To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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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RENESAS

E.S.D NOISE CLIPPING DIODES

NNCD3.3F to NNCD12F

ELECTROSTATIC DISCHARGE NOISE CLIPPING DIODES (DOUBLE TYPE, ANODE COMMON) 3PIN MINI MOLD

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, thus making itself most suitable for external interface circuit protection.

Type NNCD3.3F to NNCD12F Series include two elements in 3PIN Mini Mold Package having allowable power dissipation of 200 mW.

FEATURES

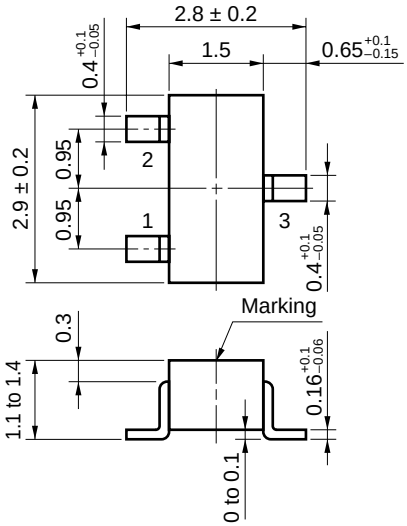
- Based on the electrostatic discharge immunity test (IEC1000-4-2), the product assures the minimum endurance of 30 kV.
- Based on the reference supply of the set, the product achieves a series over a wide range (15 product name lined up).

APPLICATIONS

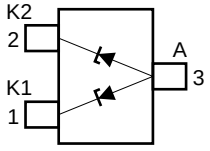
- External interface circuit E.S.D protection.
- Circuits for Waveform clipper, Surge absorber.

PACKAGE DIMENSIONS

(in millimeters)



PIN CONNECTION
1. K1: Cathode 1 SC-59 (EIAJ)
2. K2: Cathode 2
3. A : Anode (common)



MAXIMUM RATINGS (T_A = 25 °C)

Power Dissipation	P	200 mW	(Total)
Surge Reverse Power	P_{RSM}	100 W (t_T = 10 μs 1 pulse)	Fig. 6
Junction Temperature	T_j	150 °C	
Storage Temperature	T_{stg}	–55 °C to +150 °C	

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C) (A-K1, A-K2)

Type Number	Breakdown Voltage[Note 1] V_{BR} (V)			Dynamic Impedance[Note 2] Zz (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
NNCD3.3F	3.10	3.50	5	130	5	20	1.0	220	V_R = 0 V f = 1 MHz	30	C = 150 pF R = 330 Ω (IEC1000 -4-2)
NNCD3.6F	3.40	3.80	5	130	5	10	1.0	210		30	
NNCD3.9F	3.70	4.10	5	130	5	10	1.0	200		30	
NNCD4.3F	4.01	4.48	5	130	5	10	1.0	180		30	
NNCD4.7F	4.42	4.90	5	130	5	10	1.0	170		30	
NNCD5.1F	4.84	5.37	5	130	5	5	1.5	160		30	
NNCD5.6F	5.31	5.92	5	80	5	5	2.5	140		30	
NNCD6.2F	5.86	6.53	5	50	5	2	3.0	120		30	
NNCD6.8F	6.47	7.14	5	30	5	2	3.5	110		30	
NNCD7.5F	7.06	7.84	5	30	5	2	4.0	90		30	
NNCD8.2F	7.76	8.64	5	30	5	2	5.0	90		30	
NNCD9.1F	8.56	9.55	5	30	5	2	6.0	90		30	
NNCD10F	9.45	10.55	5	30	5	2	7.0	80		30	
NNCD11F	10.44	11.56	5	30	5	2	8.0	70		30	
NNCD12F	11.42	12.60	5	35	5	2	9.0	70		30	

Notes 1. Tested with pulse (40 ms)

2. Zz is measured at I_T give a small A.C. signal.

TYPICAL CHARACTERISTICS (T_A = 25 °C)

