

N-Channel Enhancement Mode MOSFET

Feature

60V/12A
 $R_{DS(ON)} = 8.6m \text{ (typ.)}@V_{GS} = 10V$
 $R_{DS(ON)} = 15.4m \text{ (typ.)}@V_{GS} = 4.5V$
 100% Avalanche Tested
 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 G090N06 XXXYWXXXXX	Package Code S: SOP-8L Date Code XXXYWXXXXX	Assembly Material G:Halogen Free
----------------------------	--	-------------------------------------

Note:HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plateTerminationfinish;which are fully compliant with RoHS.HUAYI lead-free products meet or exceed the lead-F

HYG090N06LS1S

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

Symbol	Parameter	Test Conditions	HYG090N06LS1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	1.9	-	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz	-	961	-	pF
C _{oss}	Output Capacitance		-	476	-	
C _{rss}	Reverse Transfer Capacitance		-	28	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, R _G =4 , I _D =6A, V _{GS} =10V	-	8.6	-	ns
T _r	Turn-on Rise Time		-	12.2	-	
t _{d(OFF)}	Turn-off Delay Time		-	20.4	-	
T _f	Turn-off Fall Time		-	8.2	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =48V, V _{GS} =10V I _D =10A	-	19.8	-	nC
Q _{gs}	Gate-Source Charge		-	4.6	-	
Q _{gd}	Gate-Drain Charge		-	4.5	-	

