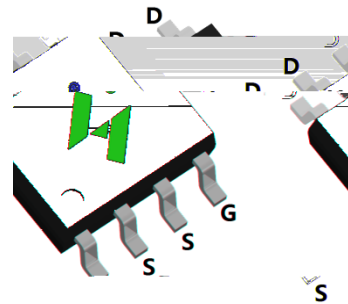


## N-Channel Enhancement Mode MOSFET

### Feature

- 40V/19A
- $R_{DS(ON)} = 5.3m$  (typ.) @  $V_{GS} = 10V$
- $R_{DS(ON)} = 6.0m$  (typ.) @  $V_{GS} = 4.5V$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen Free and Green Devices Available
- (RoHS Compliant)

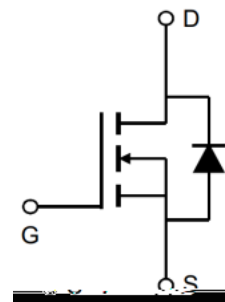
### Pin Description



SOP8L


### Applications

- Power Management for DC/DC
- Switching application



N-Channel MOSFET

### Ordering and Marking Information

 <b>HY1904</b> YYXXJWW G	<b>Package Code</b> S: SOP8L  <b>Date Code</b> YYXX WW  <b>Assembly Material</b> G: Halogen Free
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Note: HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020 for MSL classification at lead-free peak reflow temperature. HUAYI defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any time without notice.

ings (Tc=25C Unless Otherwise Noted)



# **HY1904S**

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## **Typical Operating Characteristics**

**Figure 1: Power Dissipation**

**Figure 2: Drain Current**

Tc-Case Temperature( )

Tc-Case Temperature( )

**Figure 3: Safe Operation Area**

**Figure 4: Thermal Transient Impedance**

# **HY1904S**

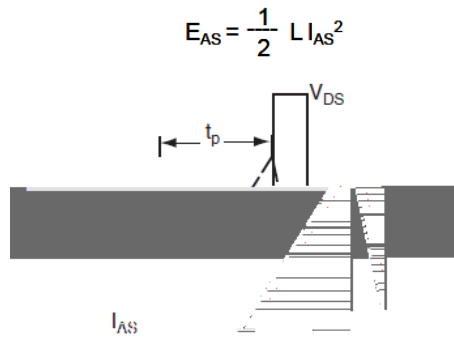
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## **Typical Operating Characteristics(Cont.)**

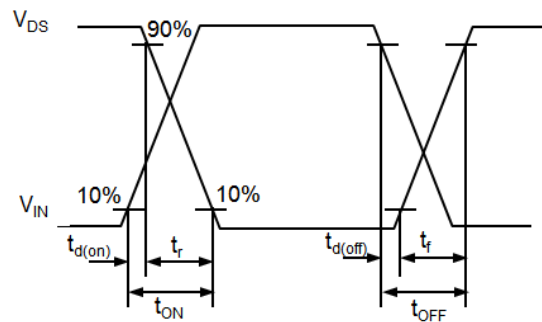
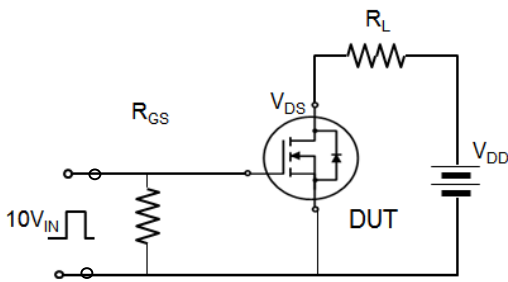
**Figure 7: On-Resistance vs. Temperature**

**Figure 8:**

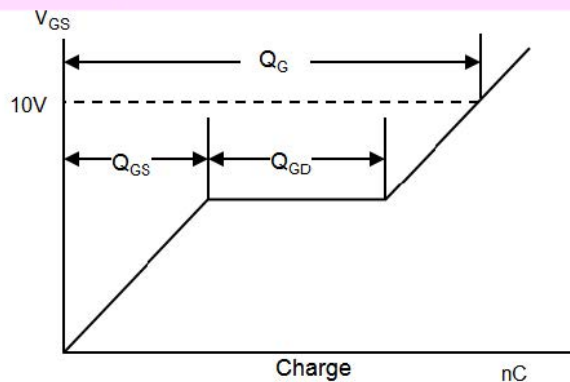
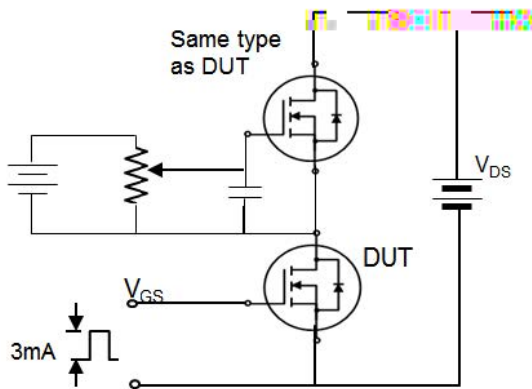
**Avalanche Test Circuit**



