

Transient Voltage Suppressors Array for ESD Protection

SE12NMP11GN

Features

- ◆ Working voltage: 12.0V
- ◆ Low clamping voltage
- ◆ Low leakage current
- ◆ RoHS compliant
- ◆ Solid-state silicon-avalanche technology

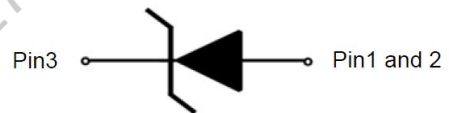
DFN2020-3L



Applications

- ◆ Power lines
- ◆ Personal digital assistants (PDA's)
- ◆ Microprocessors based equipment
- ◆ Notebooks, desktops, and servers
- ◆ Cell phone handsets and accessories
- ◆ Portable electronics
- ◆ Peripherals

Circuit Diagram



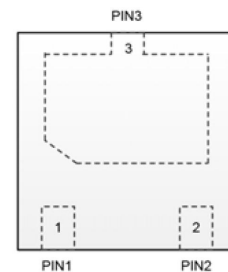
Protection Solution To Meet

- ◆ IEC61000-4-2 (ESD) $\pm 30\text{kV}$ (air), $\pm 30\text{kV}$ (contact)
- ◆ IEC61000-4-4 (EFT) 40A (5/50ns)
- ◆ IEC61000-4-5 (Lightning) 136A (8/20 μs)

Mechanical Characteristics

- ◆ DFN2020-3L package
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Quantity per reel: 3,000pcs
- ◆ Lead finish: lead free

PIN Configuration



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Absolute Maximum Rating ($T_A=25^\circ\text{C}$, RH=45%-75%, unless otherwise noted)

Symbol	Parameter	Value	Units
t_{STG}	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_J	Operating Temperature Range	-55 to +125	$^\circ\text{C}$
T_L	Lead soldering temperature	260 (10 sec.)	$^\circ\text{C}$
V_{ESD}	ESD per IEC 61000-4-2(Air)	± 30	KV
	ESD per IEC 61000-4-2 (Contact)	± 30	

Electrical Characteristics ($T_A=25^\circ\text{C}$)

Parameter	Symbol	Test Condition	Minimum	Typical	Maximum	Unit
Reverse working voltage	V_{RWM}	--	--	--	12.0	V
Reverse breakdown voltage	V_{BR}	$I_T = 1\text{mA}$	13.0	14.5	16.0	V
Reverse leakage current	I_R	$V_{\text{RWM}}=12\text{V}$	--	--	1.0	μA
Clamping voltage	V_C	$I_{\text{PP}}=50\text{A}, t_p=8/20 \mu\text{s}$	--	22.0	--	V
		$I_{\text{PP}}=100\text{A}, t_p=8/20 \mu\text{s}$	--	25.0	--	
		$I_{\text{PP}}=136\text{A}, t_p=8/20 \mu\text{s}$	--	38.0	--	
Junction capacitance	C_J	$V_{\text{RWM}}=0\text{V}, f=1\text{MHz}$	--	950	--	pF

Ratings and V-I Characteristics Curves ($T_A=25^\circ\text{C}$, unless otherwise noted)

Fig1. V- I curve characteristics(Uni-directional)