Note: *Pulse test pulse width 300us duty cycle 2%

Typical Operating Characteristics

Figure 1: Power Dissipation

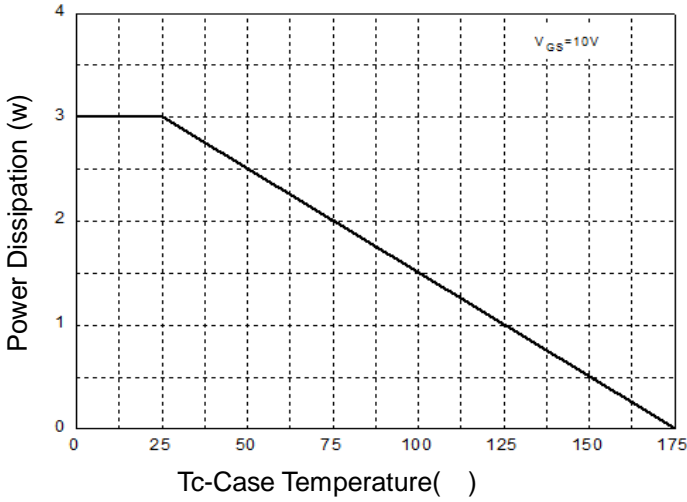


Figure 2: Drain Current

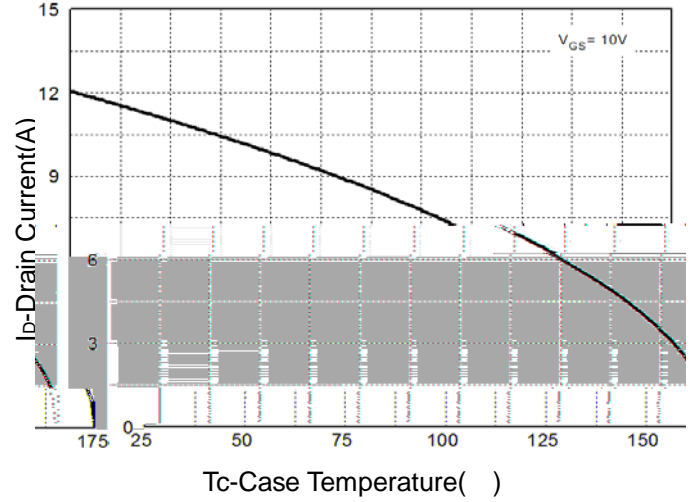


Figure 3: Safe Operation Area

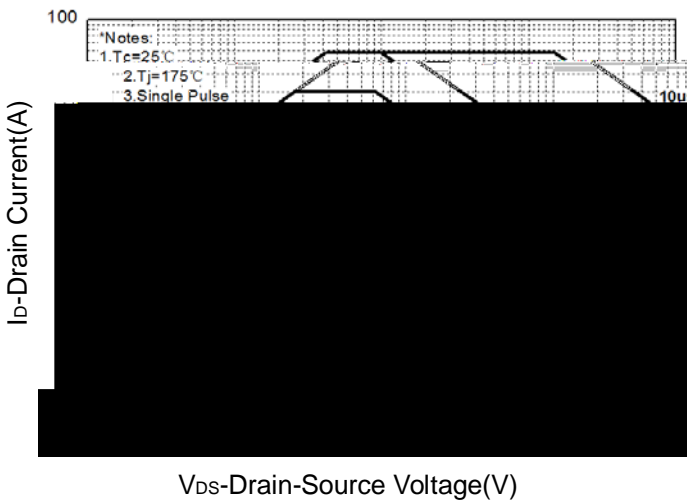


