HY1906C2

Single N-Channel Enhancement Mode MOSFET

Feature

- 60V/70A

  $R_{DS(ON)}$= 5.7 m (typ.)@V_{GS} = 10V
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available

Applications

- High Frequency Point-of

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		25	V
T_J	Junction Temperature Range		-55 to 175	℃
T_{STG}	Storage Temperature Range		-55 to 175	℃
I_S	Source Current-Continuous(Body Diode)	Tc=25°C	70	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25°C	260	A
I_D	Continuous Drain Current	Tc=25°C	70	A
		Tc=100°C	49.5	A
P_D	Maximum Power Dissipation	Tc=25°C	57.7	W
		Tc=100°C	28.8	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		2.6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **		35	°C/W
E_{AS}	SinglePulsed-Avalanche Energy ***	L=0.1mH	286.6	mJ

Note: * Repetitive rating pulse width limited by max.junction temperature.
** Surface mounted on FR-4 board.
*** Limited by $T_J$max , starting T_J=25°C, L = 0.1mH, R_G =25Ω., V_{GS} =10V.

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

Symbol	Parameter	Test Conditions	HY1906			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 Leakage Current	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	2	3	4	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}= 25V,V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=10V,I_{DS}=20A	-			

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

Symbol	Parameter	Test Conditions	HY1906			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	0.87	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V,	-	4620	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V,	-	410	-	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	360	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=30V,R_G=25 ! I_{DS}=20A,V_{GS}=10V	-	21	-	ns
T_r	Turn-on Rise Time		-	28	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	35	-	
T_f	Turn-off Fall Time		-	31	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS} =48V, V_{GS}=10V, I_D=20A	-	102	-	nC
Q_{gs}	Gate-Source Charge		-	18	-	

