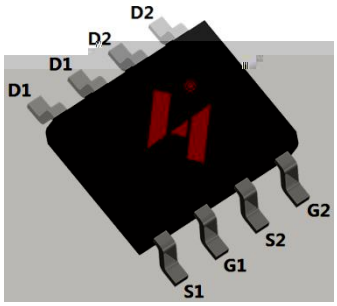
60V Complementary MOSFET

Feature

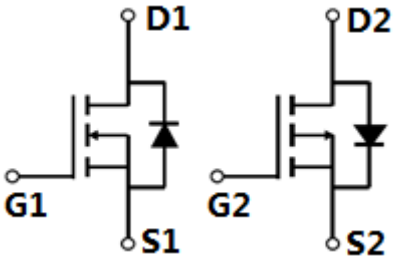
N- Channel	P - Channel
Vds = 60V	Vds = -60V
7 A (Vgs= 10V)	-4.2 A (Vgs= -10V)
19 mΩ (Vgs= 10V)	58 mΩ (Vgs= -10V)
24 mΩ (Vgs= 4.5V)	72 mΩ (Vgs= -4.5V)

- 100% Avalanche Tested
- Reliable and Rugged
- Halogen Free and Green Devices Available (RoHS Compliant)

Pin Description



SOP8L



N-Channel P-Channel

Applications

- Synchronous Rectifiers
- H-bridge Motor Drive

Ordering and Marking Information

■ S G320C06 XYWXXXXXX	Package Code S: SOP8L Date Code XYWXXXXXX

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-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 pr-oduct and/or to this document at any time without notice.

Absolute Maximum Ratings

Symbol	Parameter	N- Channel	P- Channel	Unit
	Common Ratings (Tc=25℃ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	60	-60	V
V_{GSS}	Gate-Source Voltage	±20		V
T_J	Junction Temperature Range	-55 to 175		

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

Symbol	Parameter	Test Conditions	HYG320C06LA1			Unit
			Min	Typ.	Max	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_{DS}=250 A	60	-		V
I_{DSS}	Drain-to-Source LeakageCurrent	V_{DS}=60V,V_{GS}=0V	-	-	1	A
		T_J=125°C	-	-	50	A
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250 A	1	1.7	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}=6A	-	19	26	m
		V_{GS}=4.5V,I_{DS}=4A		24	32	m
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=1A,V_{GS}=0V	-	0.7	1.0	V
t_{rr}	Reverse Recovery Time	I_{SD}=6A,dI_{SD}/dt=100A/	-	12	-	ns
Q_{rr}	Reverse Recovery Charge		-	21	-	nC

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

Symbol	Parameter	Test Conditions	HYG320C06LA1		Unit
			Min	Typ.	