Figure 4: Thermal Transient Impedance

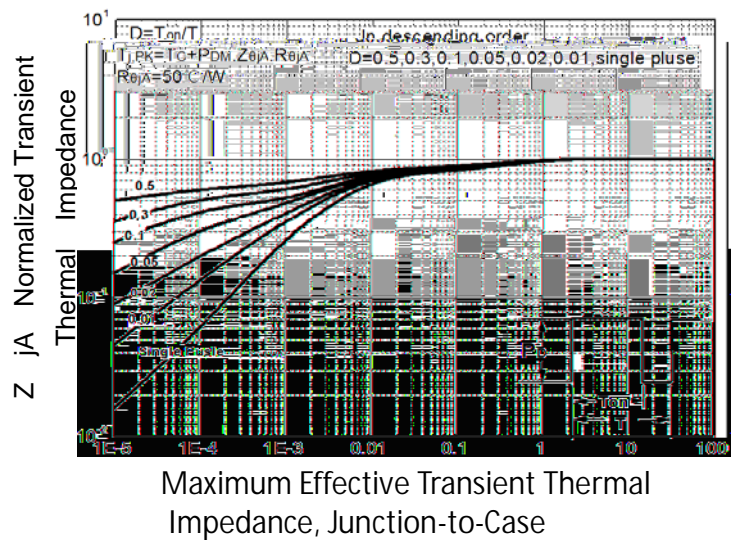


Figure 5: Output Characteristics

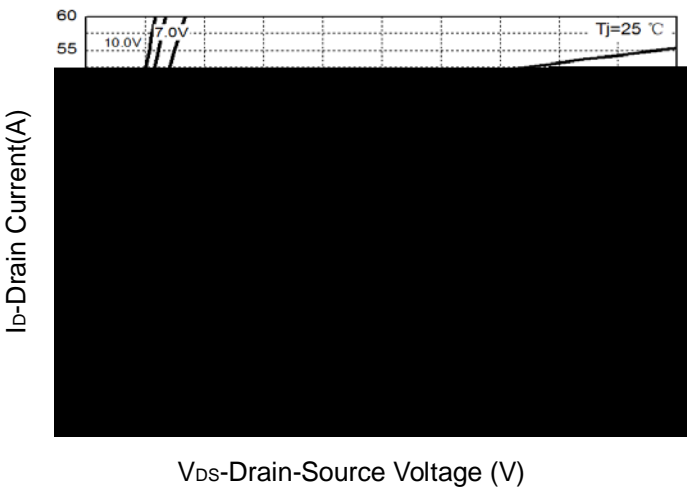
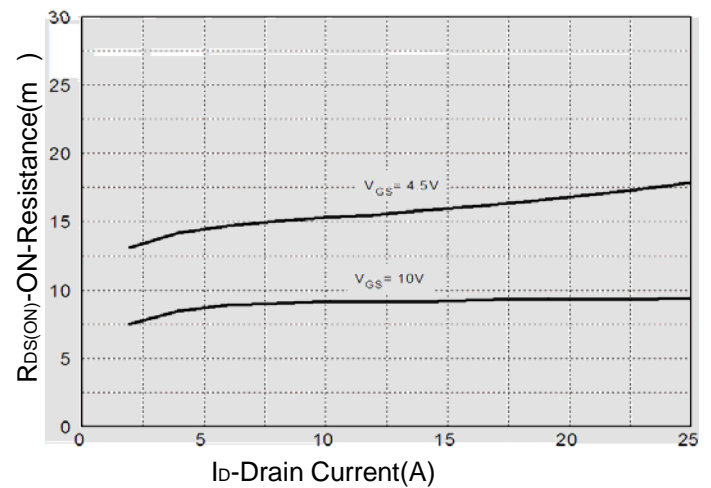


Figure 6: Drain-Source On Resistance



HYG090N06LS1S

Typical Operating Characteristics(Cont.)

