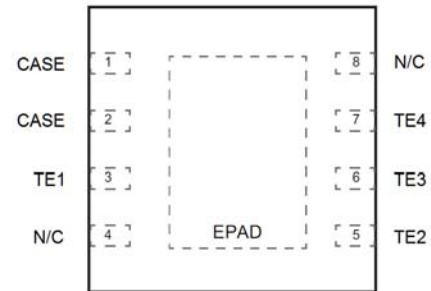


10SCT004A ULTRA-FAST TRANSIENT SURGE SUPPRESSOR

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- 20nSec Clamping Speed
- +/-12.0V Nominal Break-Over Voltage
- Small 2mm X 2mm package
- Case + 4 electrodes configuration
- Common terminal for expansion
- Case guaranteed to 10A/10mSec
- Electrodes guaranteed to 5A/10mSec
- Low Cost



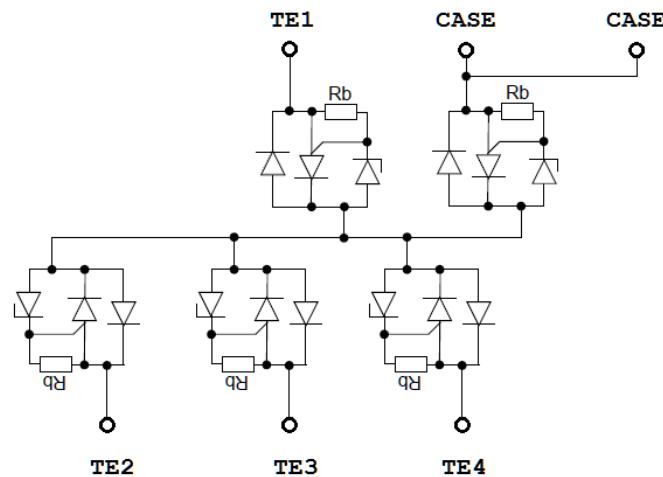
2mm x 2mm DFN-8
(Top View)

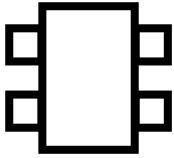
Description

The 10SCT004A is a 12V SCR array with 1 Case and 4 Terminal electrodes (TE_x) configuration. Case electrode can hold up to 10Amp and Terminal electrodes up to 5Amp for 10mSec. Common terminals are available for expanding the protection network or to provide positive (+11.0V) over-voltage protection with respect to ground. EPAD is not internally connected.

This SCR-based TVS is ultra fast with a typical clamping speed of 20nSec.

Block Diagram:

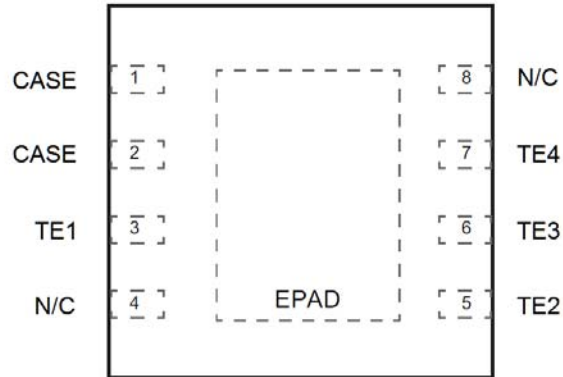




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Pin Configuration

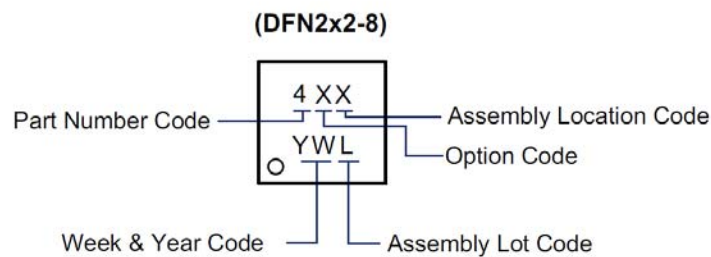


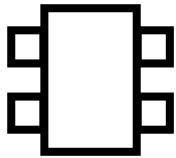
2mm x 2mm DFN-8
(Top View)