N-Mosfet Typical Operating Characteristics

Figure 1: Power Dissipation

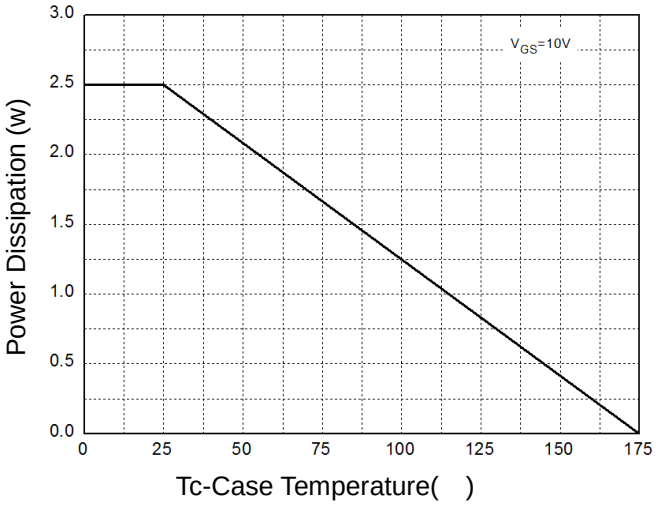


Figure 2: Drain Current

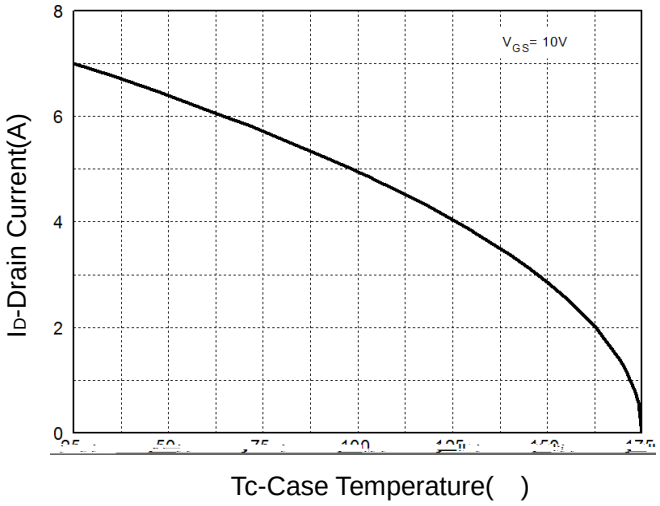


Figure 3: Safe Operation Area

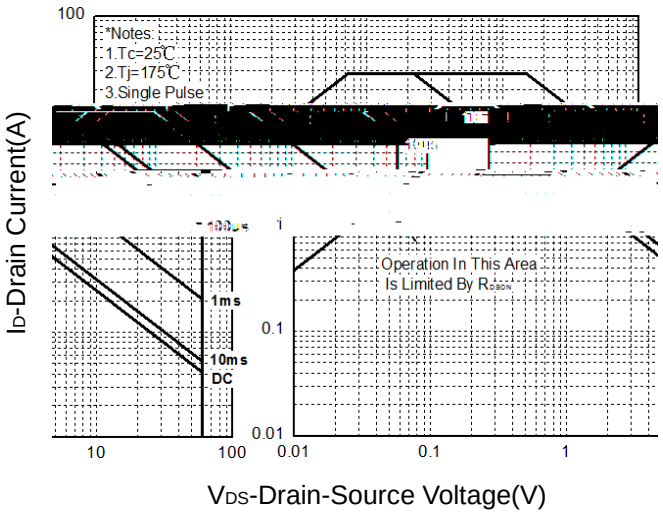
