/quality control system	MEI-1201
Quality grade on NEC semiconductor device	C11531E
Semiconductor device mounting technology manual	C10535E
Guide to quality assurance for semiconductor device	MEI-1202

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Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.