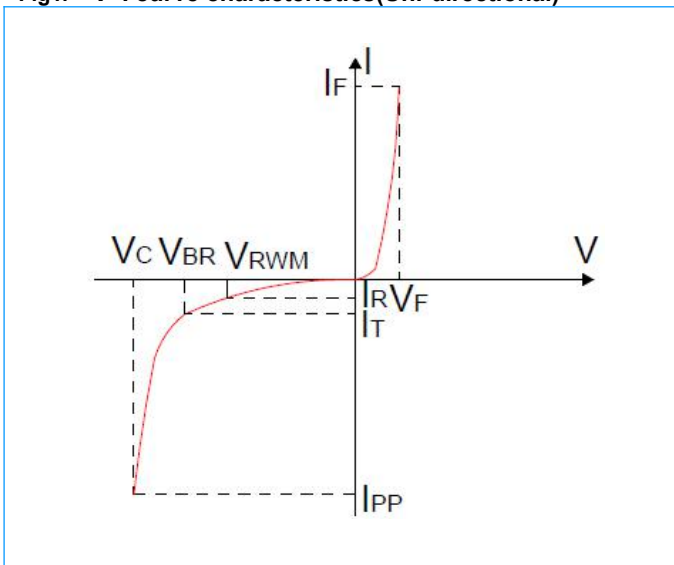
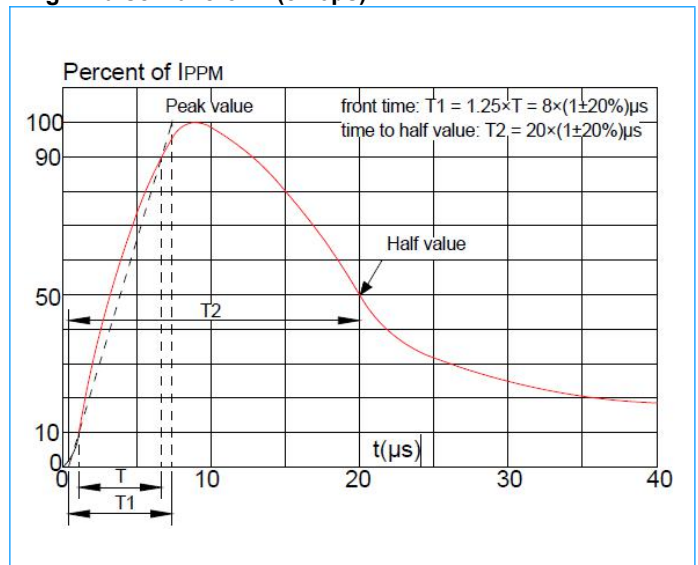


Fig2. Pulse waveform (8/20 μs)



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Ratings and V-I Characteristics Curves ($T_A=25^{\circ}\text{C}$, unless otherwise noted) Continue

Fig3. Pulse derating curve

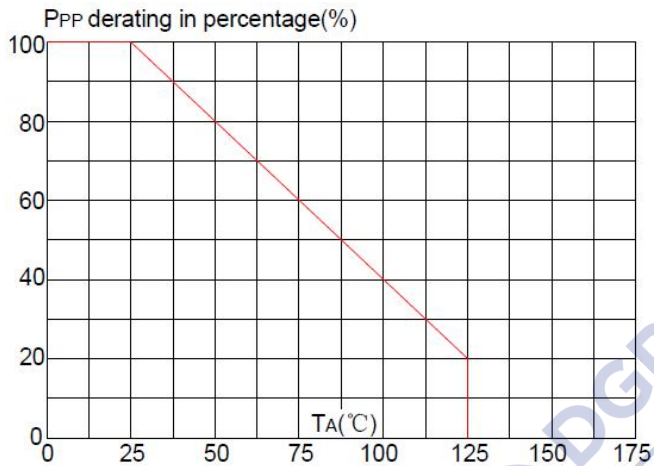


Fig4. ESD clamping (30KV contact)