Typical Operating Characteristics

Figure 1: Power Dissipation

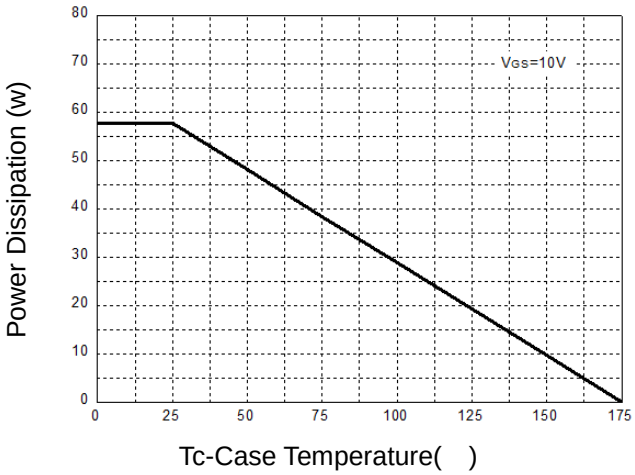


Figure 2: Drain Current

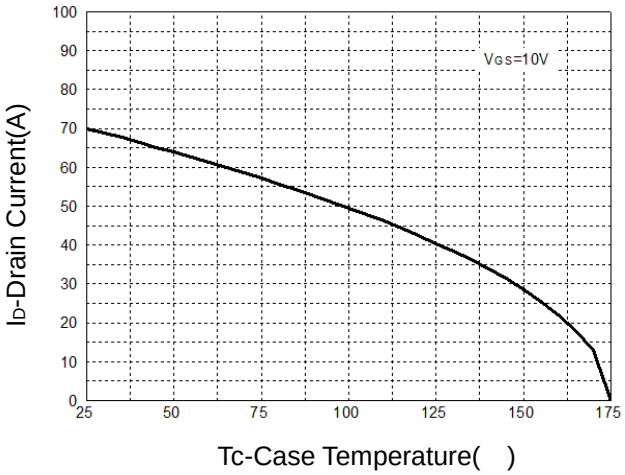


Figure 3: Safe Operation Area

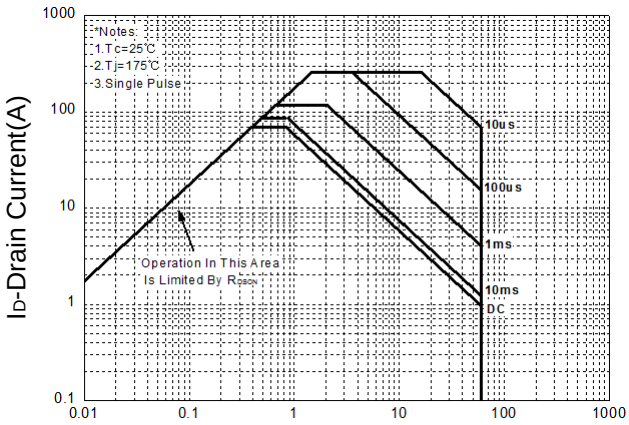


Figure 4: Thermal Transient Impedance

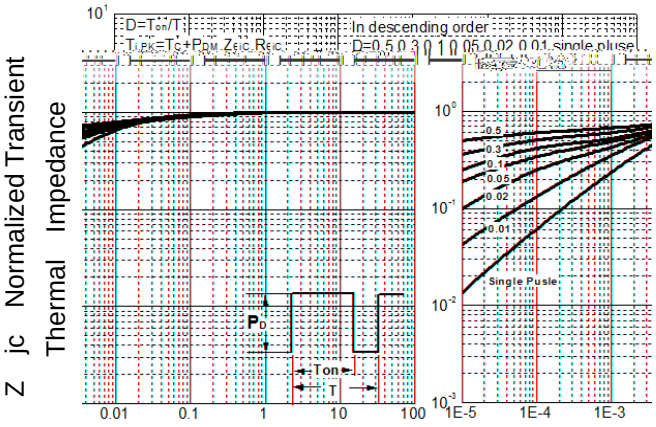


Figure 5: Output Characteristics

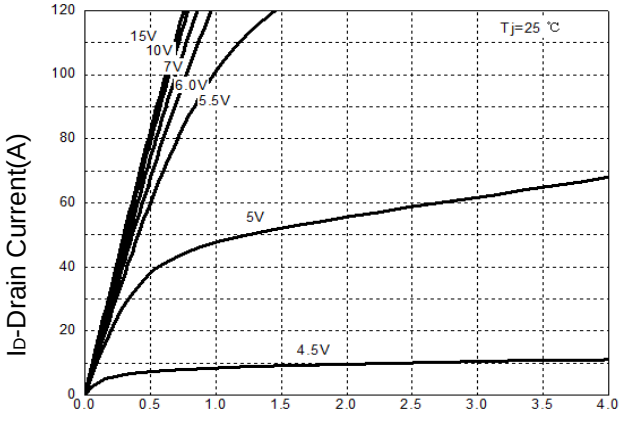
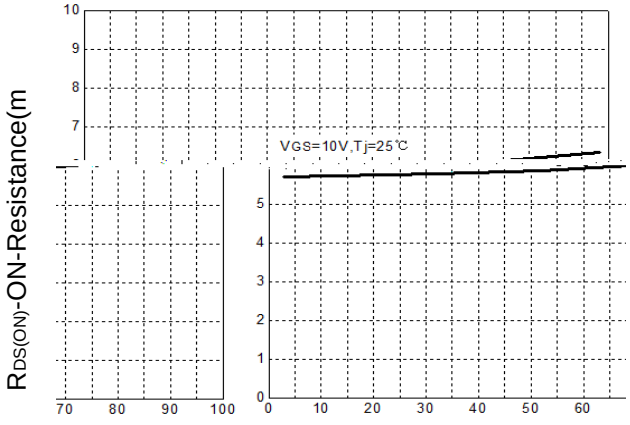
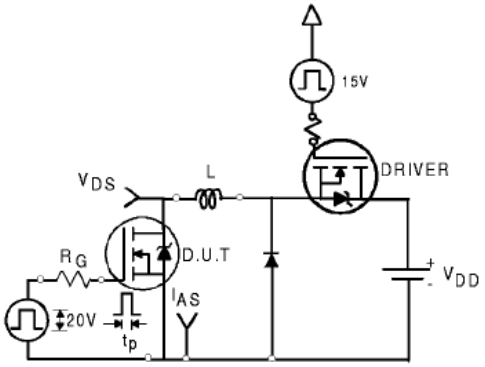


