

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter		Rating	Unit
V _{DSS}	Drain-Source Voltage		-30	V
V _{GSS}	Gate-Source Voltage		±25	
I _D *	Continuous Drain Current	V _{GS} =-10V	-4.9	A
I _{DM} *	Pulsed Drain Current		-20	
I _S *	Diode Continuous Forward Current		-2	A
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
P _D *	Power Dissipation for Single Operation	T _A =25°C	2	W
		T _A =100°C	0.8	
R _{θJA} *	Thermal Resistance-Junction to Ambient		62.5	°C/W

Note:

*Surface Mounted on 1in^2 pad area, $t \leq 10\text{sec}$.
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	SM4953K			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0V			-1	μA
		T _J =85°C			-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	-1	-1.5	-2	V
I _{GSS}	Gate Leakage Current	V _{GS} =±25V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-4.9A		53	60	mΩ
		V _{GS} =-4.5V, I _{DS} =-3.6A		80	95	
V _{SD} ^a	Diode Forward Voltage	I _{SD} =-1.7A, V _{GS} =0V		-0.8	-1.3	V
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-10V, I _{DS} =-4.9A		11.6	16	nC
Q _{gs}	Gate-Source Charge			1.3		
Q _{gd}	Gate-Drain Charge			2.5		

Electrical Characteristics (Cont.) ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	SM4953K			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics ^b						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz		8		Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, Frequency=1.0MHz		625		pF
C _{oss}	Output Capacitance			100		
C _{rss}	Reverse Transfer Capacitance			60		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, R _L =15Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω		6	12	ns
t _r	Turn-on Rise Time			12	23	
t _{d(OFF)}	Turn-off Delay Time			25	46	
t _f	Turn-off Fall Time			6	12	
t _{rr}	Reverse Recovery Time	I _{DS} =-4.9A,		14		ns
Q _{rr}	Reverse Recovery Charge	di _{SD} /dt=100A/μs		5		nC

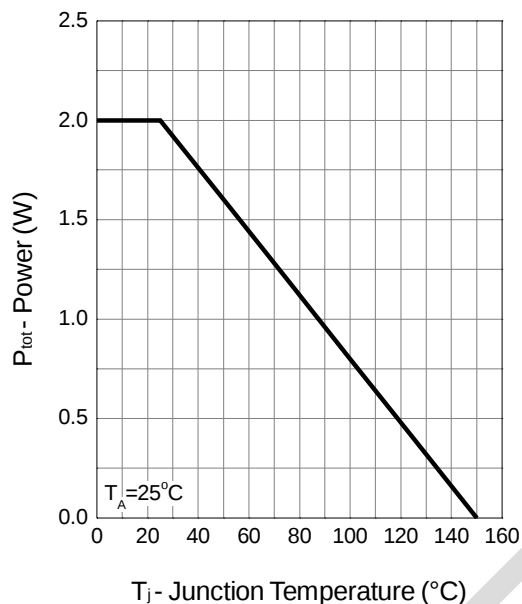
Notes:

a : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

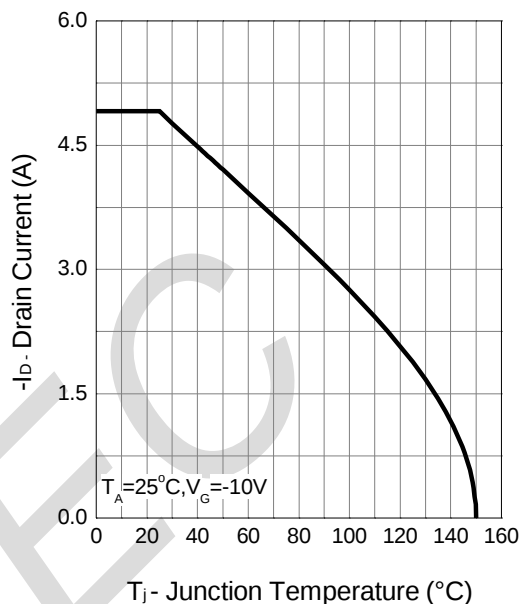
b : Guaranteed by design, not subject to production testing.