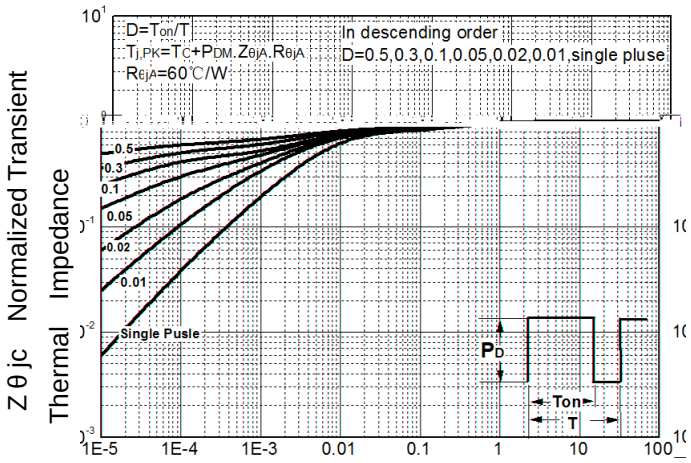


Figure 4: Thermal Transient Impedance



Maximum Effective Transient Thermal Impedance, Junction-to-Case

Figure 5: Output Characteristics

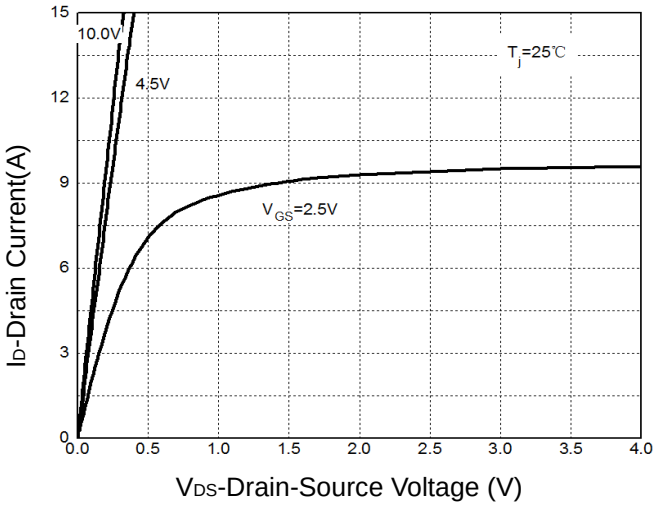
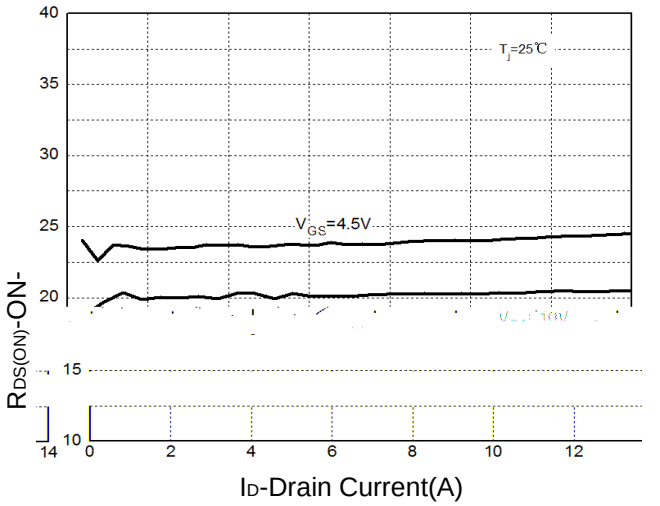