Fig. 1 POWER DISSIPATION vs. AMBIENT TEMPERATURE

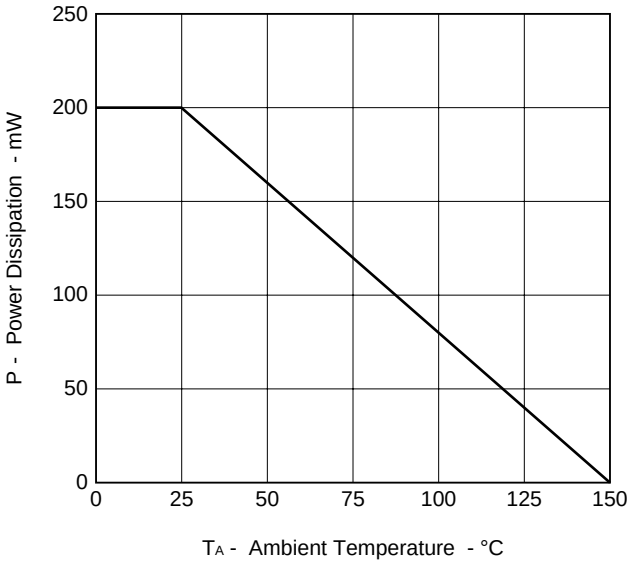


Fig. 2 I_T - V_{BR} CHARACTERISTICS

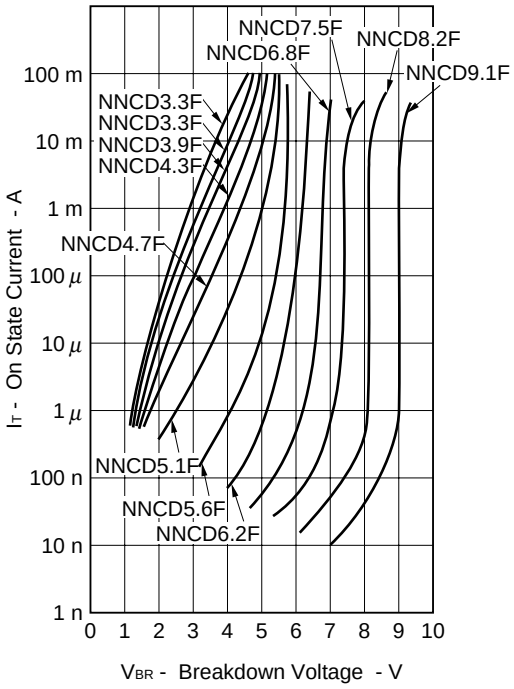


Fig. 3 I_T - V_{BR} CHARACTERISTICS

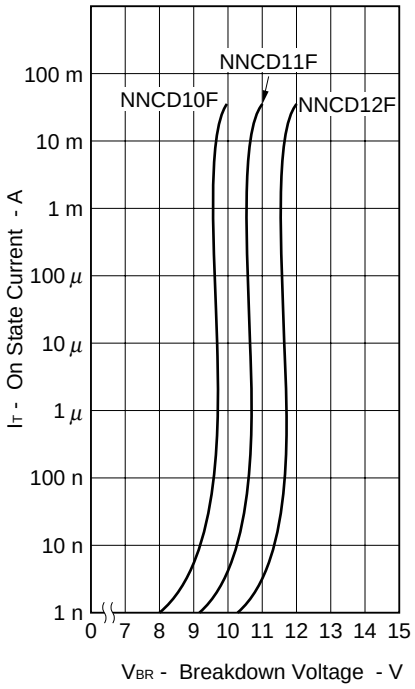


Fig. 4 Z_Z - I_T CHARACTERISTICS

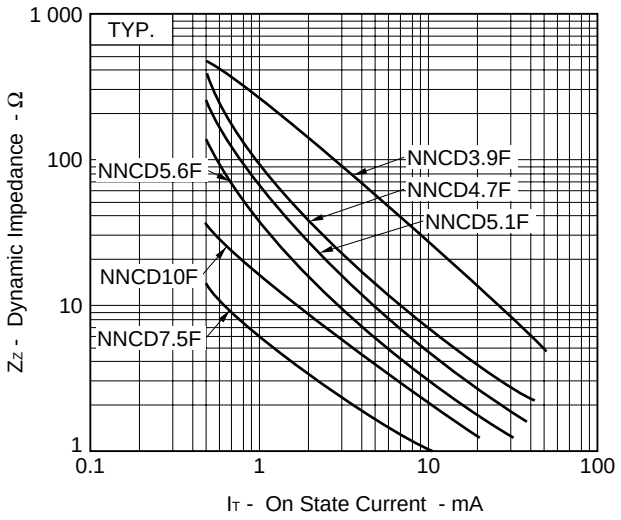


Fig. 5 TRANSIENT THERMAL IMPEDANCE