Pin Description

Number	Pin Name	Pin Function
1	Case	10A SCR to Common electrode, shorted to pin 2. Must connect both pin 1 and 2
2	Case	10A SCR to Common electrode, shorted to pin 1. Must connect both pin 1 and 2
3	TE1	5A SCR to Common electrode
4	N/C	Not connected
5	TE2	5A SCR to Common electrode
6	TE3	5A SCR to Common electrode
7	TE4	5A SCR to Common electrode
8	N/C	Not connected

Package Marking





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Absolute Maximum Rating

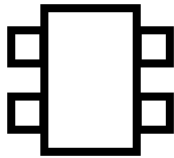
CASE current (10mSec)	10A
TERMINAL current (10mSec)	5A
Operation temperature	-40 C to 85 C
Storage temperature	-65 C to 150 C

Electrical DC Characteristics

T_A = 25C +/- 5C, unless otherwise specified.

TE_x = TE1, TE2, TE3 and TE4

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
I _{LT}	TERMINAL TE _x Leakage Current	V(TE _x) = 8.0V; Measure Current	0	20	100	nA
I _{LC}	CASE Leakage Current	V(CASE) = 8.0V; Measure Current	0	40	200	nA
V _{BR}	TERMINAL TE _x Breakdown Voltage	I(TE _x) = 1mA ; V(CASE) = 0V	9.20	9.85	10.50	V
V _{TBO}	TERMINAL TE _x Break-Over Voltage	Current 0-1A in 1uSec, report maximum voltage	11.0	12.0	13.0	V
I _{TBO}	TERMINAL TE _x Break-Over Current	Current 0-1A in 1uSec, report current at maximum voltage	15	80	200	mA
V _{CBR}	CASE Breakdown Voltage	I(CASE) = 2mA V(TE1) = V(TE2) = 0V	9.20	9.85	10.50	V
V _{CBO}	CASE Break-Over Voltage	Current 0-2A in 1uSec, report maximum voltage, V(TE1) = V(TE2) = 0V	11.0	12.0	13.0	V
I _{CBO}	CASE Break-Over Current	Current 0-2A in 1uSec, report current at maximum voltage, V(TE1) = V(TE2) = 0V	30	150	400	mA
V _{TE1}	Terminal 1A Voltage	I(TE1) = 1A for 10uSec V(TE4) = 0V	2.0	3.2	4.0	V
V _{TE5}	Terminal 5A Voltage	I(TE1) = 5A for 10mSec V(TE4) = 0V	3.0	4.2	5.0	V
V _{CA2}	Case 1A Voltage	I(CASE) = 2A for 10uSec V(TE1) = V(TE2) = V(TE3) = V(TE4) = 0V	2.0	3.2	4.0	V
V _{CA10}	Case 10A Voltage	I(CASE) = 10A for 10mSec V(TE1) = V(TE2) = V(TE3) = V(TE4) = 0V	3.0	4.2	5.0	V



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Electrical DC Characteristics (Continued)

$T_A = 25C \pm 5C$, unless otherwise specified.

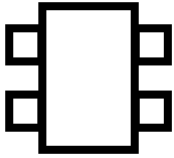
TE_x = TE1, TE2, TE3 and TE4

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V _{BRG}	TERMINAL TE _x Breakdown Voltage	I(TE _x) = 1mA ; V(COMMON) = 0V	8.60	9.25	9.90	V
V _{TBOG}	TERMINAL TE _x Break-Over Voltage	Current increase from 0 to 1A in 1uSec; V(COMMON) = 0V; Report maximum voltage	9.0	10.0	11.0	V
V _{CBRG}	CASE Breakdown Voltage	I(CASE) = 2mA; V(COMMON) = 0V	15	80	200	V
V _{CBOG}	CASE Break-Over Voltage	Current increase from 0 to 2A in 1uSec; V(COMMON) = 0V; Report maximum voltage	8.60	9.25	9.90	V
V _{TE1G}	Terminal 1A Voltage	I(TE1) = 1A for 10uSec V(COMMON) = 0V	0.7	0.9	1.2	V
V _{TE5G}	Terminal 5A Voltage	I(TE1) = 5A for 10mSec V(COMMON) = 0V	1.0	1.4	1.8	V
V _{CA2G}	Case 1A Voltage	I(CASE) = 2A for 10uSec V(COMMON) = 0V	0.7	0.9	1.2	V
V _{CA10G}	Case 10A Voltage	I(CASE) = 10A for 10mSec V(COMMON) = 0V	1.0	1.4	1.8	V

Electrical Transient Characteristics

$T_A = 25C \pm 5C$, unless otherwise specified.