Figure 6: Drain-Source On Resistance



N-Mosfet Typical Operating Characteristics

Figure 7: On-Resistance vs. Temperature

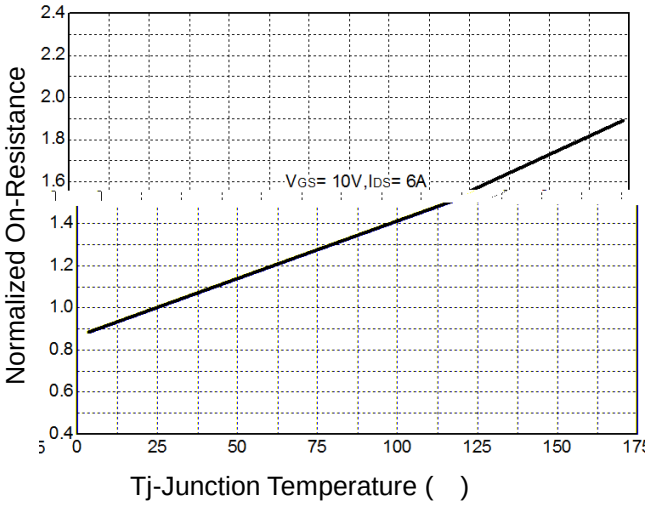


Figure 8: Source-Drain Diode Forward

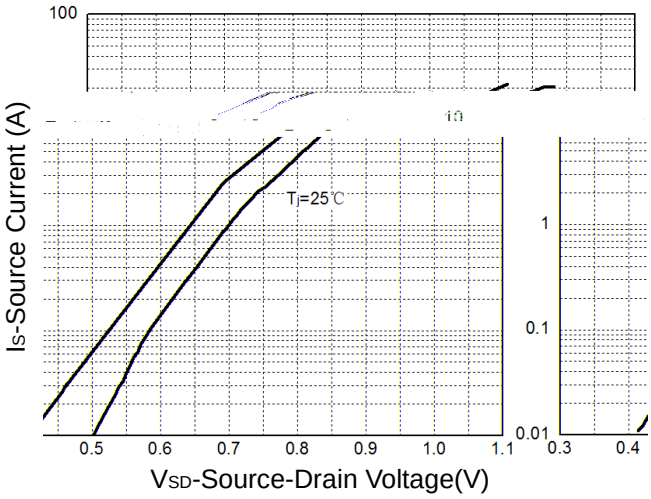


Figure 9: Capacitance Characteristics

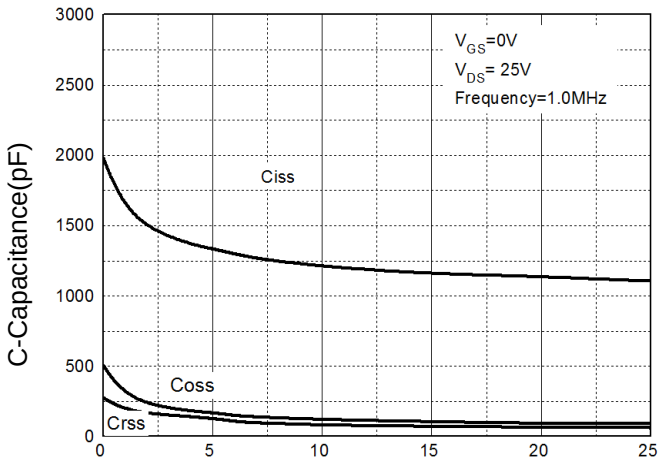
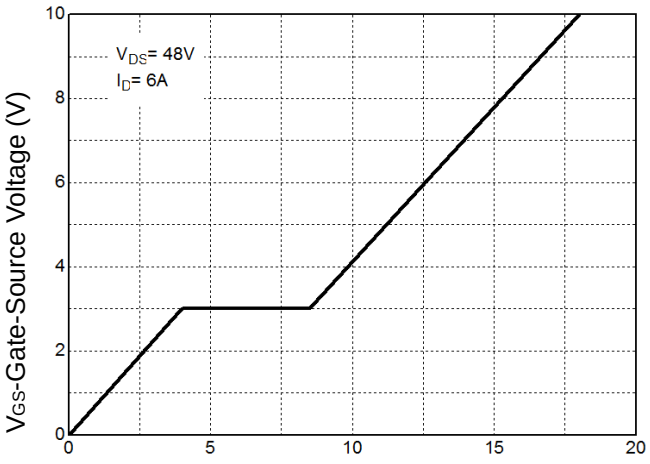
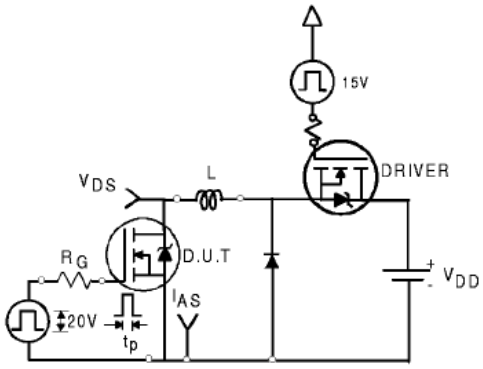