**Switching Time Test Circuit**



**Gate Charge Test Circuit**

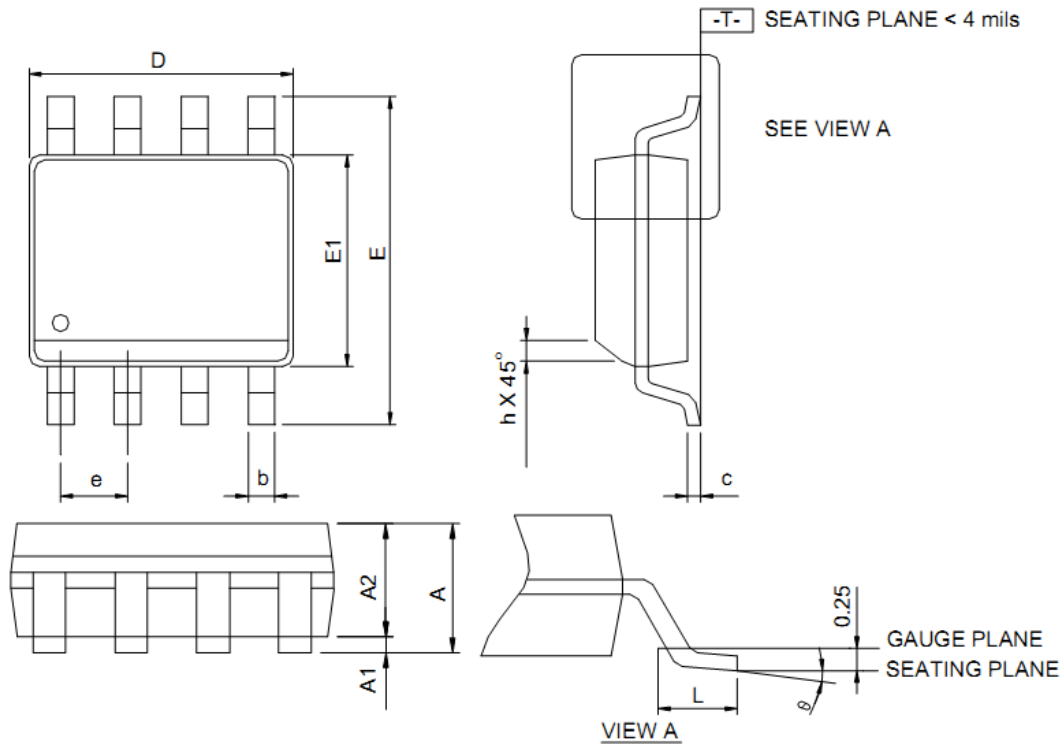


## Device Per Unit

Package Type	Unit	Quantity
SOP8L	Reel	2500

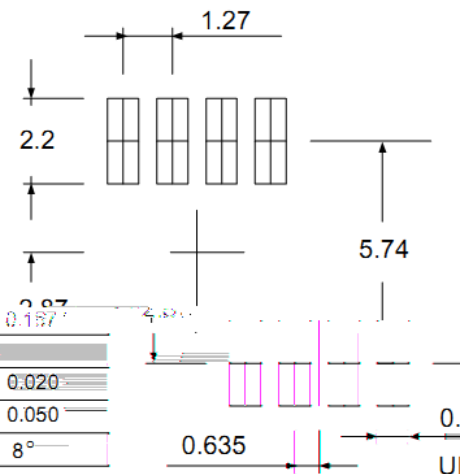
## Package Information

### SOP8L



FORMER	SOP8L			
	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

### RECOMMENDED LAND PATTERN

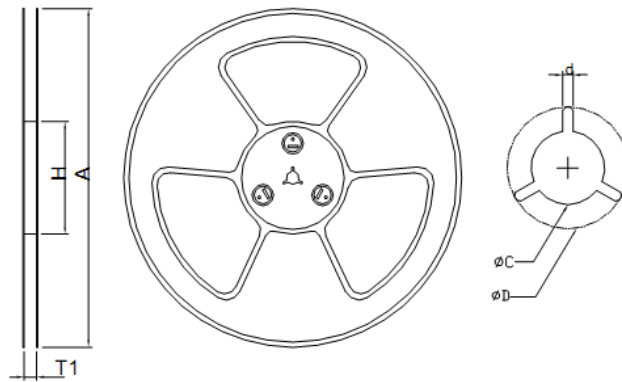
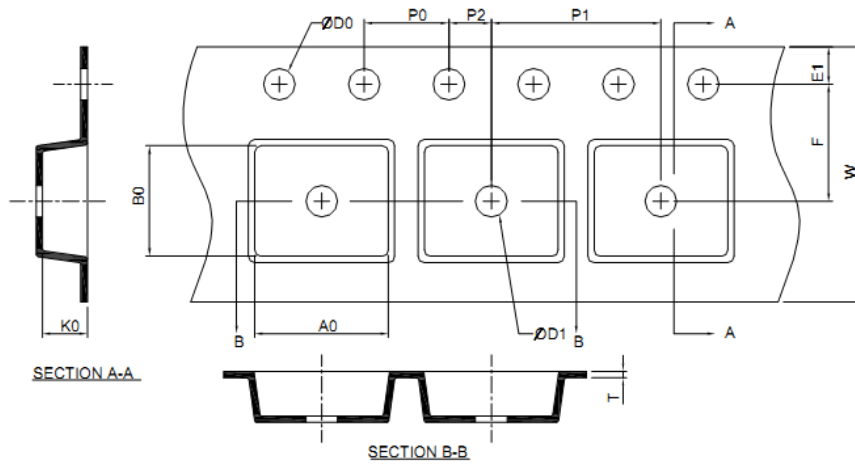