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{TBO}	Terminal Break-Over time	Current 0-1A in 1uSec, measure time between V(V _{TBR})+1V and V(V _{TBO})+1V V(CASE) = 0V	0	20	50	nSec
t _{CBO}	Case Break-Over time	Current 0-1A in 1uSec, measure time between V(V _{CBR})+1V and V(V _{CBO})+1V V(TE1) = V(TE2) = 0V	0	20	50	nSec
C _{TT}	TE1-TE2 Capacitance	10kHz 100mVp V(TE1) = V(TE2) = 0V	0	10	20	pF
C _{CT}	Case-TE _x Capacitance	10kHz 100mVp V(CASE) = V(TE1) = 0V;	0	20	40	pF



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Typical Charts

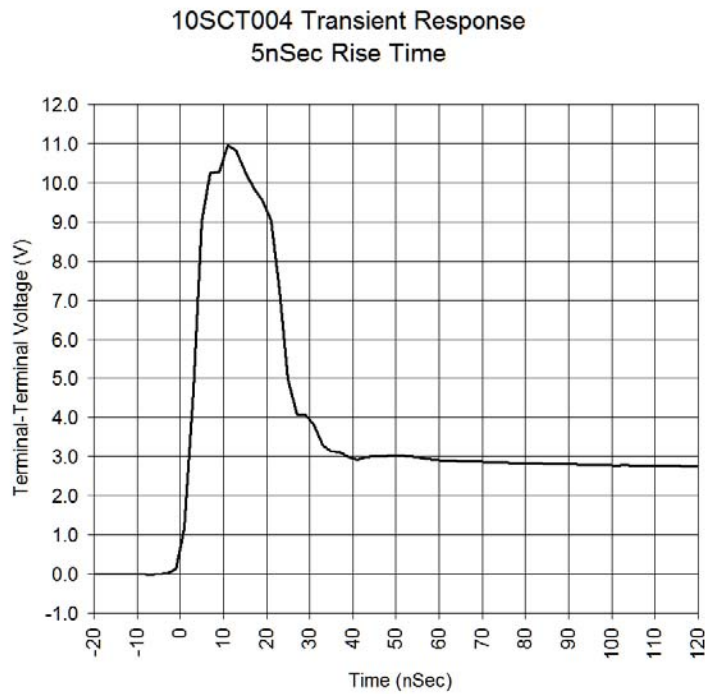
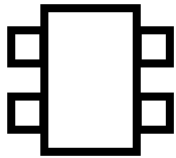