Typical Characteristics

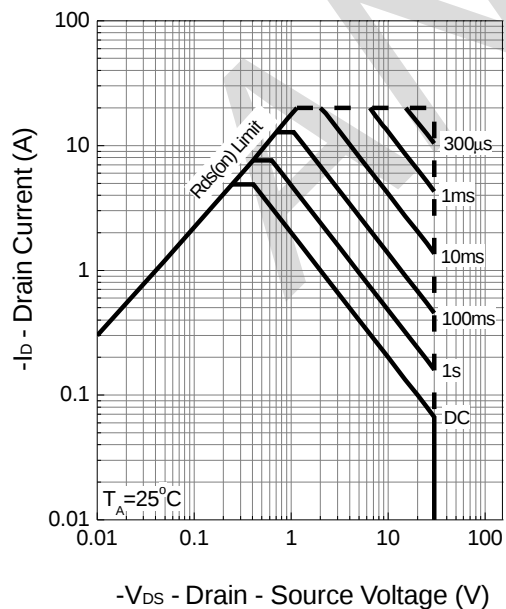
Power Dissipation



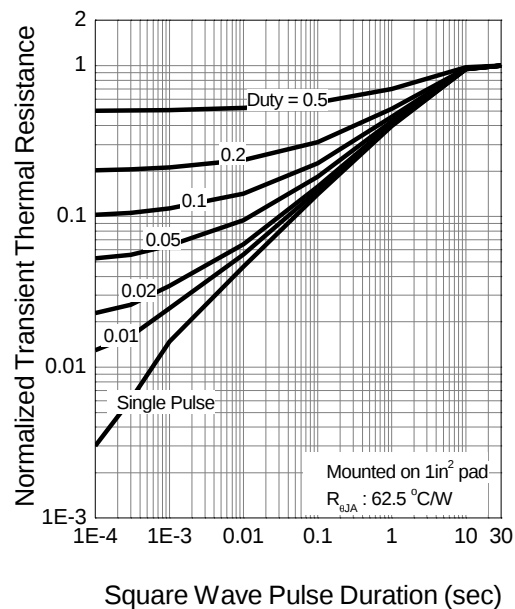
Drain Current



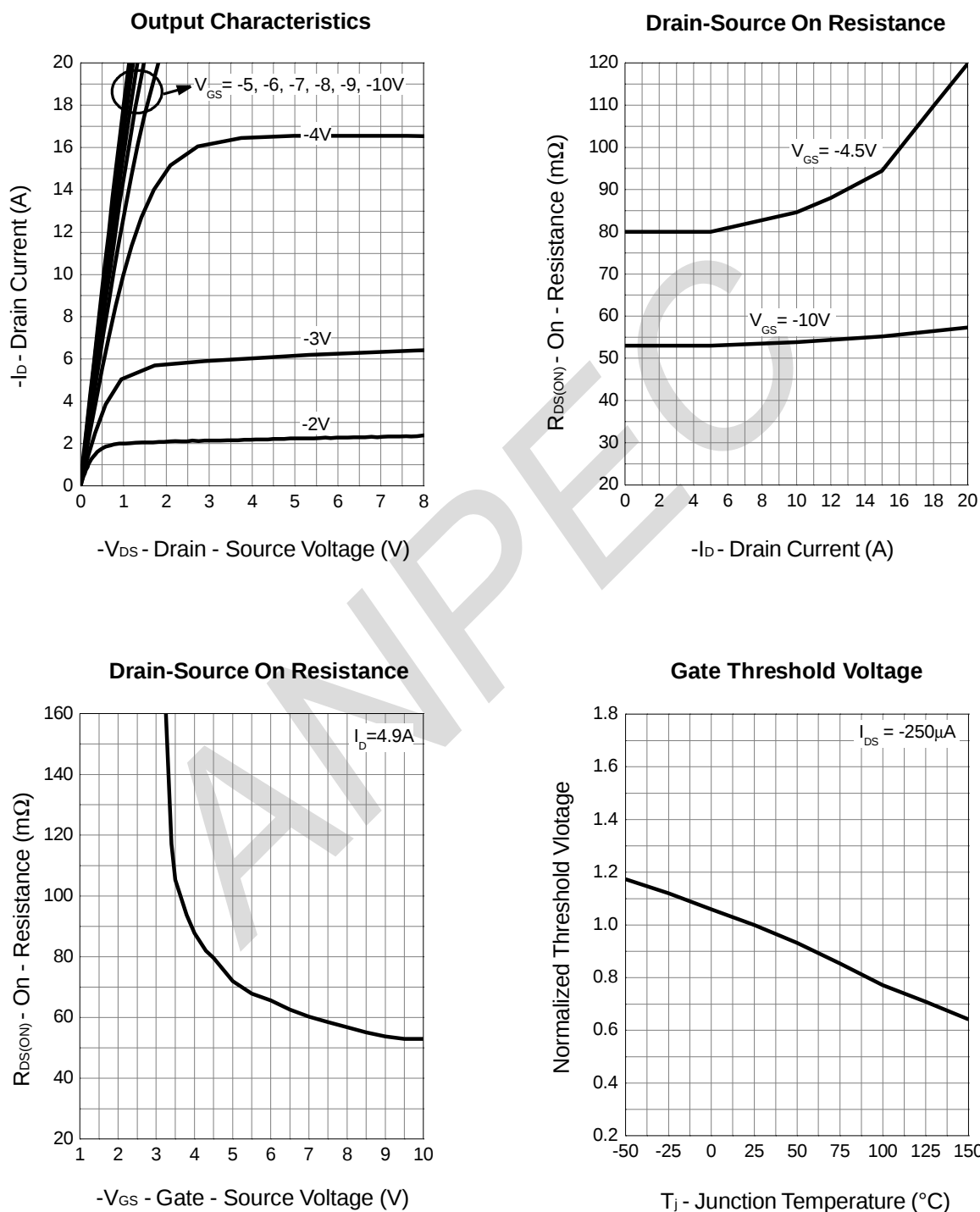