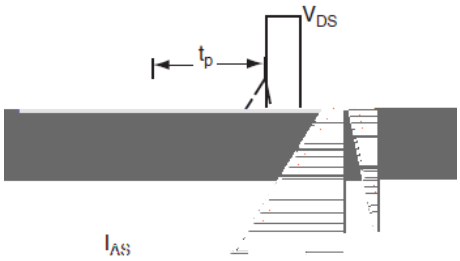
Figure 6: Drain-Source On Resistance



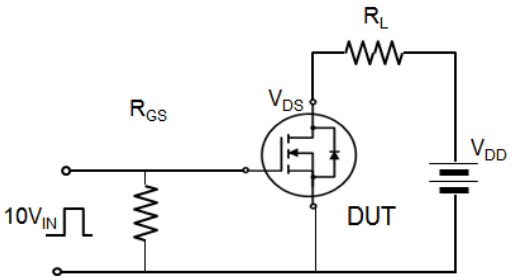
Avalanche Test Circuit

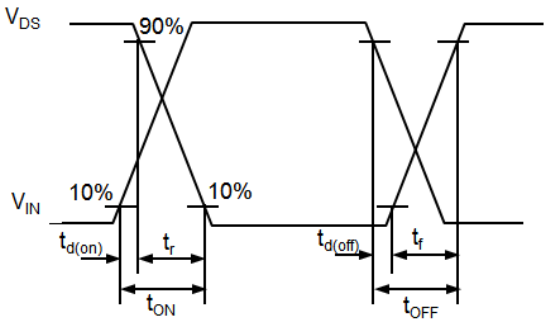


$$E_{AS} = \frac{1}{2} L I_{AS}^2$$

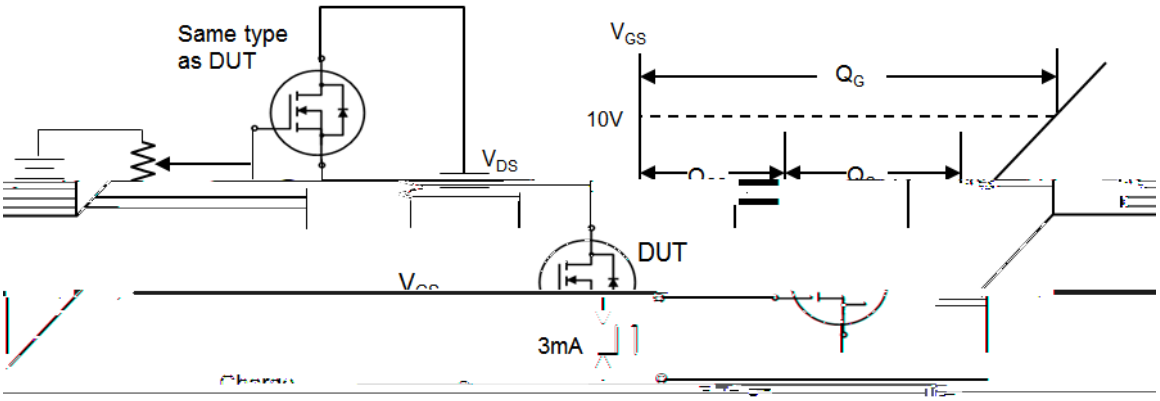


Switching Time Test Circuit





Gate Charge Test Circuit