E1	3.90	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

NIT: mm

Dimensions in parentheses are for reference only. Dimensions in millimeters are mandatory. Dimensions in inches are for reference only. Dimensions in inches are mandatory. In a lead flash and protrusion shall not exceed 0.1mm per side.

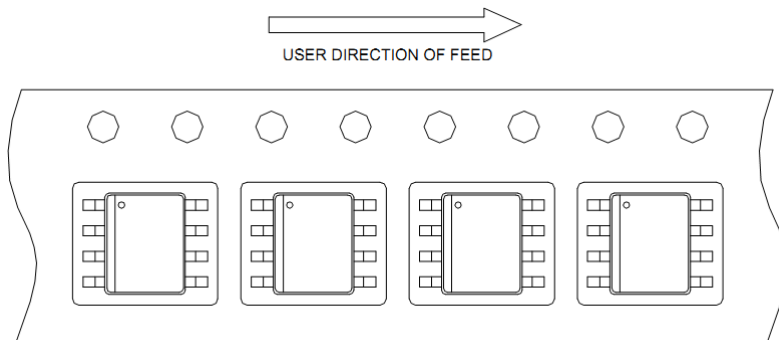
## Carrier Tape & Reel Dimensions



Application	A	H	T1	C	D	W	F1	F	
SOP8L	8.0 ±0.10	2.0 ±0.05	1.5 <sup>+0.10</sup> <sub>-0.00</sub>	1.5 MIN.	0.6 <sup>+0.00</sup> <sub>-0.40</sub>	6.4 ±0.20	5.2 ±0.20	2.1 ±0.20	4

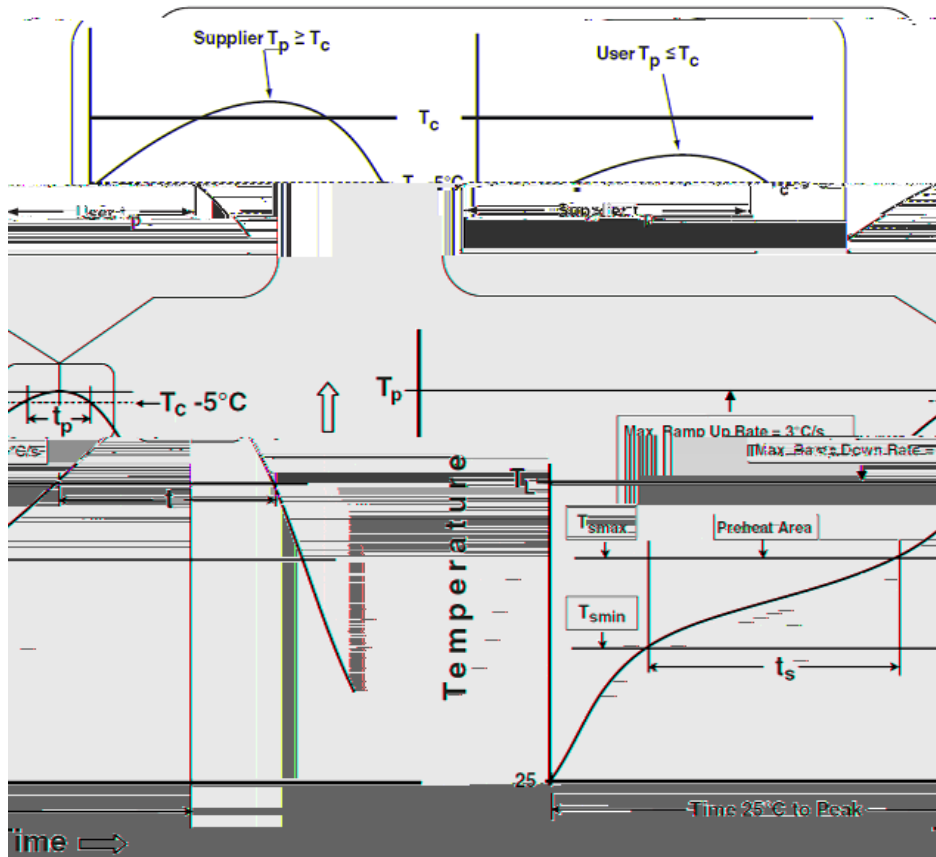
(mm)

## Taping Direction Information





**Classification Profile**



**Classification Reflow Profiles**

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
<b>Preheat &amp; Soak</b>		
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/1000Hrs, 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

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