Safe Operation Area



Thermal Transient Impedance

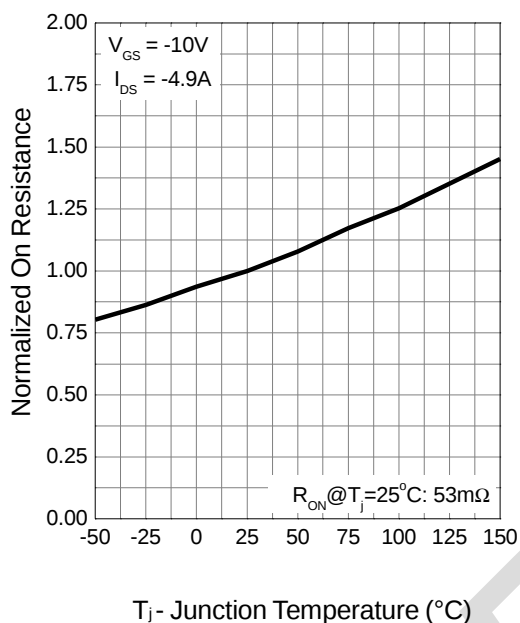


Typical Characteristics (Cont.)

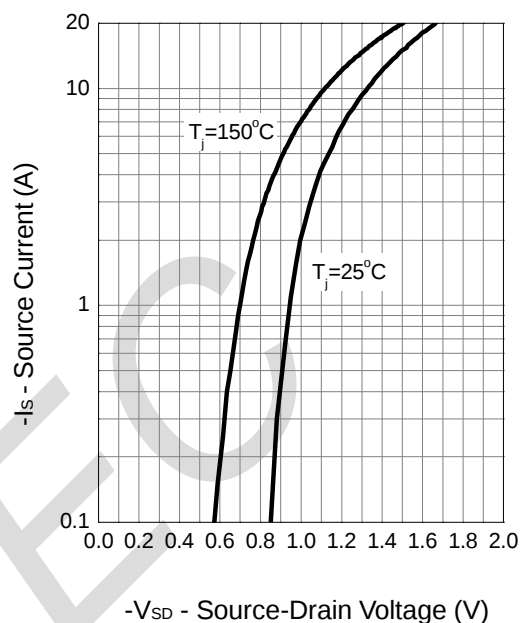


Typical Characteristics (Cont.)

