

# E.S.D NOISE CLIPPING DIODES

## NNCD3.3B to NNCD12B

### ELECTROSTATIC DISCHARGE NOISE CLIPPING DIODES (500 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 NNCD2.0B to NNCD12B Series is into DO-35 Package with DHD (Double Heatsink Diode) construction having allowable power dissipation of 500 mW.

#### FEATURES

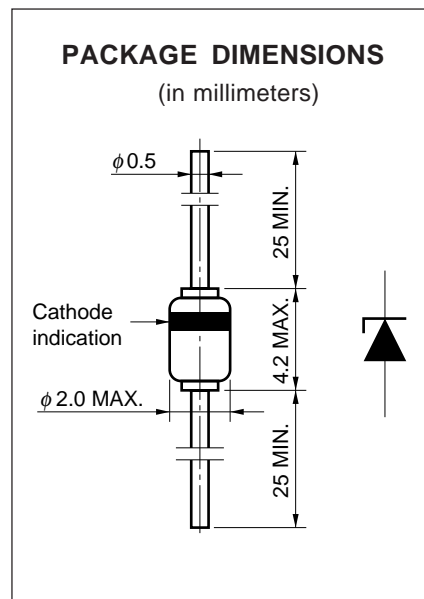
- Based on the electrostatic discharge immunity test (IEC1000-4-2), the product assures the minimum endurance of 30 kV.
- Based on the reference supply of the set, the product achieves a series over a wide range (15 product name lined up).
- DHD (Double Heatsink Diode) construction.

#### APPLICATIONS

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

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

Power Dissipation	P	500 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<sub>A</sub> = 25 °C)

Type Number	Breakdown Voltage <sup>Note 1</sup> V <sub>BR</sub> (V)			Dynamic Impedance <sup>Note 2</sup> Z <sub>z</sub> (Ω)		Reverse Leakage I <sub>R</sub> (μA)		Capacitance C <sub>t</sub> (pF)		E.S.D Voltage (kV)	
	MIN.	MAX.	I <sub>T</sub> (mA)	MAX.	I <sub>T</sub> (mA)	MAX.	V <sub>R</sub> (V)	TYP.	TEST CONDITION	MIN.	TEST CONDITION
NNCD3.3B	3.16	3.53	20	70	20	20	1.0	240	V <sub>R</sub> = 0 V f = 1 MHz	30	C = 150 pF R = 330 Ω (IEC1000-4-2)
NNCD3.6B	3.47	3.83	20	60	20	10	1.0	230		30	
NNCD3.9B	3.77	4.14	20	50	20	5	1.0	220		30	
NNCD4.3B	4.05	4.53	20	40	20	5	1.0	210		30	
NNCD4.7B	4.47	4.91	20	25	20	5	1.0	190		30	
NNCD5.1B	4.85	5.35	20	20	20	5	1.5	160		30	
NNCD5.6B	5.29	5.88	20	13	20	5	2.5	140		30	
NNCD6.2B	5.81	6.40	20	10	20	5	3.0	120		30	
NNCD6.8B	6.32	6.97	20	8	20	2	3.5	110		30	
NNCD7.5B	6.88	7.64	20	8	20	0.5	4.0	90		30	
NNCD8.2B	7.56	8.41	20	8	20	0.5	5.0	90		30	
NNCD9.1B	8.33	9.29	20	8	20	0.5	6.0	90		30	
NNCD10B	9.19	10.3	20	8	20	0.2	7.0	80		30	
NNCD11B	10.18	11.26	10	10	10	0.2	8.0	70		30	
NNCD12B	11.13	12.30	10	10	10	0.2	9.0	70	30		

- Notes** 1. Tested with pulse (40 ms)  
 2. Z<sub>z</sub> is measured at I<sub>T</sub> give a small A.C. signal.

TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

Fig. 1 POWER DISSIPATION vs. AMBIENT TEMPERATURE

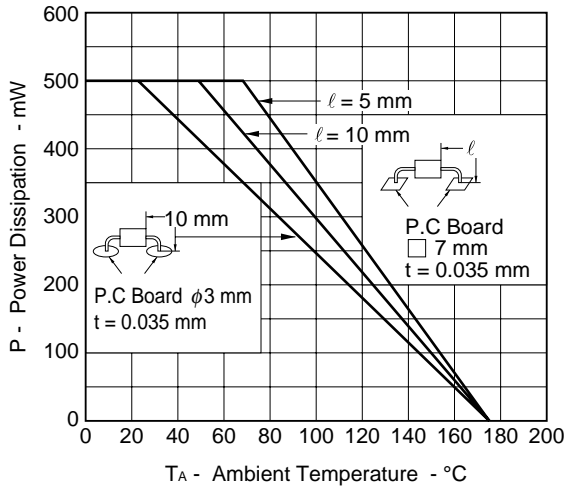


Fig. 2 THERMAL RESISTANCE vs. SIZE OF P.C BOARD

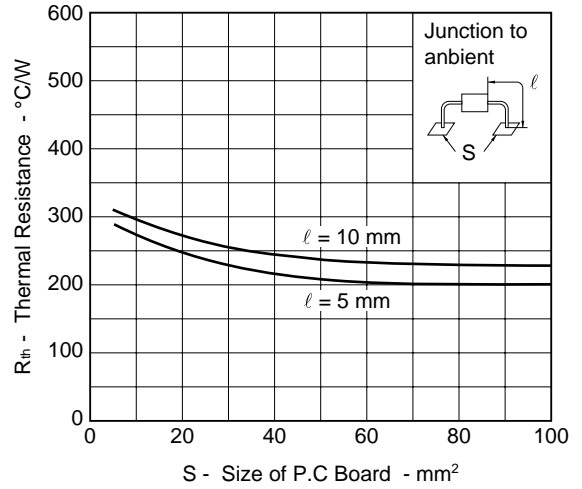


Fig. 3 I<sub>T</sub> - V<sub>BR</sub> CHARACTERISTICS

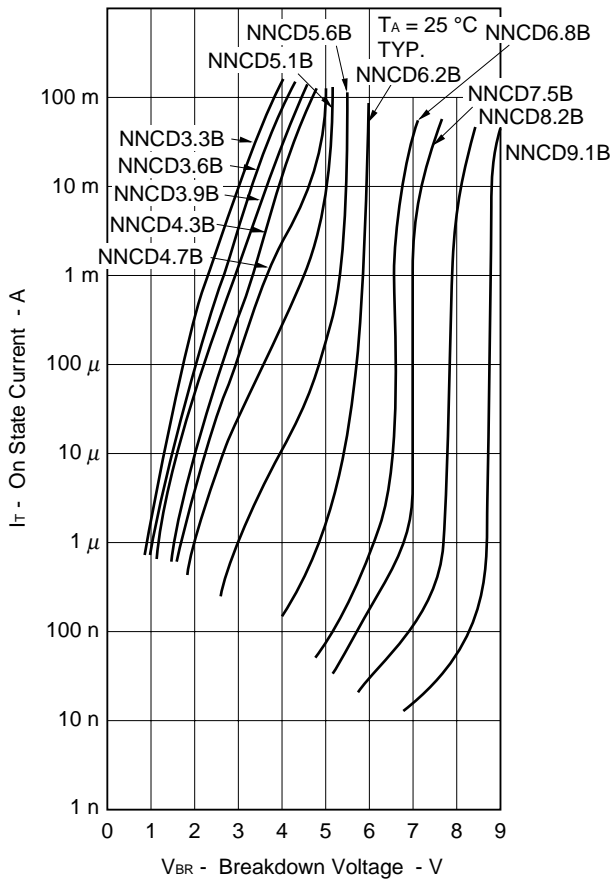


Fig. 4 I<sub>T</sub> - V<sub>BR</sub> CHARACTERISTICS

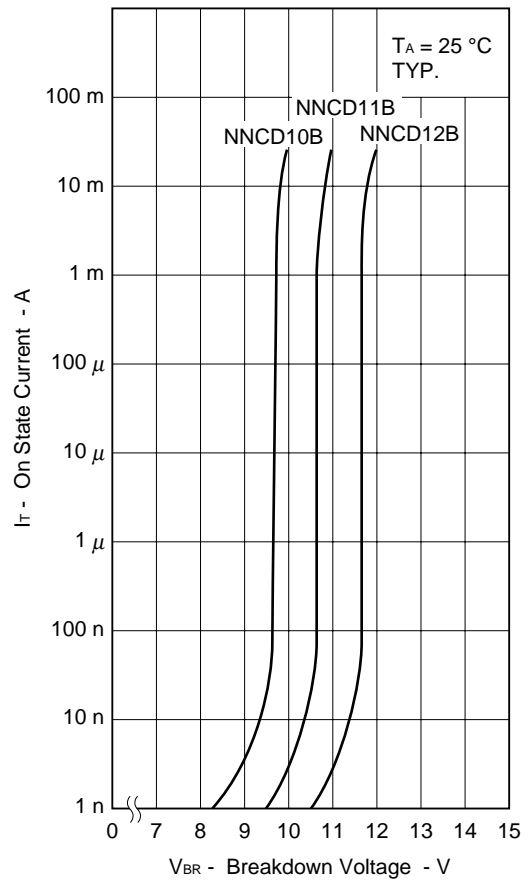