Figure 9: On-Resistance vs. Temperature

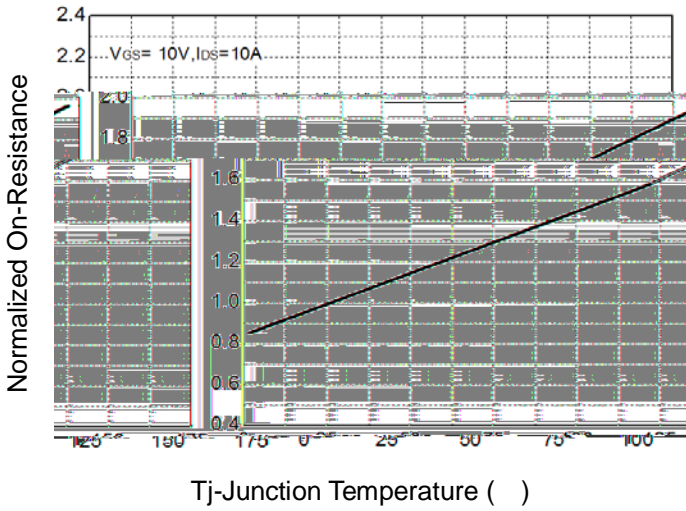


Figure 10: Source-Drain Diode Forward

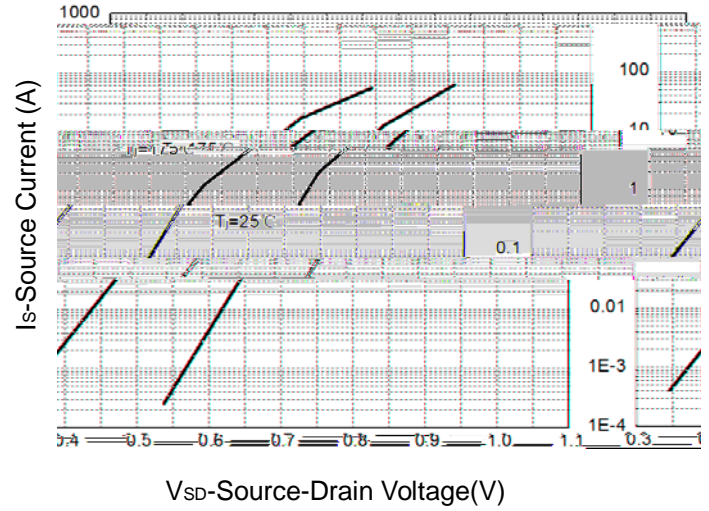


Figure 11: Capacitance Characteristics

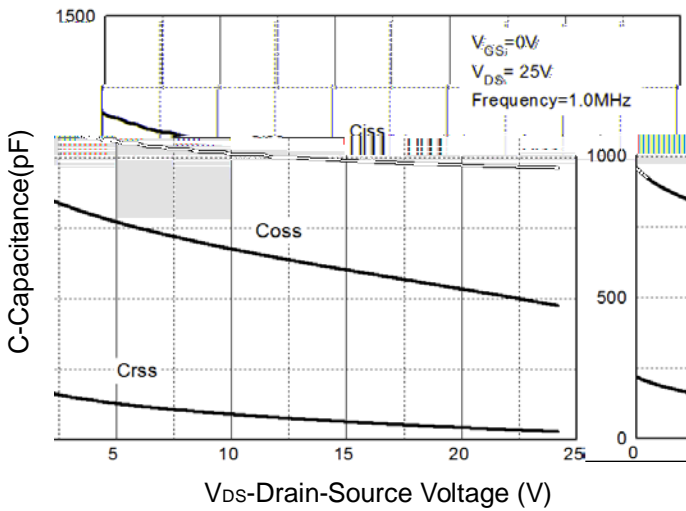
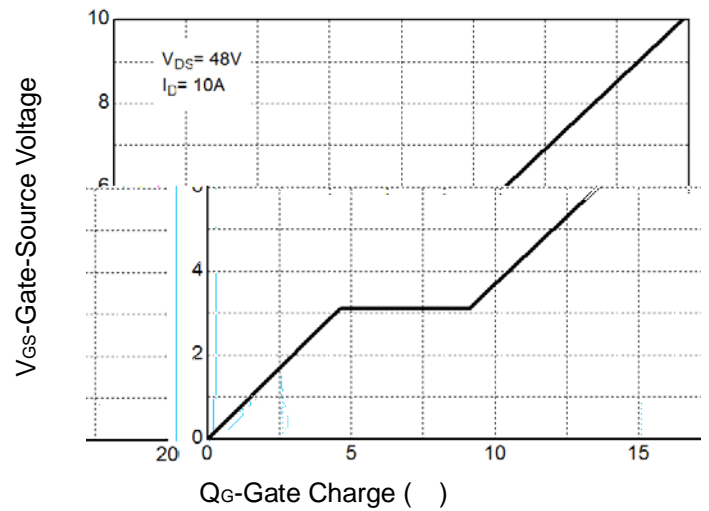
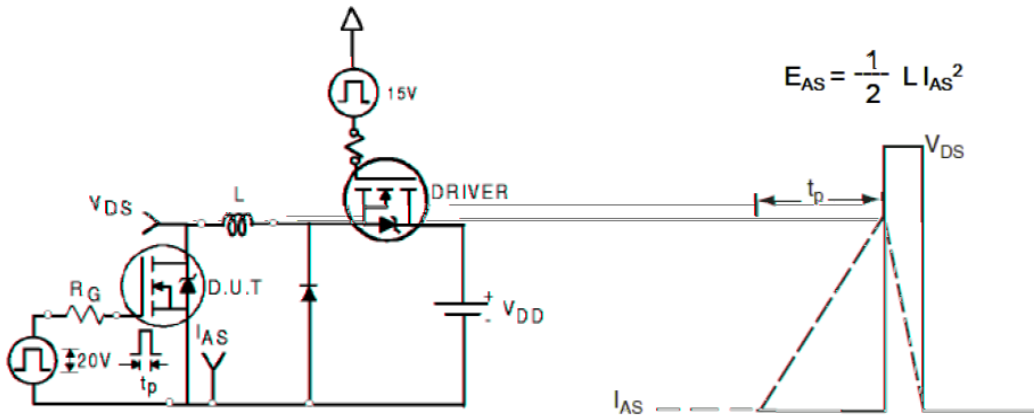


