N-Channel Enhancement Mode MOSFET

Feature

- 30V/10A zDS(ON)c0 Tw( )Tj/TT9 1 T-477791(TD6969( )8.1268)8[=8.5)101(mc0 T85353
- Reliable and Rugged
- Halogen Free and Green Devices Available (RoHS Compliant)

Pin Description

Applications

- Power Management for DC/DC
- Switching Application
- Battery Protection

Ordering and Marking Information

S G110N03 XYMXXXXXX	Package Code S: SOP8L Date Code XYMXXXXXX

Note:HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plateTermi-Nationfinish;which are fully compliant with RoHS.HUAYI lead-free products meet or exceed the lead-Free require-ments of IPC/JEDEC J-STD-020 for MSL classification at lead-fr on65.2l0()-.((ak(f)7-4.9re of)-9.l(i)4.3(o)-8.2()-13(ed t)-11.9(e)

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	V
T_J	Junction Temperature Range		-55 to 175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Source Current-Continuous(Body Diode)	Tc=25°C	10	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25°C	40	A
I_D	Continuous Drain Current	Tc=25°C	10	A
		Tc=100°C	7	A
P_D	Maximum Power Dissipation	Tc=25°C	2.5	W
		Tc=100°C	1.25	W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient		60	°C/W
E_{AS}	SinglePulsed-Avalanche Energy **	L=0.3mH	22	mJ

Note: * Repetitive rating pulse width limited by max.junction temperature.
** Limited by $T_J$max , starting T_J=25°C, L = 0.3mH, R_G= 25Ω, V_{GS} =10V.

Electrical Characteristics(Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG110N03LR1			Unit
			Min	Typ.	Max	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_{DS}=250μA	30	-		V
I_{DSS}	Drain-to-Source LeakageCurrent	V_{DS}=30V,V_{GS}=0V	-	-	1	μA
		T_J=125°C	-	-	50	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1	1.8	3	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}= 20V,V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$*	Drain-Source On-State Resistance	V_{GS}=10V,I_{DS}=10A		8.5	11.5	mΩ
		V_{GS}=4.5V,I_{DS}=5A		12.5	16.5	
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=1A,V_{GS}=0V	-	0.68	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=10A,dI_{SD}/dt=100A/μs	-	8	-	ns
Q_{rr}	Reverse Recovery Charge		-	10	-	nC

Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG110N03LR1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Frequency=1.0MHz	-	0.6	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V,	-	731	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V,	-	87	-	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	69	-	
$t_{d(ON)}$	Turn-on Delay Time		-	4	-	ns
T_r		V_{DD}=25V,R_G=3Ω, I_{DS}=10A,V_{GS}=10V				