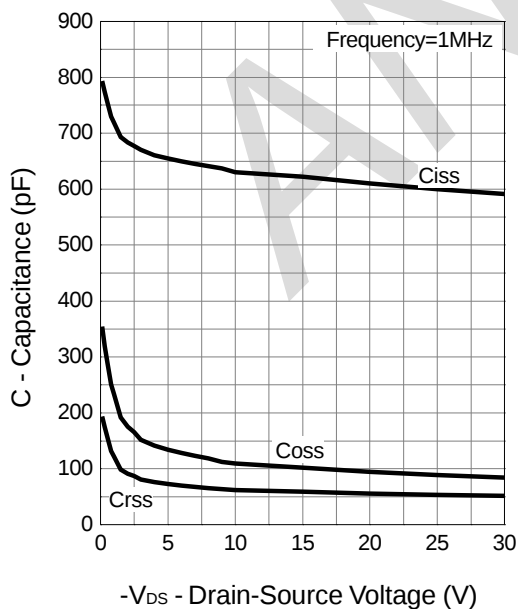
Drain-Source On Resistance



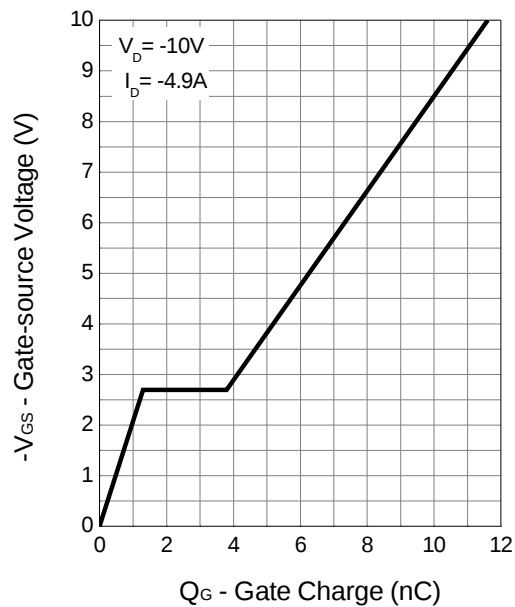
Source-Drain Diode Forward



Capacitance

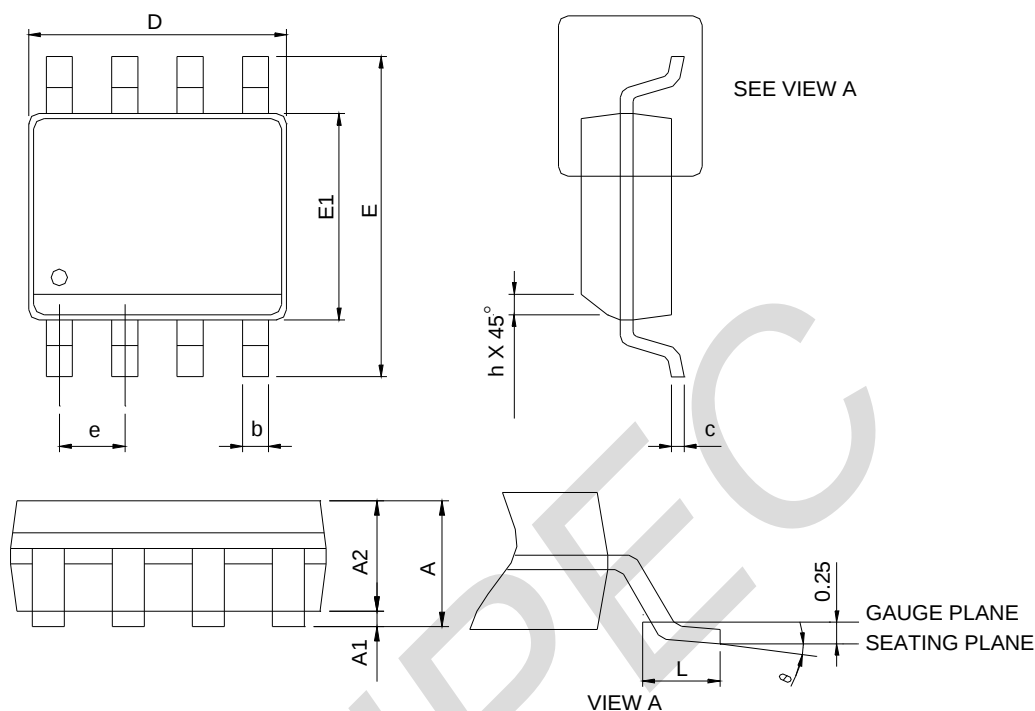


Gate Charge



Package Information

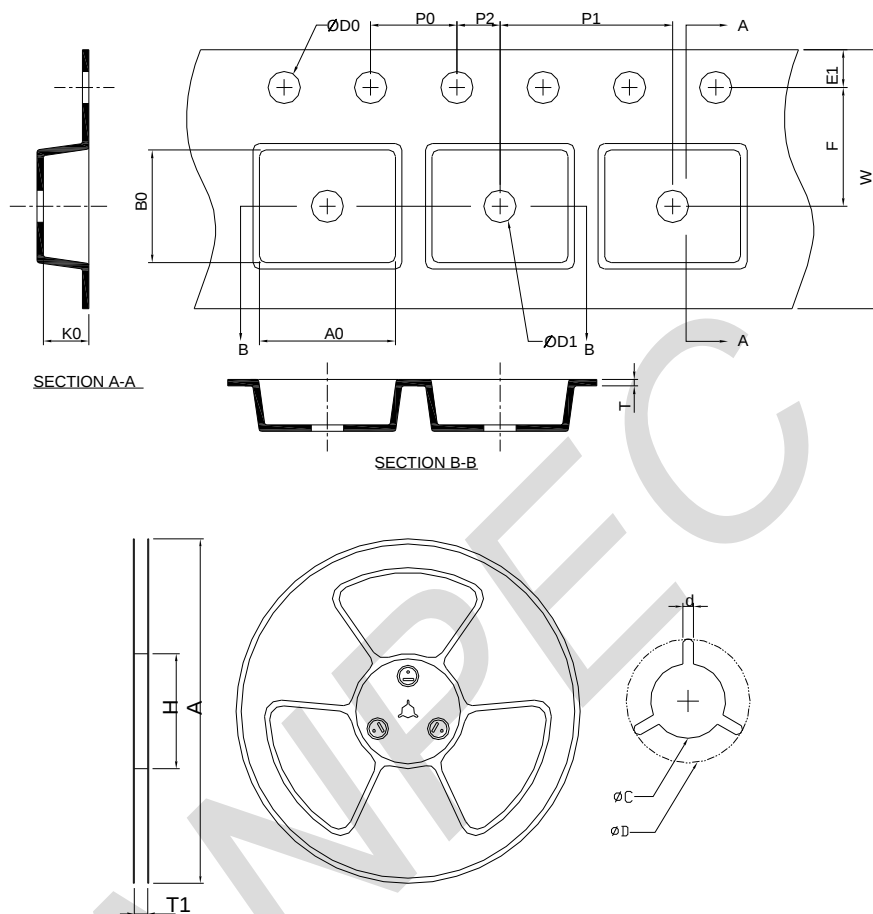
SOP-8



SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.75		0.069
A1	0.10	0.25	0.004	0.010
A2	1.25		0.049	
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

- Note: 1. Follow JEDEC MS-012 AA.
 2. Dimension "D" does not include mold flash, protrusions or gate burrs.
 Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
 3. Dimension "E" does not include inter-lead flash or protrusions.
 Inter-lead flash and protrusions shall not exceed 10 mil per side.

Carrier Tape & Reel Dimensions



Application	A	H	T1	C	d	D	W	E1	F
SOP-8	330.0 ±2.00	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0 ±0.30	1.75 ±0.10	5.5 ±0.05
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.0 ±0.10	8.0 ±0.10	2.0 ±0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40 ±0.20	5.20 ±0.20	2.10 ±0.20

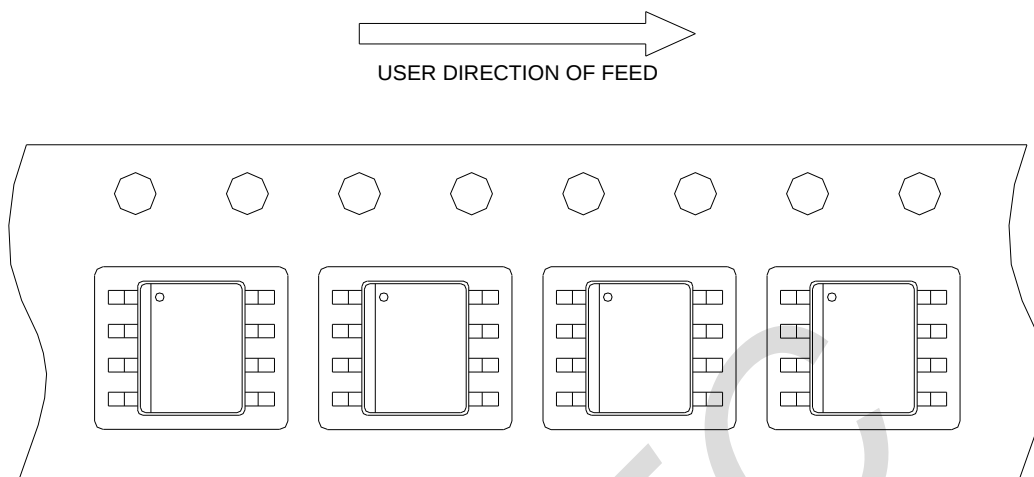
(mm)