Fig. 5  $Z_z - I_T$  CHARACTERISTICS

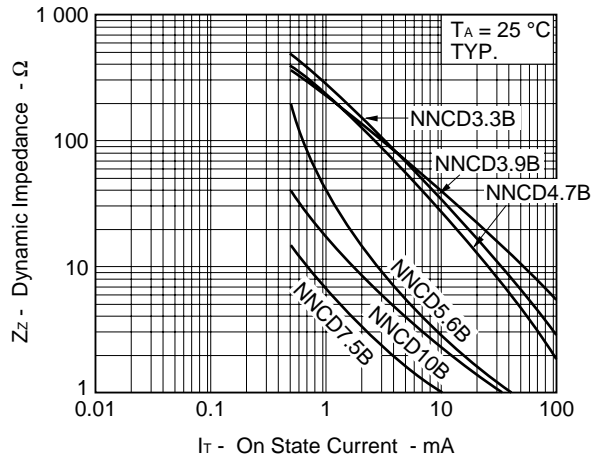


Fig. 6 TRANSIENT THERMAL IMPEDANCE

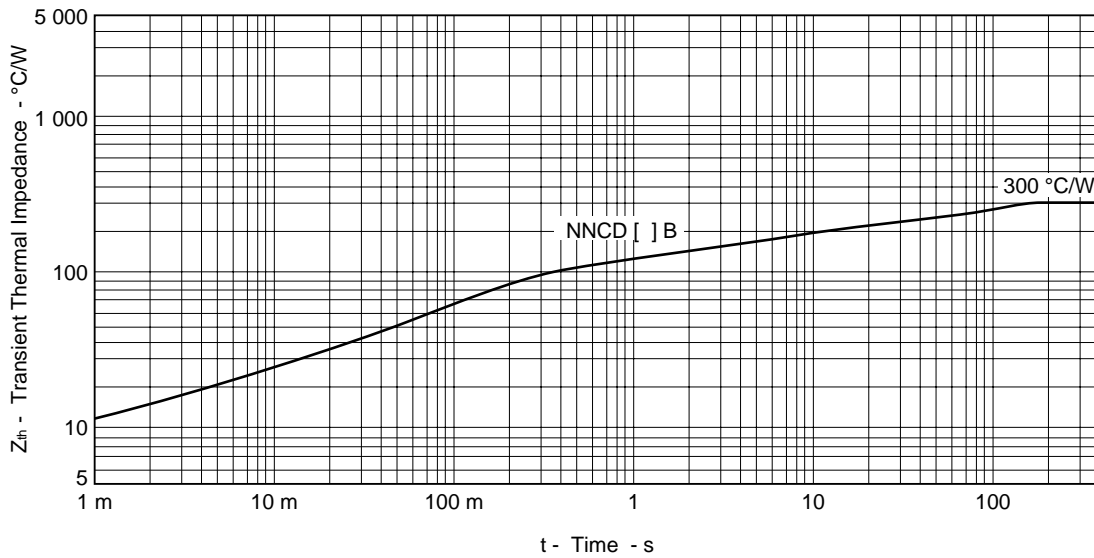
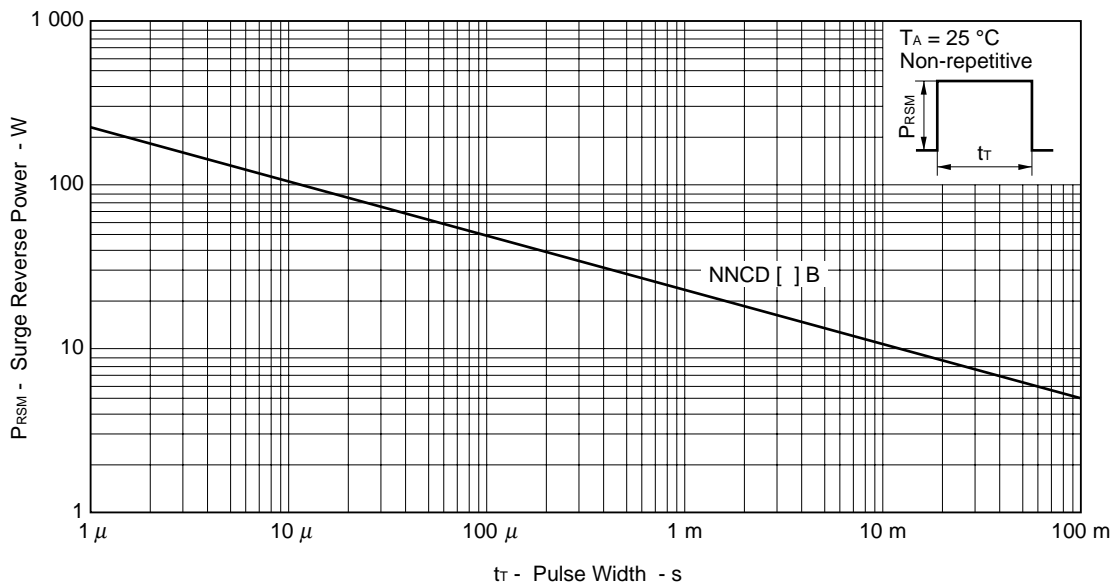


Fig. 7 SURGE REVERSE POWER RATING



**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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Anti-radioactive design is not implemented in this product.