Typical Operating Characteristics

Figure 1: Power Dissipation

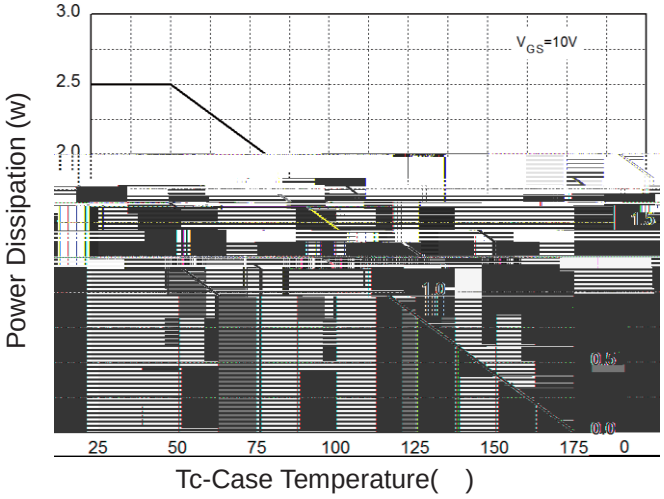


Figure 2: Drain Current

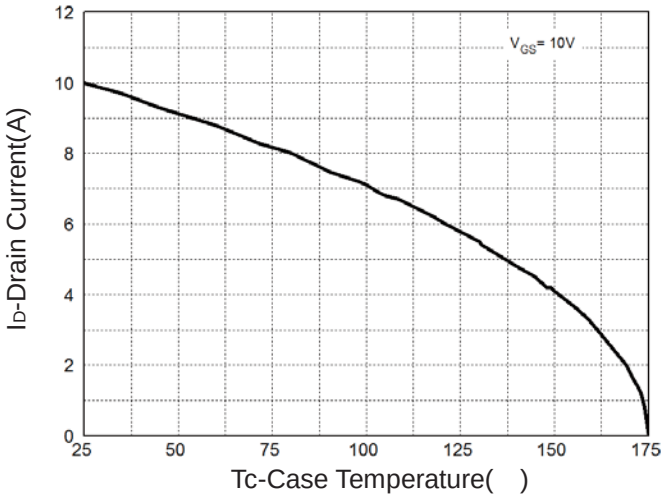


Figure 3: Safe Operation Area

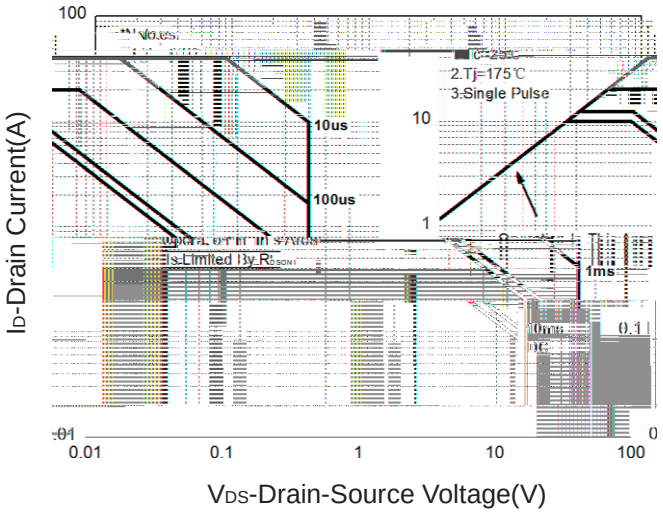


Figure 4: Thermal Transient Impedance

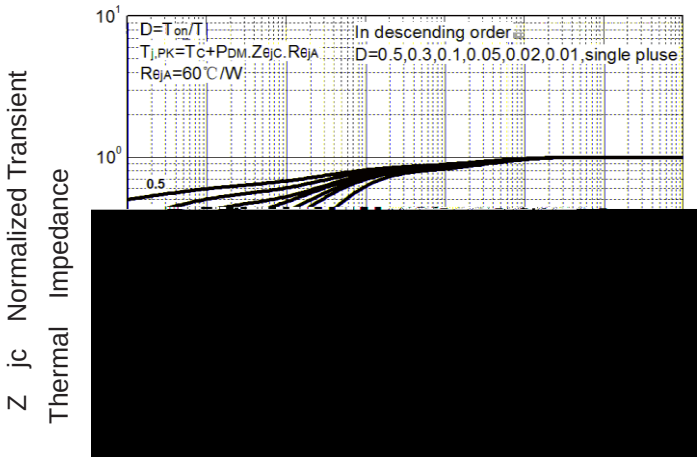


Figure 5: Output Characteristics

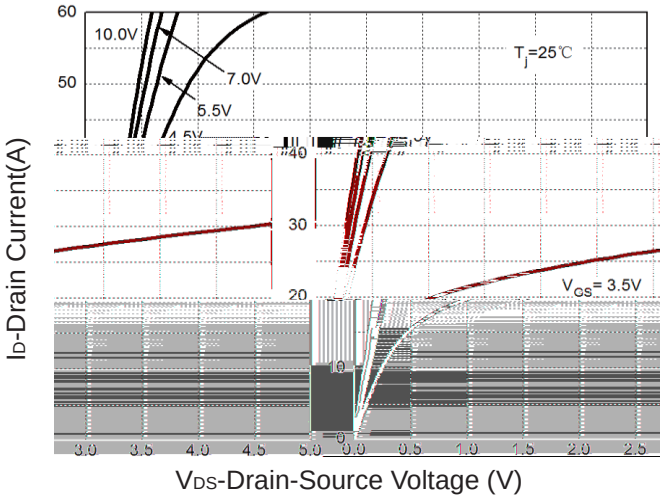
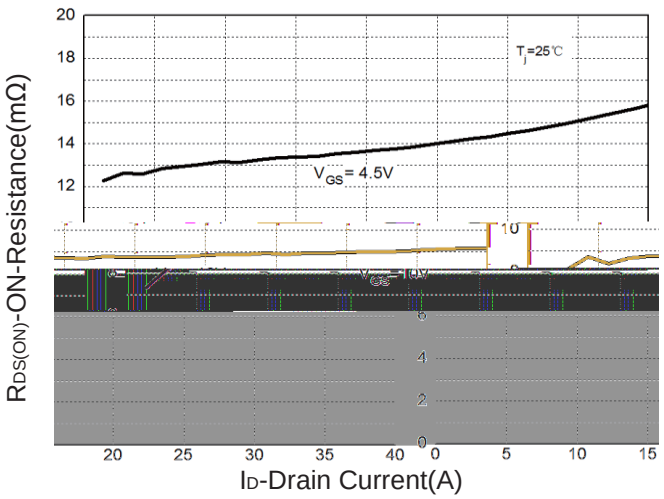