Figure 12: Gate Charge Characteristics

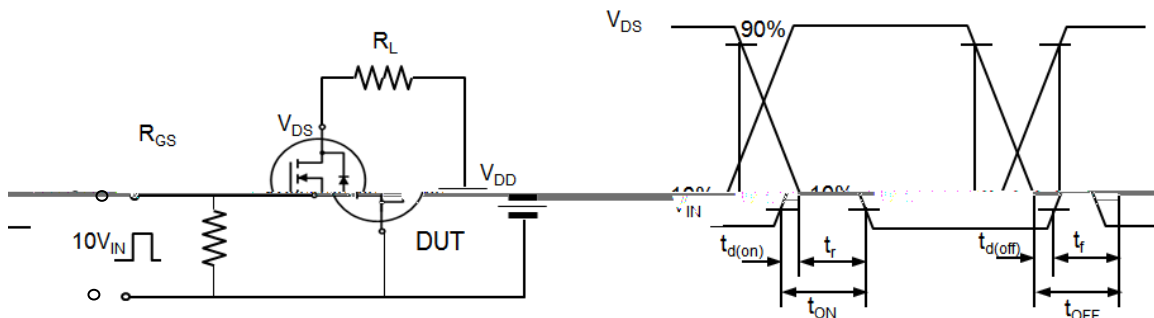


HYG090N06LS1S

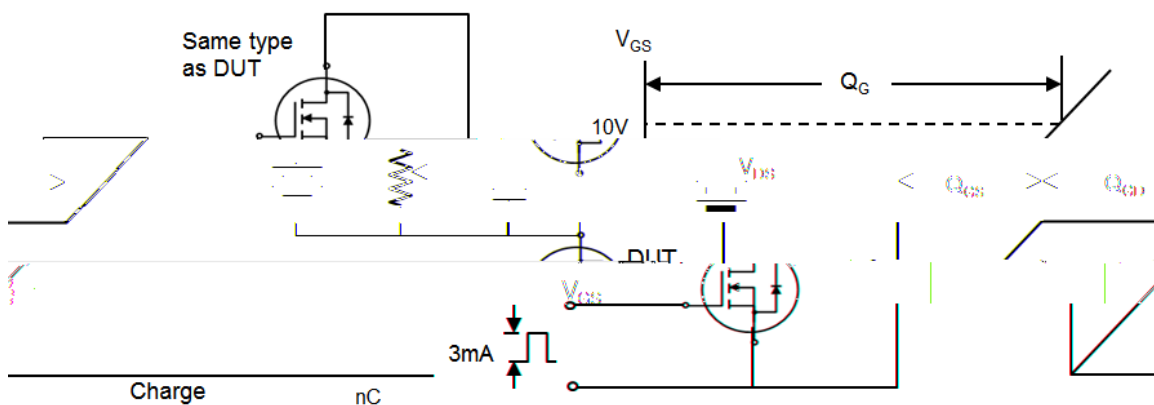
Avalanche Test Circuit



Switching Time Test Circuit



Gate Charge Test Circuit

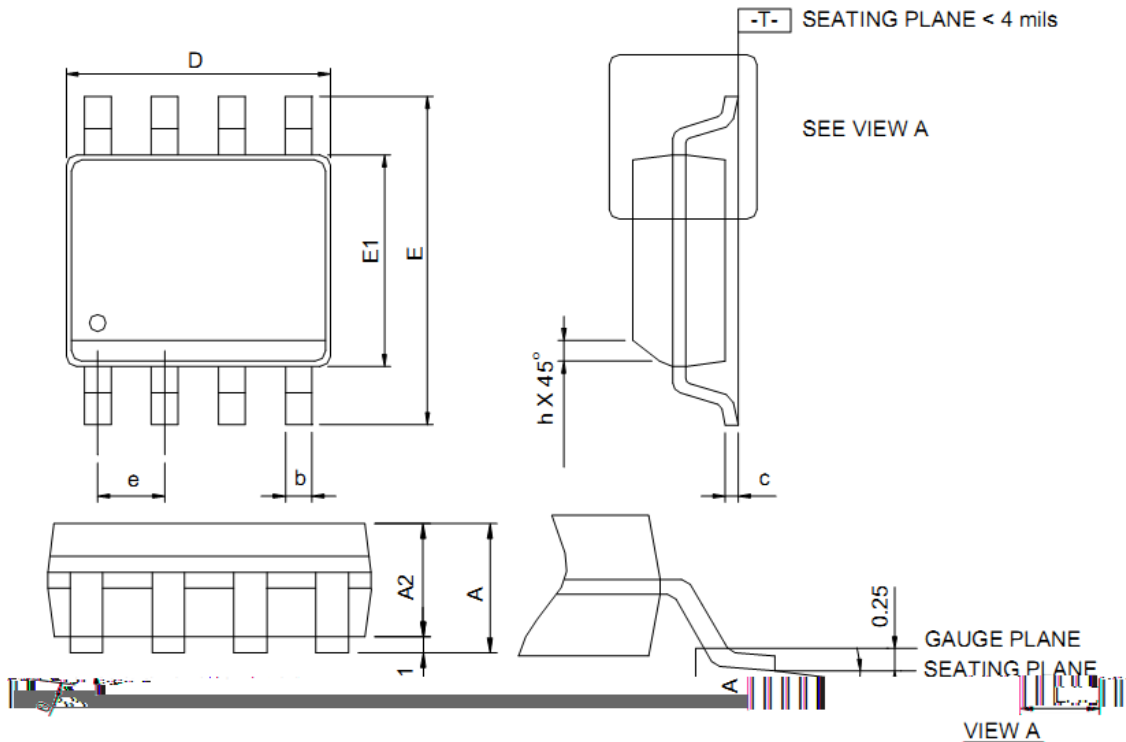


Device Per Unit

Package Type	Unit	Quantity
SOP-8L	Reel	2500

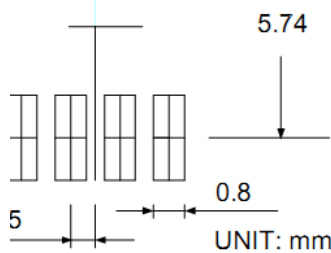