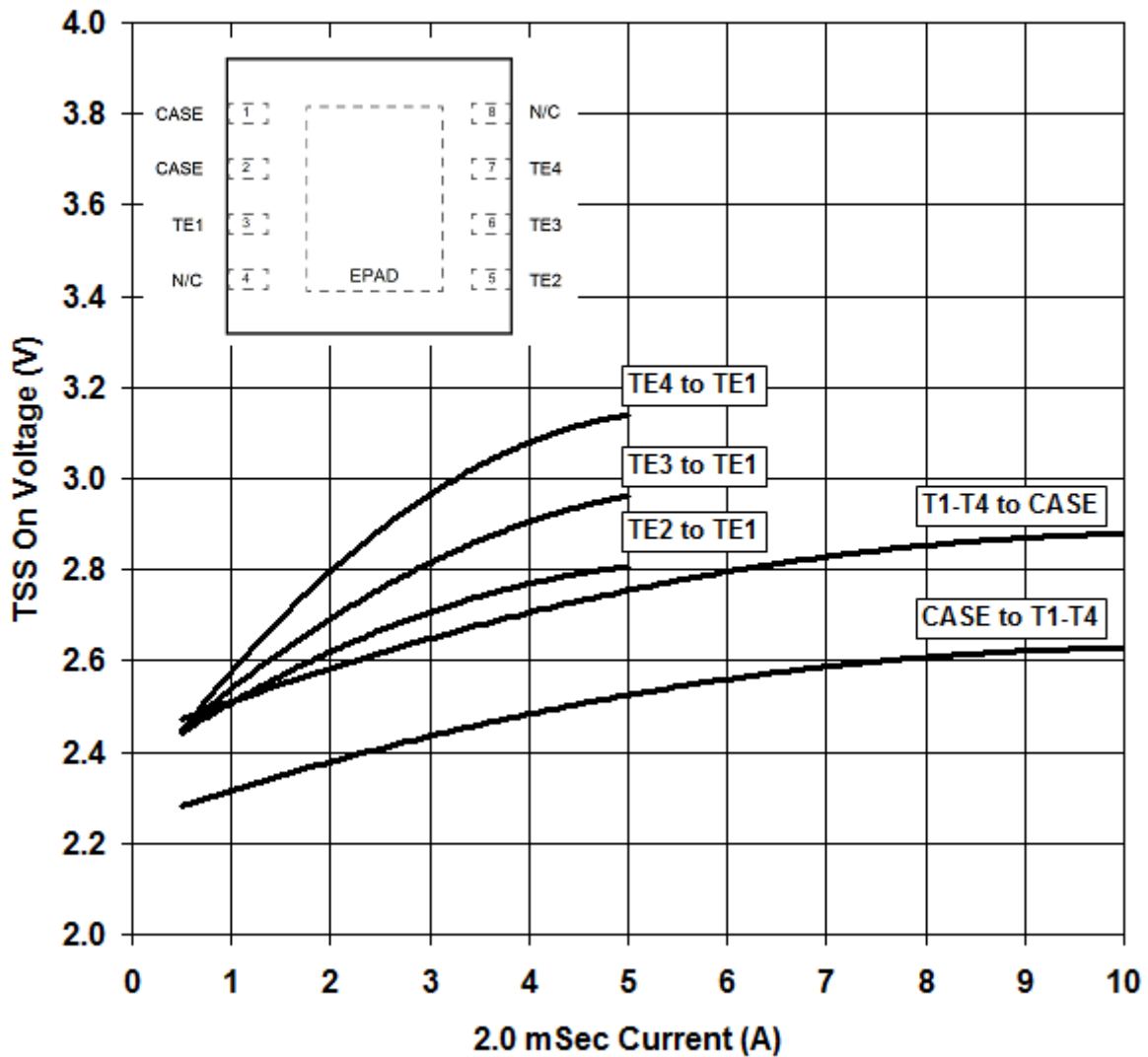
Fig. 1: SCR switching characteristics. Current is switched from 0 to 0.5A in <10nSec and SCR responds from 11V (peak) to about 3.8V in about 20nSec.

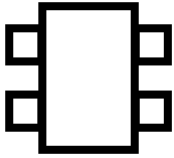


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Typical Clamping (Kelvin) Voltage after 2mSec Pulse across Terminals





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Spice Model (Nominal)