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics

Figure 7: On-Resistance vs. Temperature

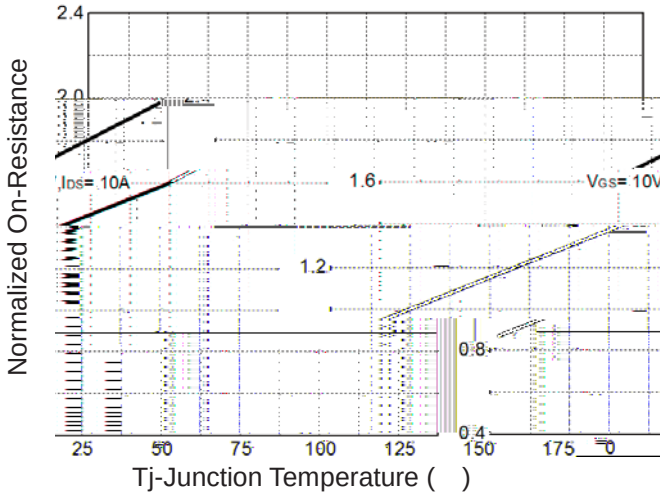


Figure 8: Source-Drain Diode Forward

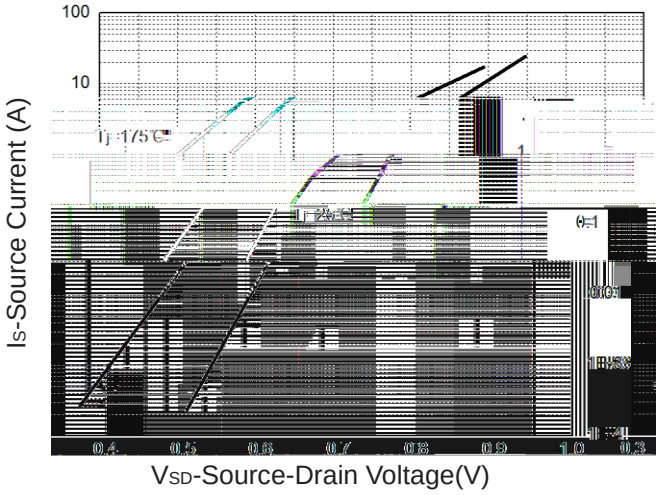


Figure 9: Capacitance Characteristics

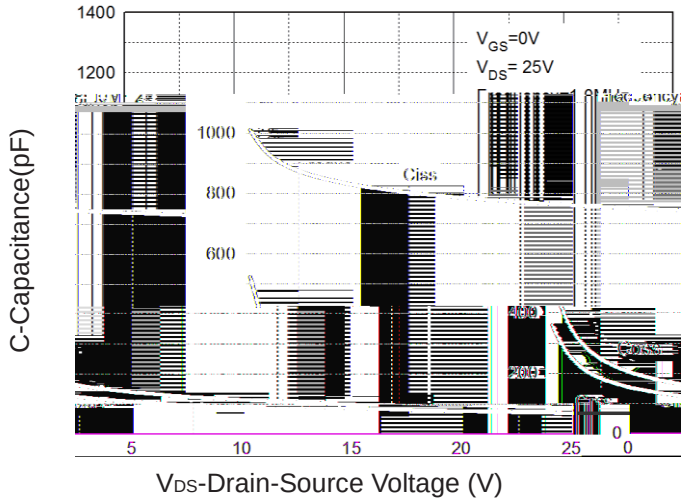
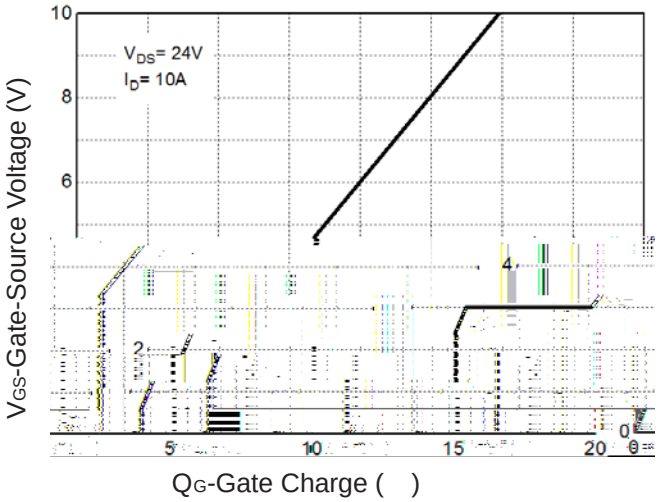