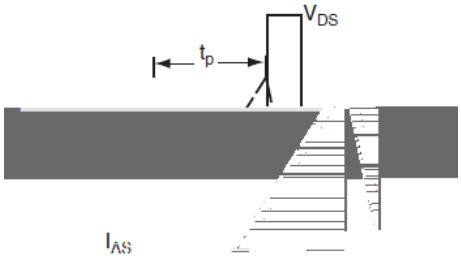
Figure 10: Gate Charge Characteristics



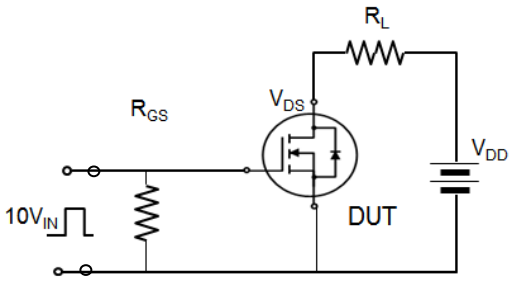
Avalanche Test Circuit

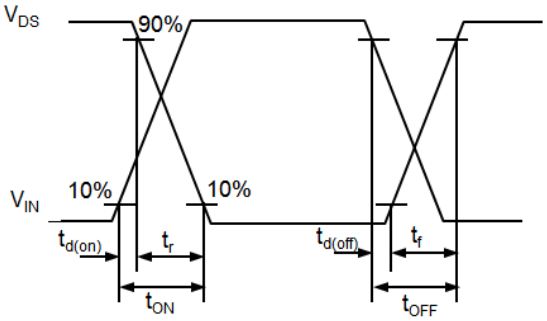


$$E_{AS} = \frac{1}{2} L I_{AS}^2$$

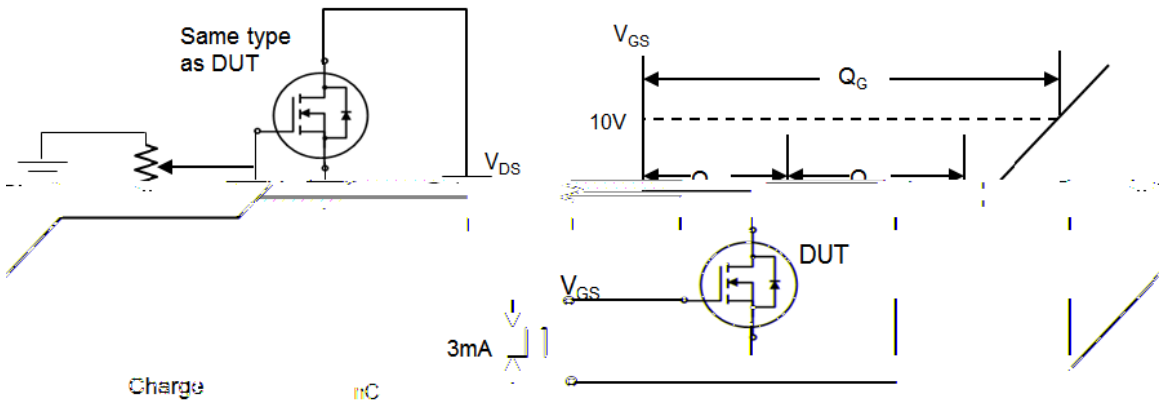


Switching Time Test Circuit





Gate Charge Test Circuit



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

Symbol	Parameter	Test Conditions	HYG320C06LA1			Unit
				Typ.	Max	
Static Characteristics						
	Drain Source Breakdown Voltage	V_{GS}=0V,I_{DS}=-250 A	- 60	-		V
DSS	Drain- -Source LeakageCurrent	V_{DS}=-60V,V		-	-1	A
		T_J=125°C		-	-	A
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250 A	-1	-1.6	-3	V
	Gate-Source Leakage Current	V_G = ± 20V,V_{DS}=0V	-	-	±	nA
(ON)*	Drain Source On-State Resistance	V_{GS}=-10V,I_{DS}=-4A	-	58		m
		V_{GS}=-4.5V,I_{DS}=-3A		72		m
V_{SD}*	Diode Forward Voltage	-1A,V_{GS}=0V	-	-0.7	- 1	
	Reverse Recovery Time	-4A,dI$_{SD}$/dt=100A/	-	11	-	ns
rr	Reverse Recovery Charge		-	32	-	n

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

Symbol	Parameter	Test Conditions			Unit
			.		
Dynamic Characteristics					
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Frequency=1.0MHz	14		
		=-4A,V_{GS}=-10V			ns
	Turn-off Fall Time		18	-	
		V_{DS} =-48V $_{GS}$=-10 , I_D=-4A			nC
gd	Gate-Drain Charge			-	

Note: *Pulse test pulse width duty cycle

P-Mosfet 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

-V_{DS}-Drain-Source Voltage(V)