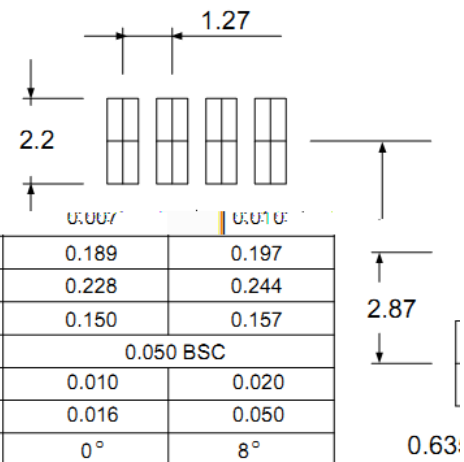
Package Information

SOP-8L



FORM	SOP-8L			
	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

RECOMMENDED LAND PATTERN



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°

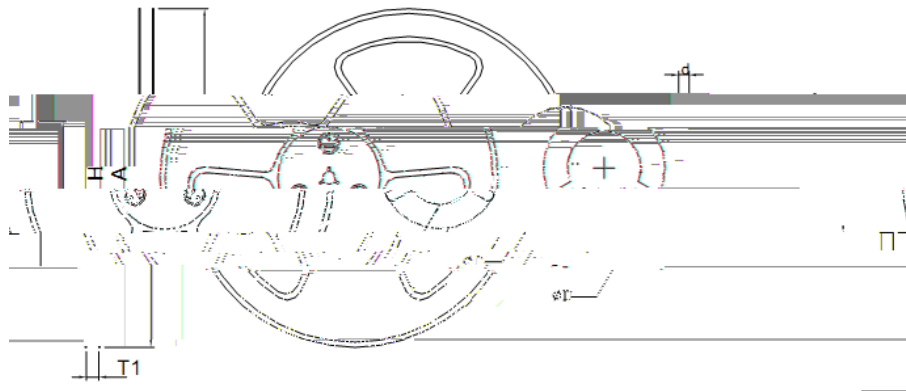
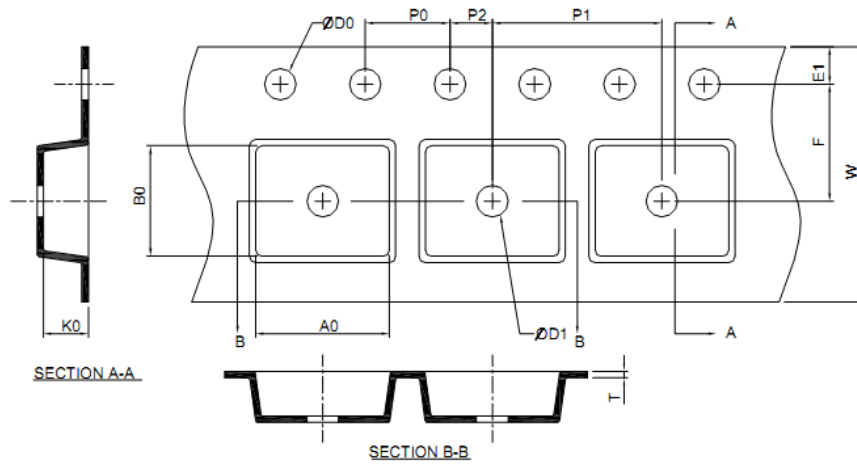
Note: 1. Follow JEDEC MS-012 AA.