Figure 10: Gate Charge Characteristics



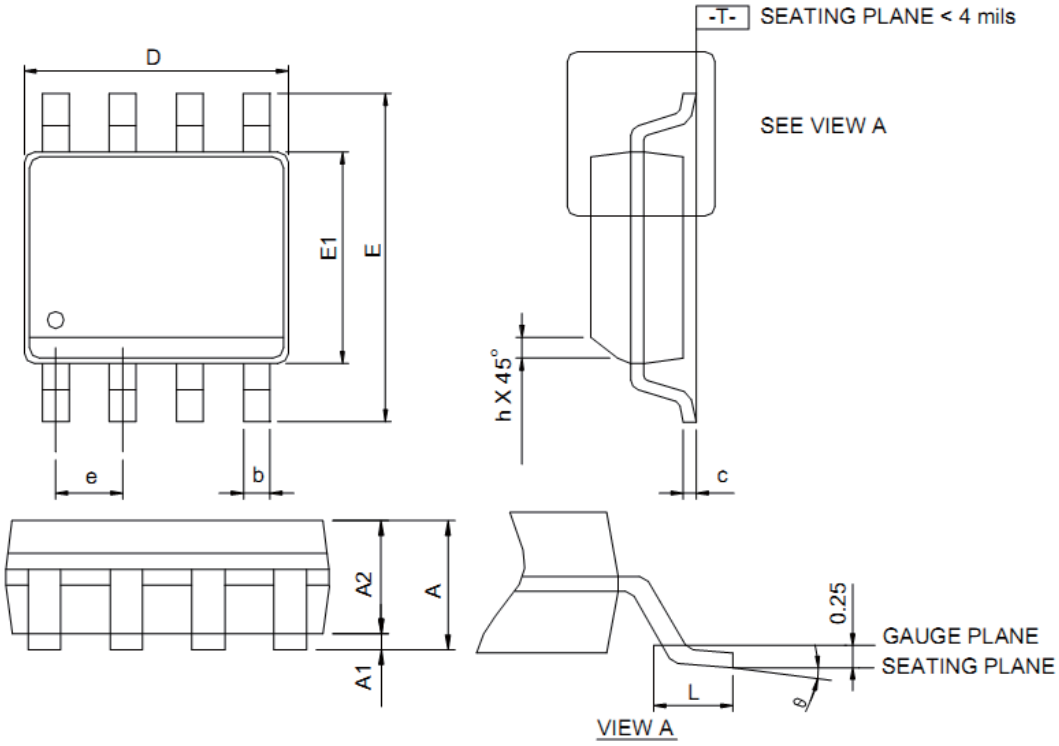
HYG110N03LR1S

Device Per Unit

Package Type	Unit	Quantity
SOP8L	Reel	2500

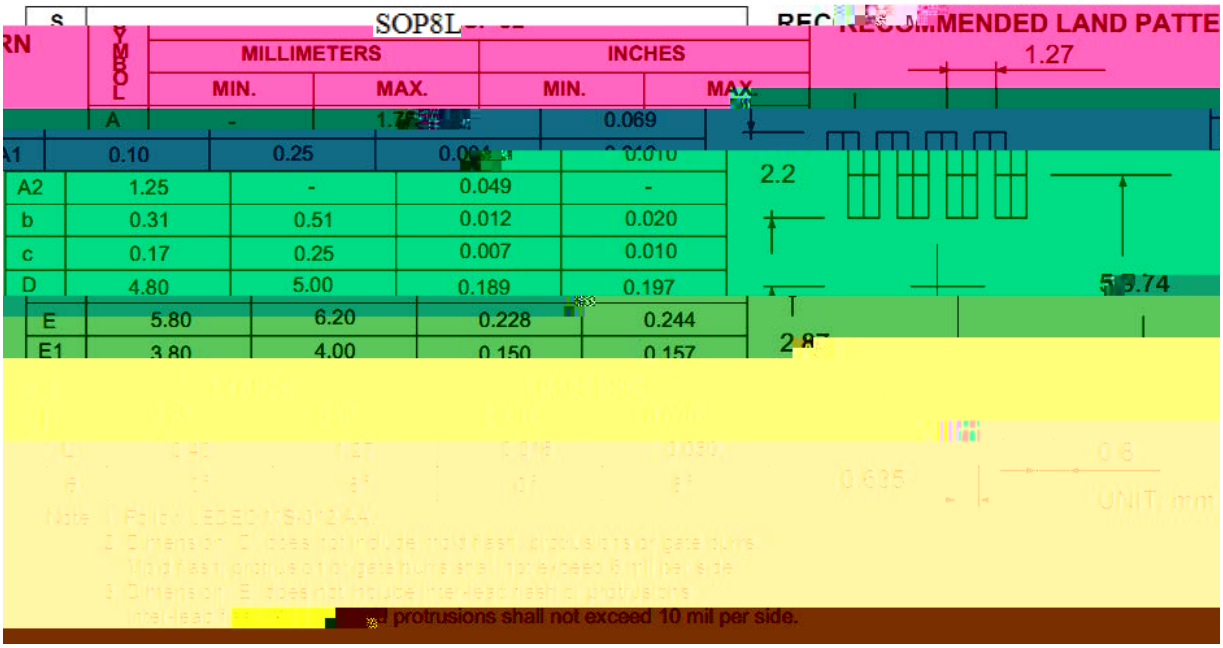
Package Information

SOP8L

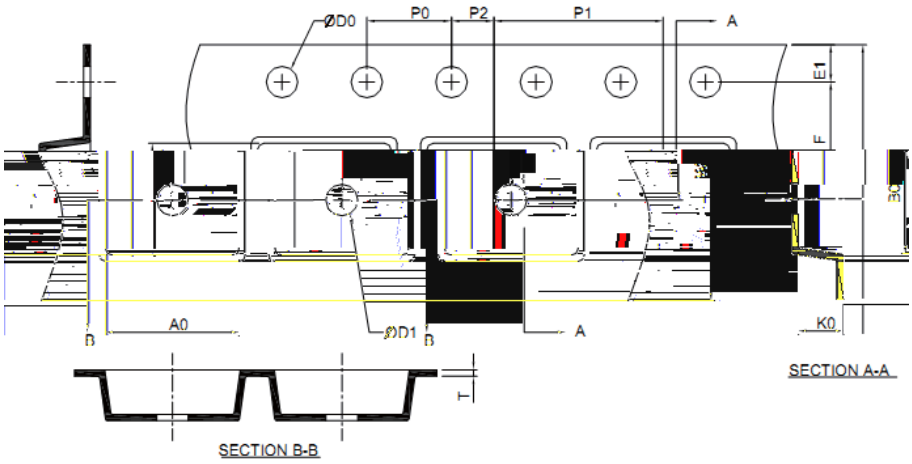


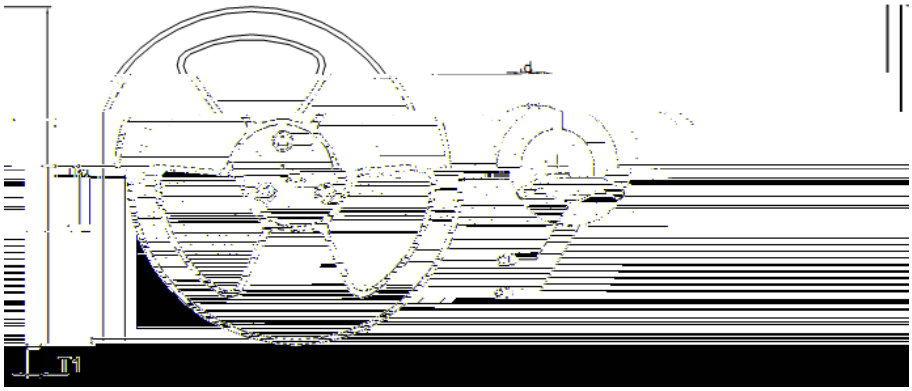
SOP8L

SYMBOL	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



Carrier Tape & Reel Dimensions