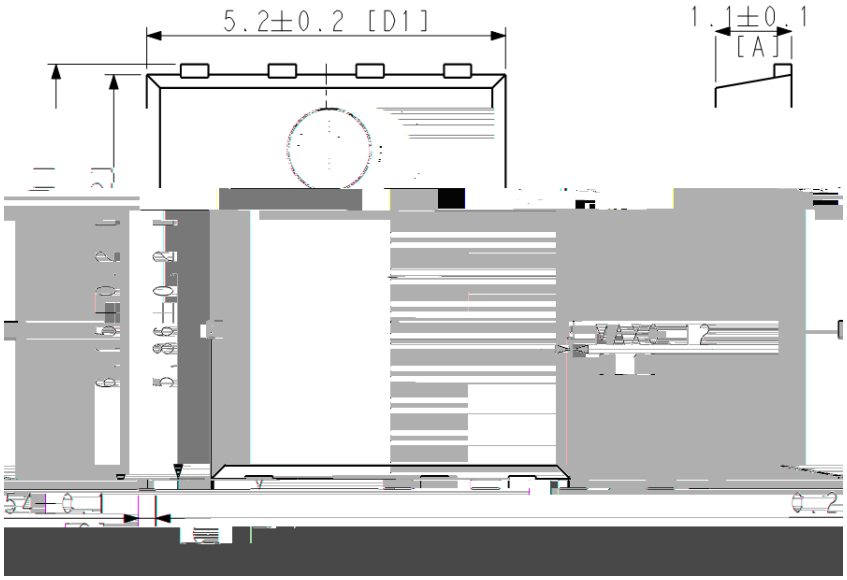


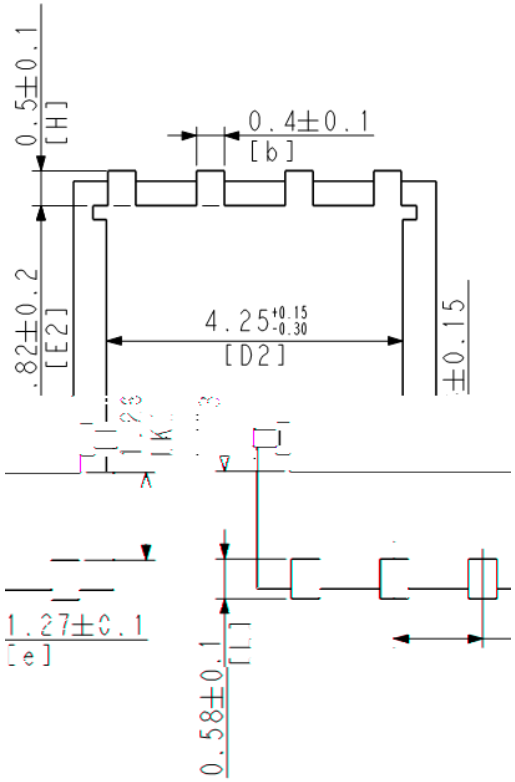
Device Per Unit

Package Type	Unit	Quantity
PPAK5*6-8L	Reel	5000

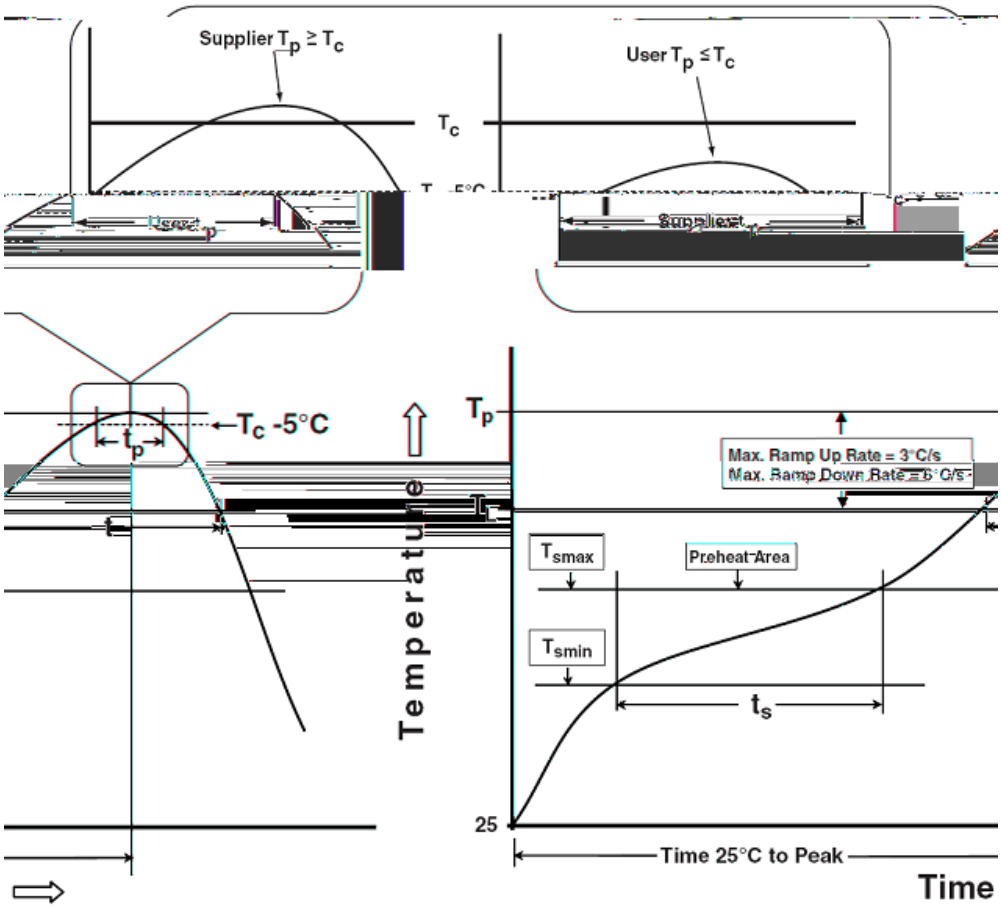
Package Information

PPAK5*6-8L





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

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