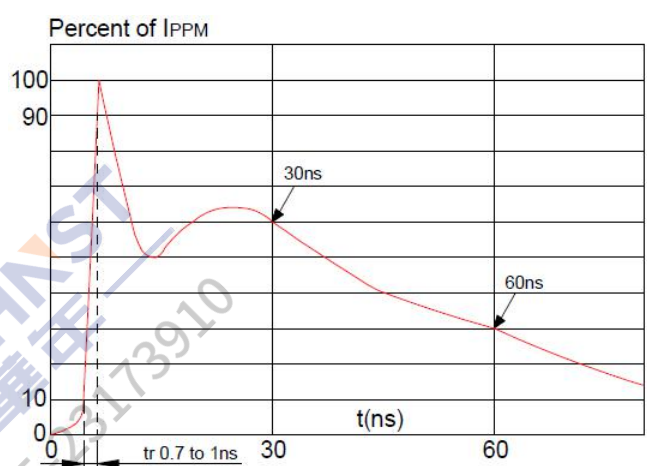


FIG.5:Clamping voltage vs.peak pulse current

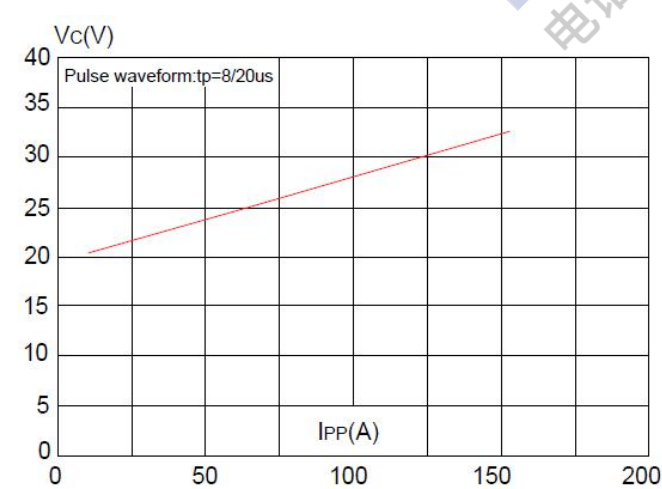
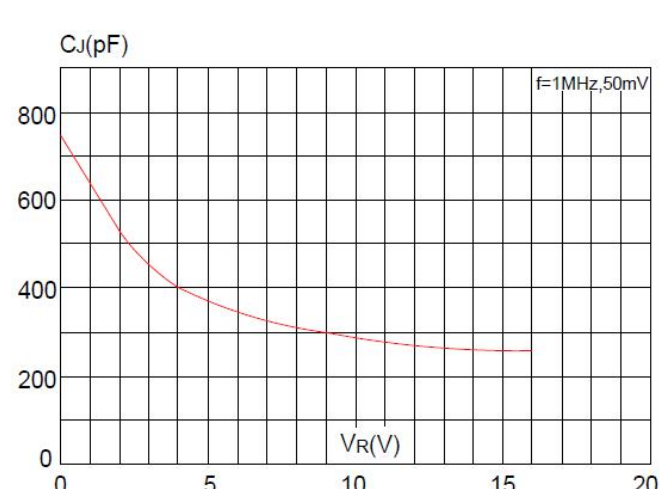


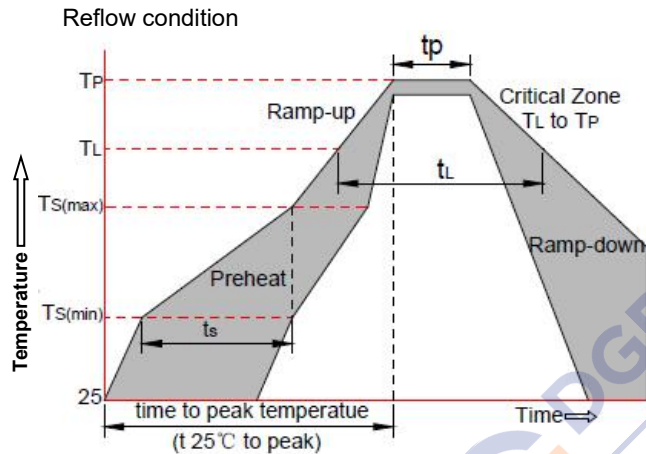
FIG.6:Capacitance vs.reverse voltage



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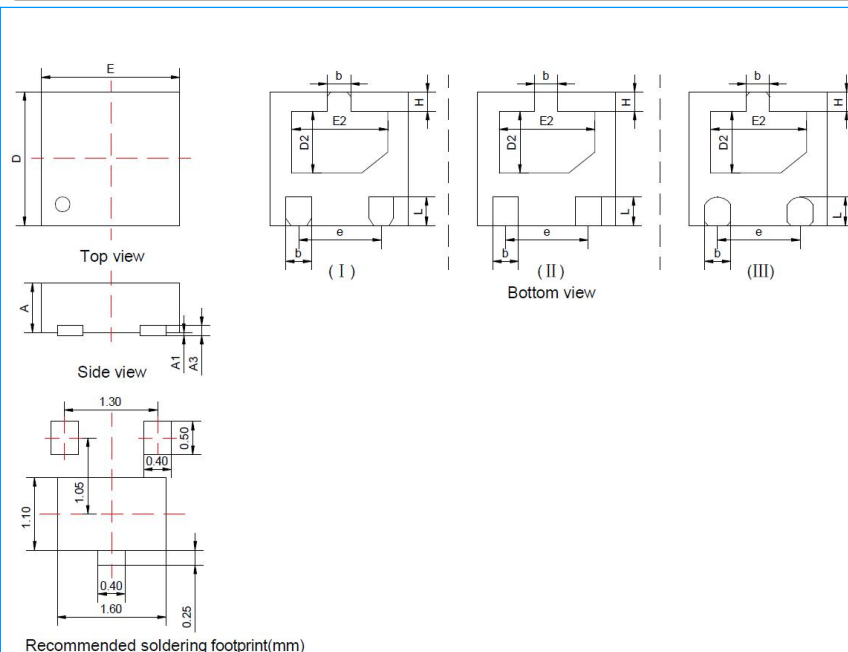
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Soldering Parameters