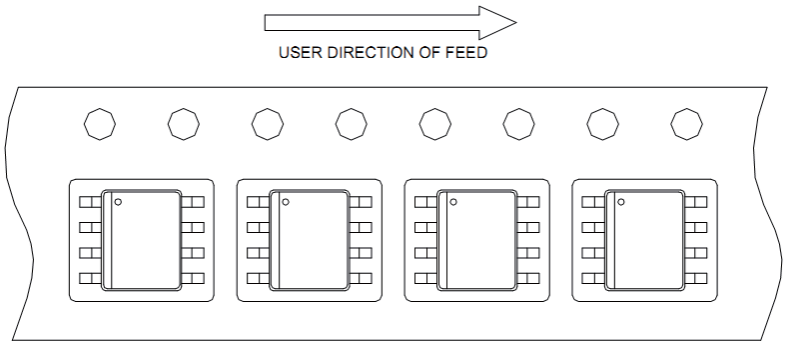




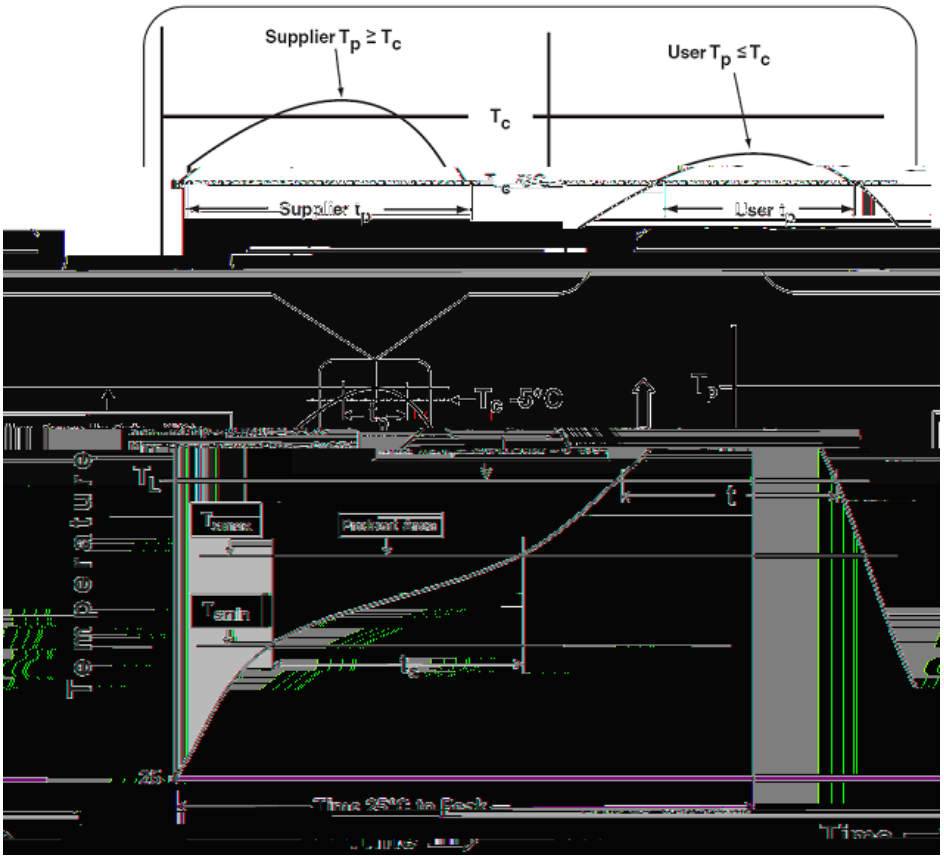
Application	A	H	T1	C	d	D	W	E1	F
SOP8L	330.0 2.00	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0 0.30	1.75 0.10	5.5 0.05
	P0	P1	P2	D0	D1	T	A0	B0	K0
	2.10 0.20	4.0 0.10	8.0 0.10	2.0 0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40 0.20	5.20 0.20

(mm)

Taping Direction Information



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (Tsmin to Tsmax) (t_s)	 100 °C 150 °C 60-120 seconds	 150 °C 200 °C 60-120 seconds
Average ramp-up rate ($T_{smax}$to T_P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	SeeClassification Tempin table 2
Time (t_P)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate ($T_p$to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
*Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum. ** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.		