Maximum Effective Transient Thermal Impedance, Junction-to-Case

Figure 5: Output Characteristics

Figure 6: Drain-Source On Resistance

P-Mosfet Typical Operating Characteristics

Figure 7: On-Resistance vs. Temperature

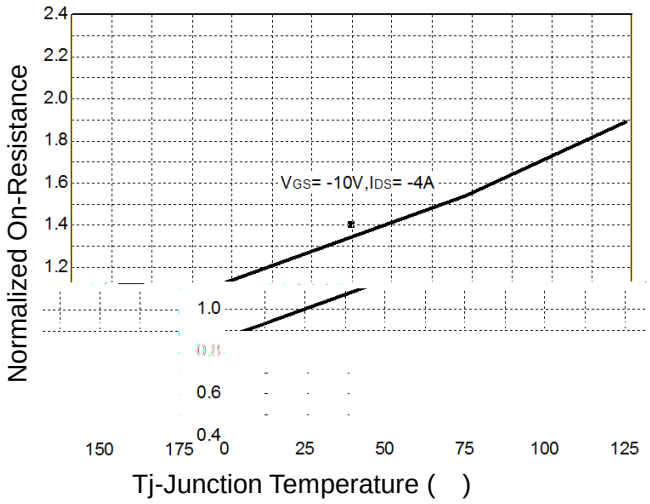


Figure 8: Source-Drain Diode Forward

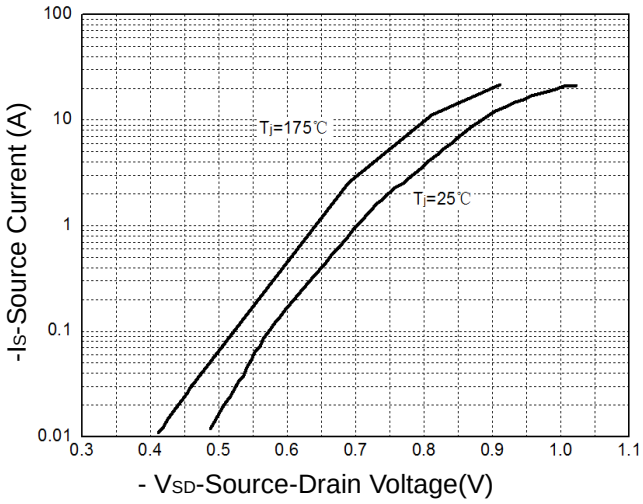


Figure 9: Capacitance Characteristics

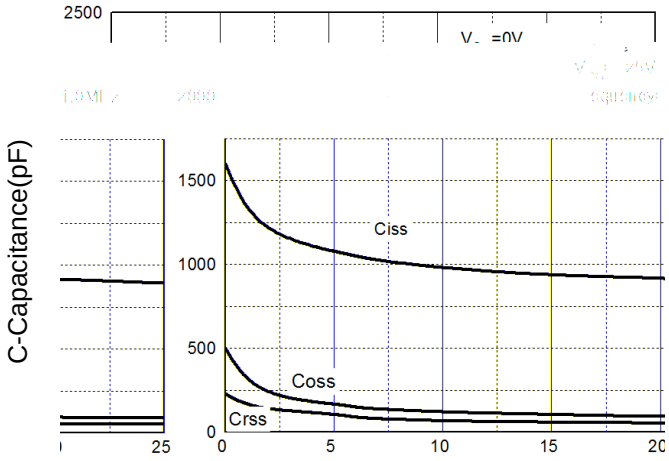
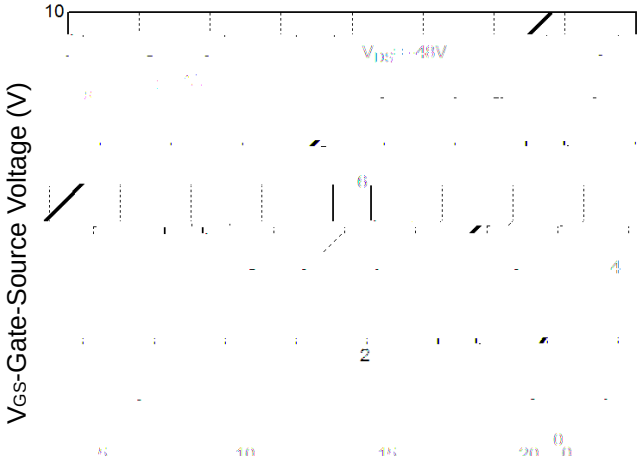
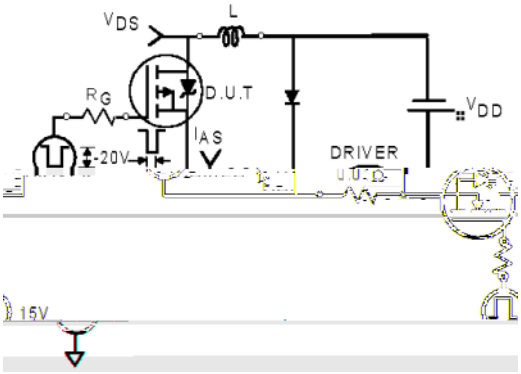
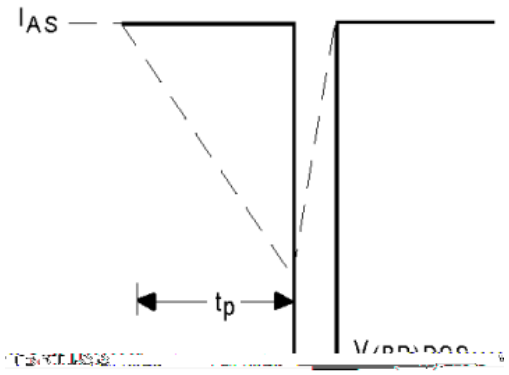