* Spice Model for 10SCT004A

```
.subckt 10sct004A CASE T1 T2 T3 T4 Common
XX1 Common T1 scrcellv2
XX2 Common T2 scrcellv2
XX3 Common T3 scrcellv2
XX4 Common T4 scrcellv2
XX5 Common CASE scrcellv2 params: NUNITS = {56.7*2}

.subckt scrcellv1p2 Anode Cathode

.PARAM NUNIT=51.8
Q1 NPNbase ESD03 N001 PNPA {NUNIT} OFF
RshuntPNP N001 PNPbase {3000/NUNIT}
D1 Anode ESD01 DZ {NUNIT}
RshuntNPN NPNbase Anode {500/NUNIT}
Q2 ESD03 P001 Anode NPNA {NUNIT}
R1NDCAP PNPbase ESD01 {150/NUNIT}
R2NDCAP ESD03 PNPbase {30/NUNIT}
D2 Anode N002 DZ2 {NUNIT}
R1 Cathode N001 {6.08/NUNIT}
R2 NPNbase P001 {1/NUNIT}
D3 N002 N001 DZ2 {NUNIT}

.model DZ D(Is={89*5*.001f} N=1.0500 Rs=.24711 Ikf=1.0080 Cjo=80f
+ M=.35891 Vj=.77639 Isr=1.6251E-14 Nr=3.4 Bv=9.0 Ibv=1e-6
+ tt=18.2n Nbv=3 Tbv1=0.00081 Ibv1=10e-9 nbv1=14)

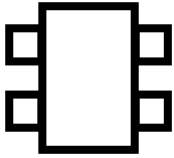
.model PNPA PNP(IBC={1E-14} IBE=1e-14 ISC=1e-15 VAF=500 BF=200 IKF=0.4 XTB=1.5 BR=4
+ CJC={0} CJE={0} RB=0.2 RC=0.1 RE=0.1
+ TR=10.0E-9 TF=10.90E-9 ITF=1 VTF=2 XTF=3 XTI=3 eg=0.9)

.model NPNA NPN(IS=1E-14 VAF=100 Bf=300 IKF=0.4 XTB=1.5 BR=20
+ CJC={0} CJE={0} RB=0.2 RC=0.1 ISC=1e-15
+ RE=0.1 TR=5.0E-9 TF=2.4E-9 ITF=1 VTF=2 XTF=3)

.model DZ2 D(Is={5*.001f} N=1.1500 Rs=.24711 Ikf=1.0080 Cjo=100f
+ M=.35891 Vj=.77639 Isr=1.6251E-14 Nr=3.4 Bv=26.0 Ibv=1e-9
+ tt=18.2n Nbv=0.4 Tbv1=0.00081)

.ends scrcellv1p2

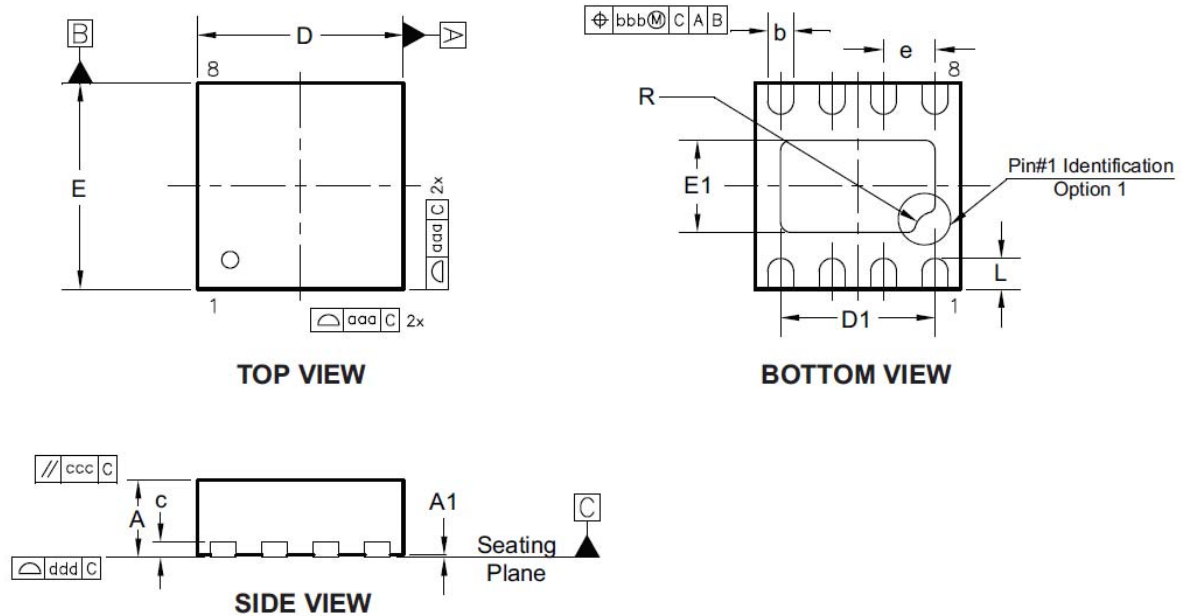
.ends 10SCT004A
```



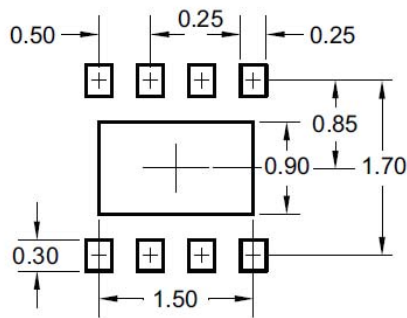
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Package dimensions:



RECOMMENDED LAND PATTERN



UNIT: mm

Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
b	0.18	0.25	0.30
c	0.20 REF		
D	1.90	2.00	2.10
D1	1.10	1.50	1.60
E	1.90	2.00	2.10
E1	0.50	0.90	1.00
e	0.50 BSC		
L	0.20	0.30	0.40
R	0.20		
aaa	0.15		
bbb	0.10		
ccc	0.10		
ddd	0.08		