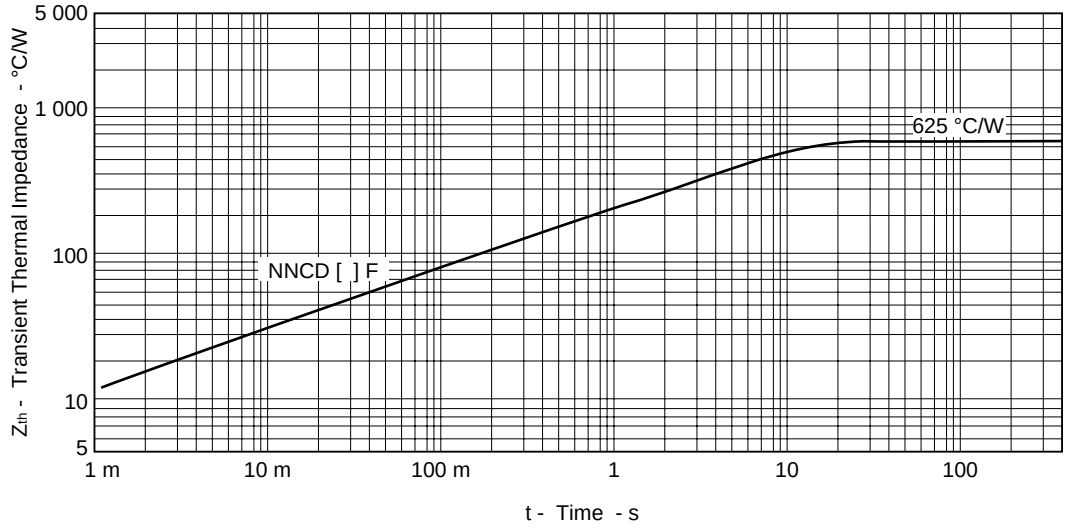
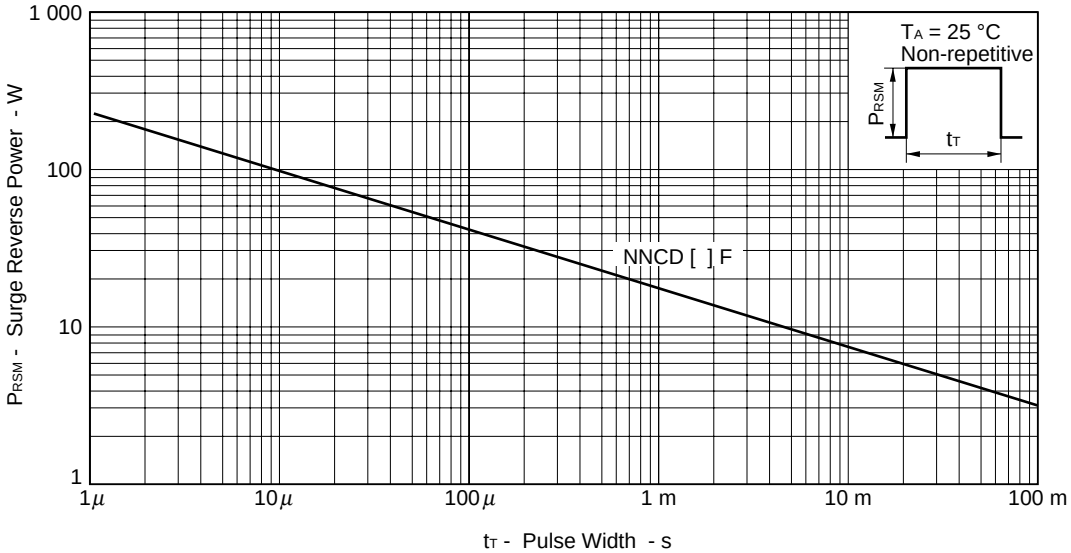
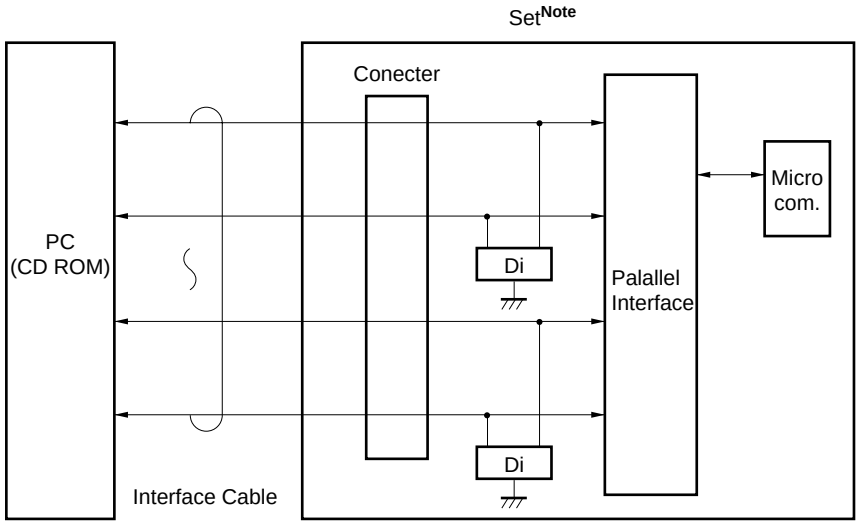


Fig. 6 SURGE REVERSE POWER RATING



Sample Application Circuits



Note Set
Printer, P.D.C, T.V Game etc.

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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