Figure 10: Gate Charge Characteristics

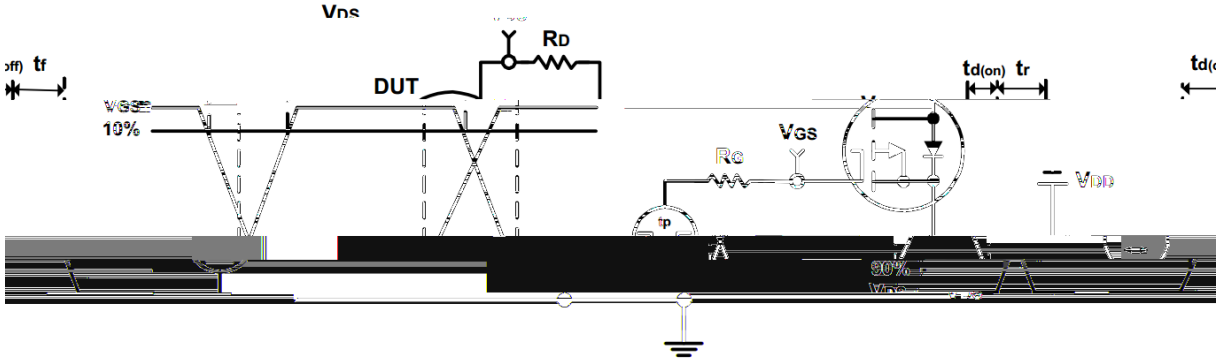


Avalanche Test Circuit

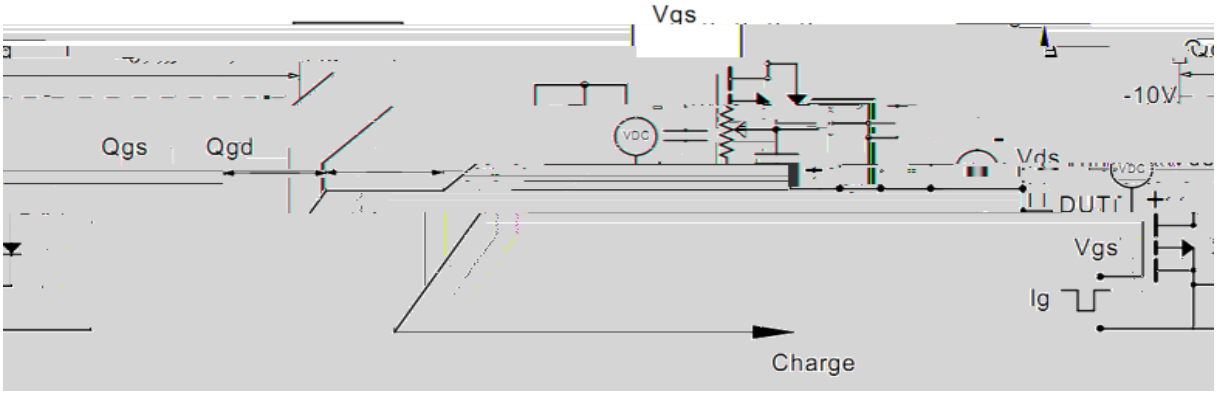




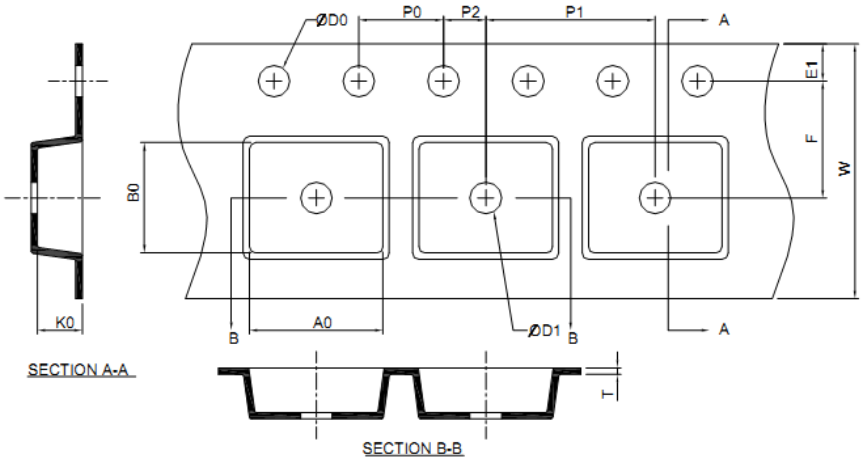
Switching Time Test Circuit

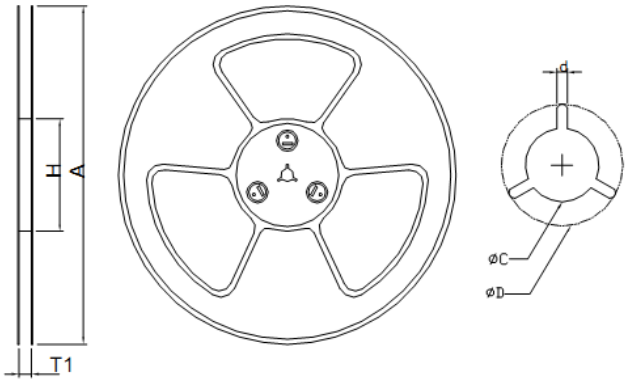


Gate Charge Test Circuit



Carrier Tape & Reel Dimensions

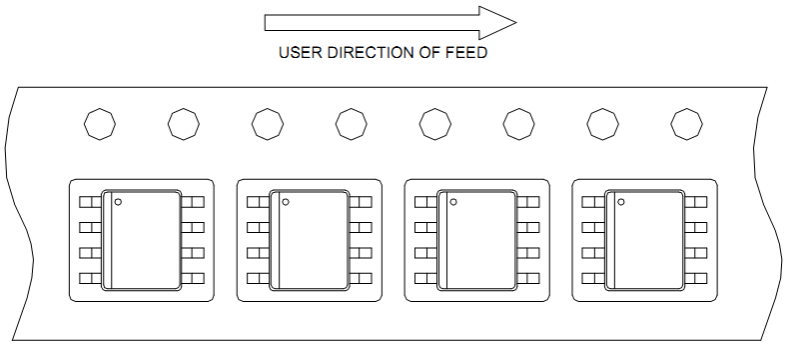