Reflow Condition		Pb-Free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max ($T_{s(max)}$)	+200°C
	-Time (min to max) (t_s)	60 - 180 Seconds
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/Second Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/Second Max
Reflow	- Temperature (T_L) (Liquidus)	+217°C
	-Temperature (t_L)	60 - 150 Seconds
Peak Temperature (T_P)		+260(+0/-5)°C
Time within 5°C of actual peak Temperature (t_P)		20-40 Seconds
Ramp-down Rate		6°C/Second Max
Time 25°C to peak Temperature (T_P)		8 minutes Max
Do not exceed		+260°C

Package Mechanical Data

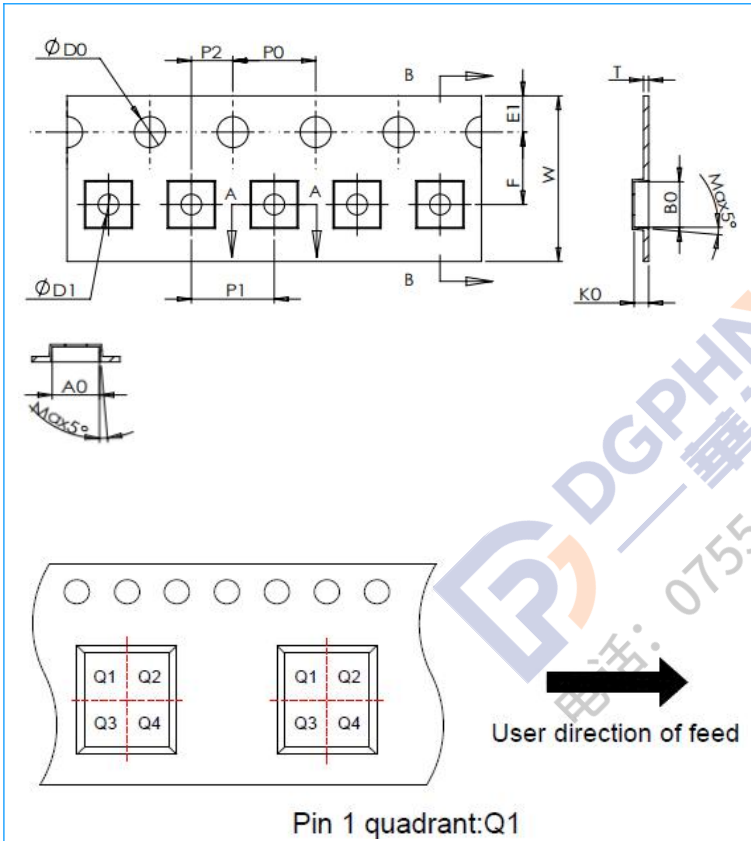


Symbol	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.45	0.50	0.60	0.018	0.020	0.024
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	0.15REF			0.006REF		
b	0.25	0.30	0.35	0.010	0.012	0.014
D	1.90	2.00	2.10	0.075	0.079	0.083
E	1.90	2.00	2.10	0.075	0.079	0.083
D2	0.85	1.05	1.15	0.033	0.041	0.045
E2	1.40	1.50	1.60	0.055	0.059	0.063
e	1.30BSC			0.051BSC		
H	0.20	0.25	0.30	0.008	0.010	0.012
L	0.35	0.40	0.45	0.014	0.016	0.018

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Tape and Reel Information - DFN2020-3L



Symbol	Millimeters	Inches
	Typ.	Typ.
W	8.00	0.315
P1	4.00	0.157
E1	1.75	0.069
F	3.50	0.138
D0	1.55	0.061
D1	1.00	0.039
P0	4.00	0.157
P1	4.00	0.157
P2	2.00	0.079
A0	2.20	0.087
B0	2.20	0.087
K0	0.70	0.028
T	0.23	0.009

Packaging Quantity

Part Number	Packaging Option	Quantity
SE12NMP11GN	Tape & Reel	3000 PCS