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 interlead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

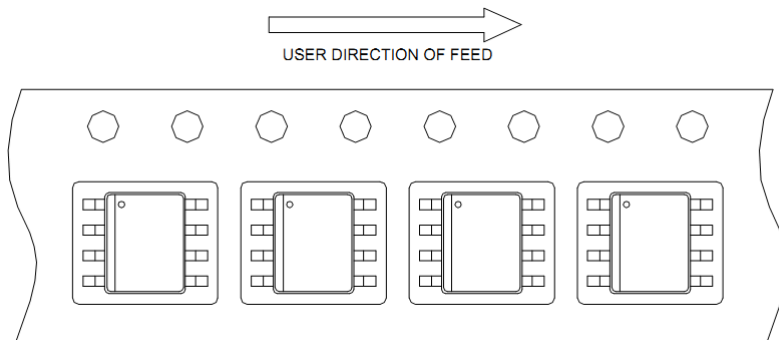
HYG090N06LS1S

Carrier Tape & Reel Dimensions

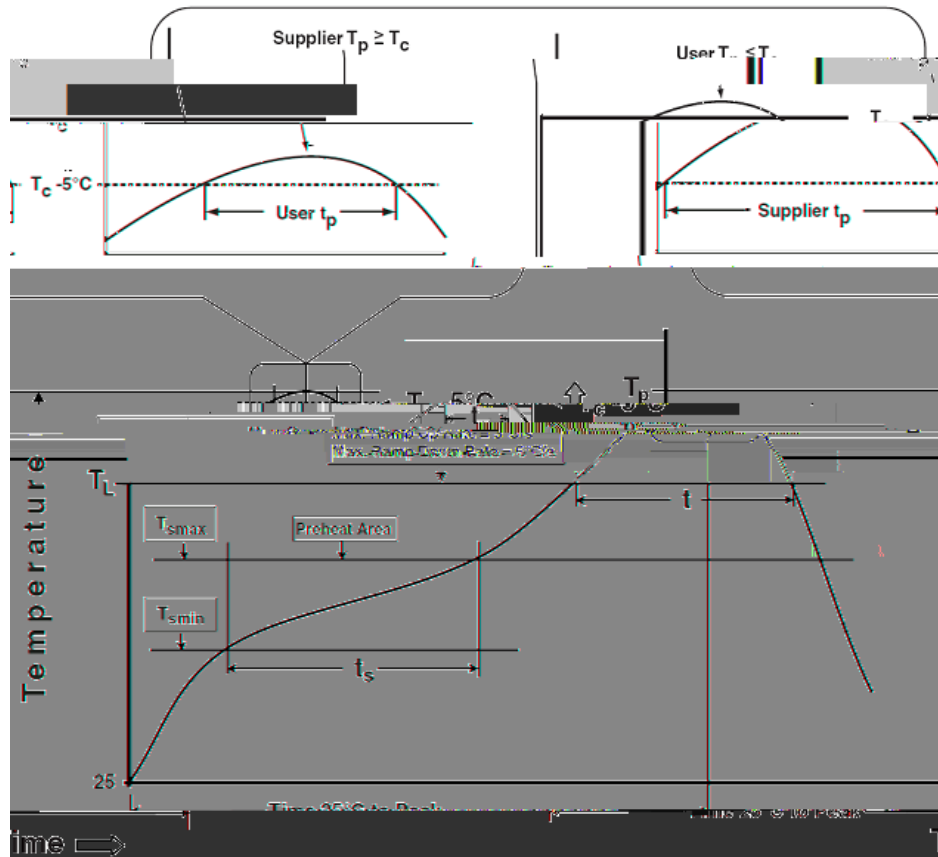


Application	A	H	T1	C	d	D	W	E1	F

Taping Direction Information



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T_{smin})	100 °C	150 °C
Temperature max (T_{smax})	150 °C	200 °C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time at liquidous (t_L)	60-150 seconds	60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	See Classification Temp in 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.		

Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

Package Thickness	Volume mm <350	Volume mm 350
2.5 mm	235 °C	220 °C
2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (Tc)

Package Thickness	Volume mm <350	Volume mm 350-2000	Volume mm 2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test item	Method	Description
SOLDERABILITY	JESD-22, B102	5 Sec, 245°C
HTRB	JESD-22, A108	168 Hrs/500 Hrs/1000 Hrs, Bias @ 150°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	500 Cycles, -55°C~150°C

Customer Service

Worldwide Sales and Service: sales@hymexa.com

Technical Support: Technology@hymexa.com

Huayi Microelectronics Co., Ltd.

No.8928, Shangji Road, Economic and Technological Development Zone, Xi'an, China

TEL: (86-029) 86685706

FAX: (86-029) 86685705

E-mail: sales@hymexa.com

Web net: www.hymexa.com