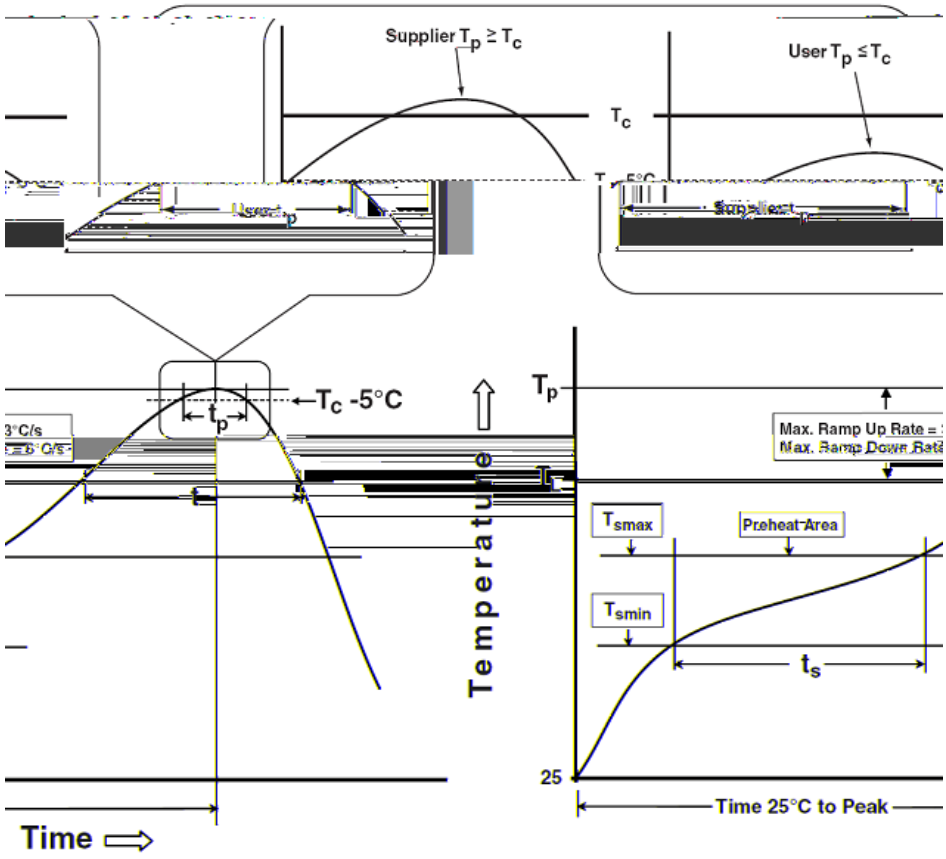
Application	A	H	T1	C	d	D	W	E1	F
				12.4+2.00	13.0+0.50				
SOP8L									
10	8.0 0.10	2.0 0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40 0.20	5.20 0.20	2.10 0.20	4.0 0.

(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.		

Table 1.SnPb Eutectic Process Classification Temperatures (Tc)

Package	