Devices Per Unit

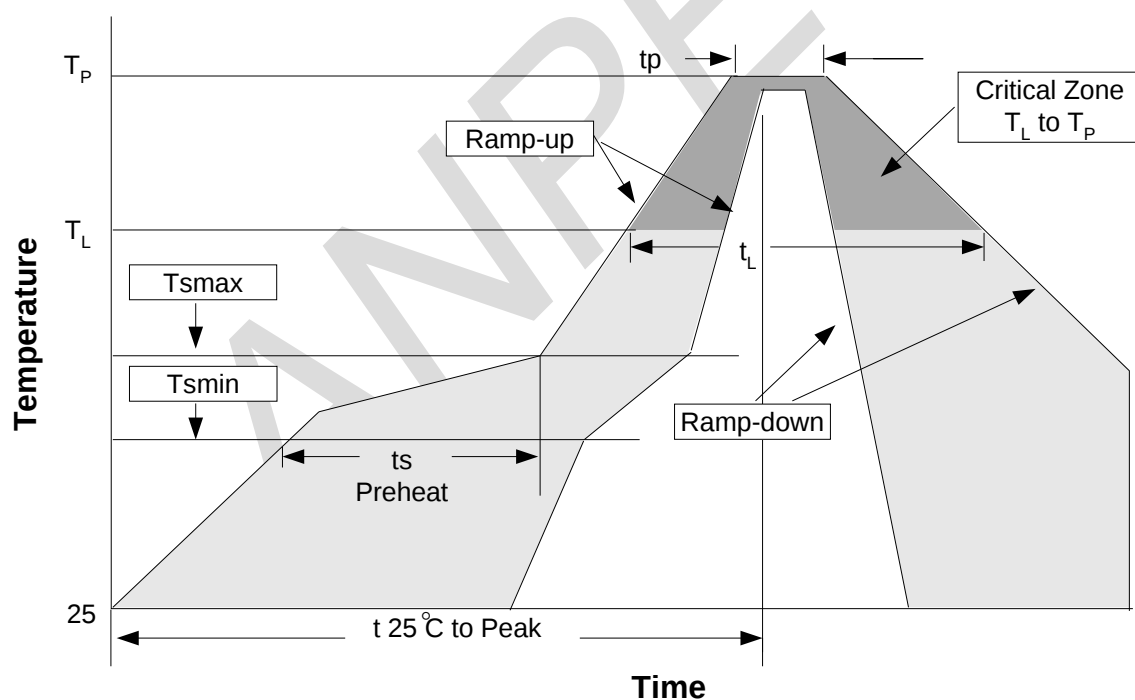
Package Type	Unit	Quantity
SOP- 8	Tape & Reel	2500

Taping Direction Information

SOP-8



Reflow Condition (IR/Convection or VPR Reflow)



Reliability Test Program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C, 5 sec
HOLT	MIL-STD-883D-1005.7	1000 Hrs Bias @125°C
PCT	JESD-22-B, A102	168 Hrs, 100%RH, 121°C
TST	MIL-STD-883D-1011.9	-65°C~150°C, 200 Cycles

Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.	3°C/second max.
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (min to max) (ts)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: - Temperature (T_L) - Time (t_L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak/Classification Temperature (T_P)	See table 1	See table 2
Time within 5°C of actual Peak Temperature (tp)	10-30 seconds	20-40 seconds
Ramp-down Rate	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Note: All temperatures refer to topside of the package. Measured on the body surface.

Table 1. SnPb Eutectic Process – Package Peak Reflow Temperatures

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥ 350
<2.5 mm	240 +0/-5°C	225 +0/-5°C
≥2.5 mm	225 +0/-5°C	225 +0/-5°C

Table 2. Pb-free Process – Package Classification Reflow Temperatures

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 +0°C*	260 +0°C*	260 +0°C*
1.6 mm – 2.5 mm	260 +0°C*	250 +0°C*	245 +0°C*
≥2.5 mm	250 +0°C*	245 +0°C*	245 +0°C*

*Tolerance: The device manufacturer/supplier **shall** assure process compatibility up to and including the stated classification temperature (this means Peak reflow temperature +0°C. For example 260°C+0°C) at the rated MSL level.

Customer Service

Anpec Electronics Corp.

Head Office :

No.6, Dusing 1st Road, SBIP,

Hsin-Chu, Taiwan, R.O.C.

Tel : 886-3-5642000

Fax : 886-3-5642050

Taipei Branch :

2F, No. 11, Lane 218, Sec 2 Jhongsing Rd.,

Sindain City, Taipei County 23146, Taiwan

Tel : 886-2-2910-3838

Fax : 886-2-2917-3838