

Single N-Channel Enhancement Mode MOSFET

Feature

- 60V/70A
 $R_{DS(ON)} = 5.7\text{ m}\ (\text{typ.}) @ V_{GS} = 10\text{V}$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen- Free Devices Available

Applications

- High Frequency Point-of-Load Synchr

HY1906C2

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	°C
T _{STG}	Storage Temperature Range	-55 to 175	°C
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 _{θJC}	Thermal Resistance, Junction-to-Case	2.6	°C/W
R _{θJA}	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_{Jmax}, 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	-	-	-	

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

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, V _{DS} =25V, Frequency=1.0MHz	-	4620	-	pF
C _{oss}	Output Capacitance		-	410	-	
C _{rss}	Reverse Transfer Capacitance		-	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

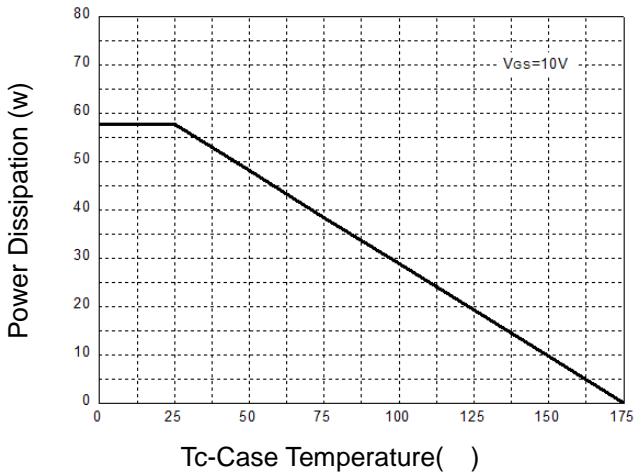


Figure 2: Drain Current

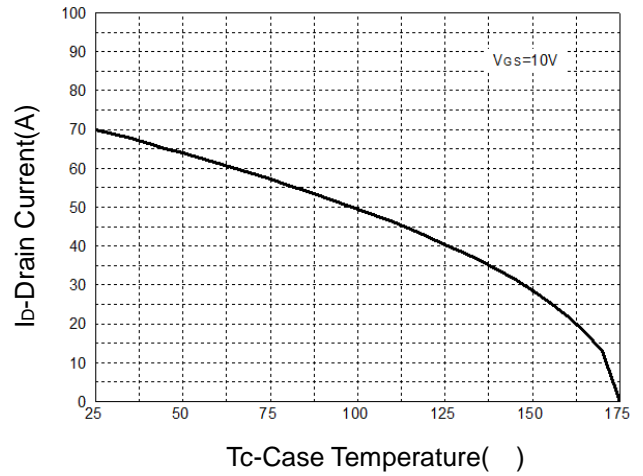


Figure 3: Safe Operation Area

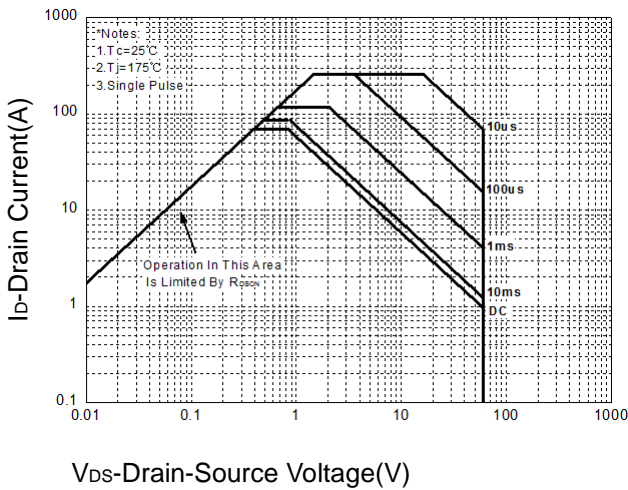


Figure 4: Thermal Transient Impedance

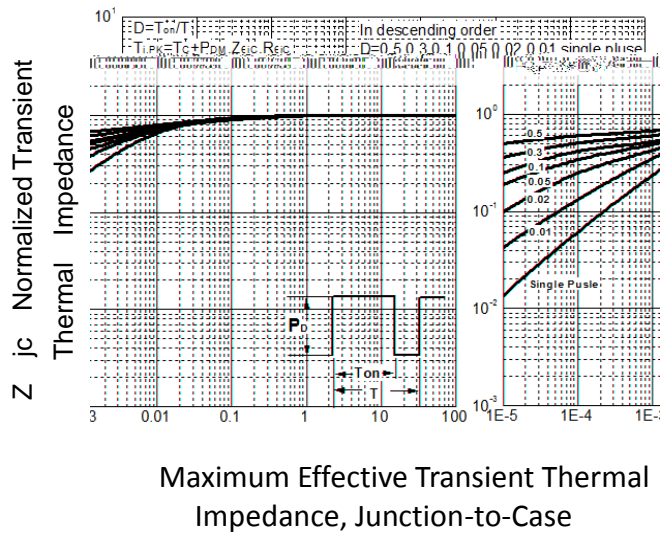


Figure 5: Output Characteristics

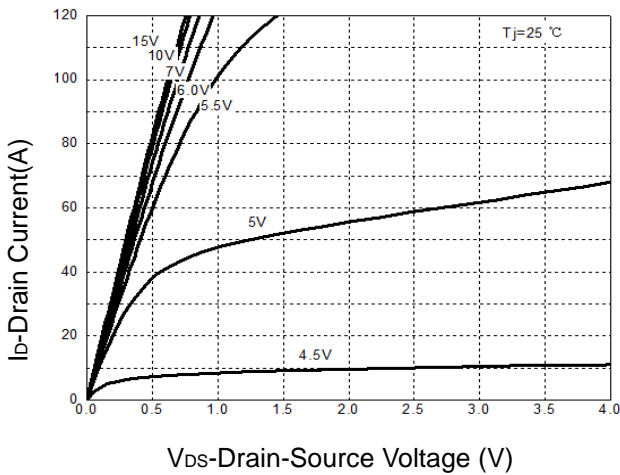
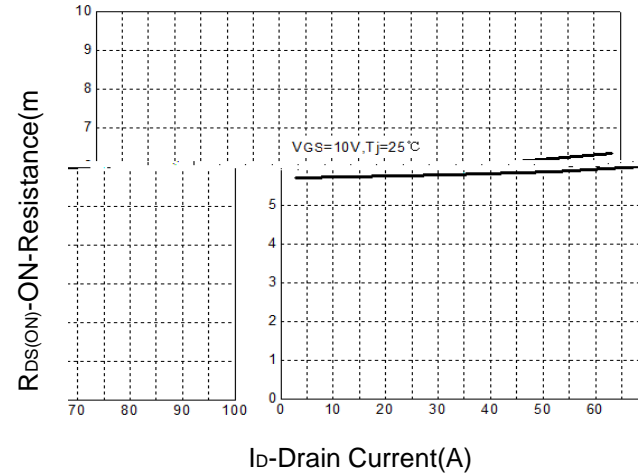
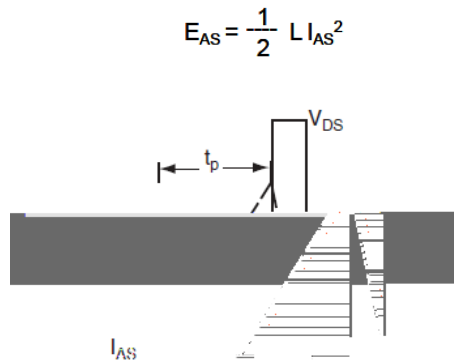
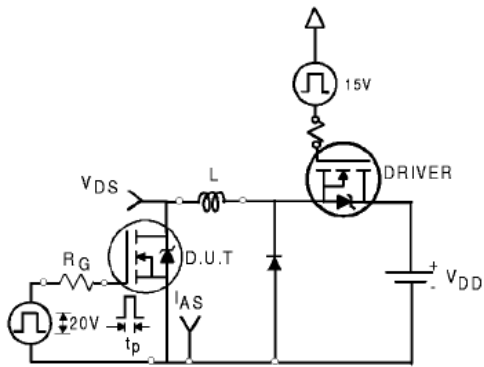


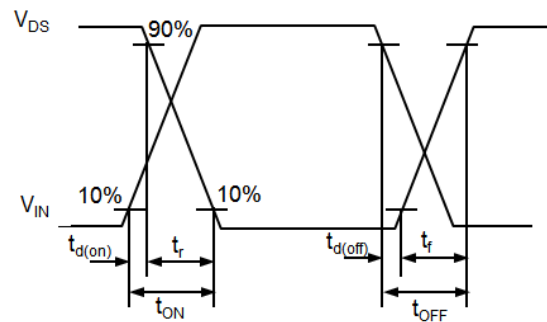
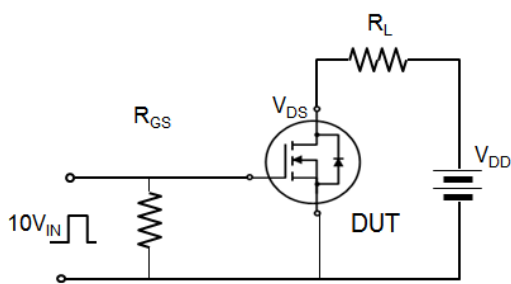
Figure 6: Drain-Source On Resistance



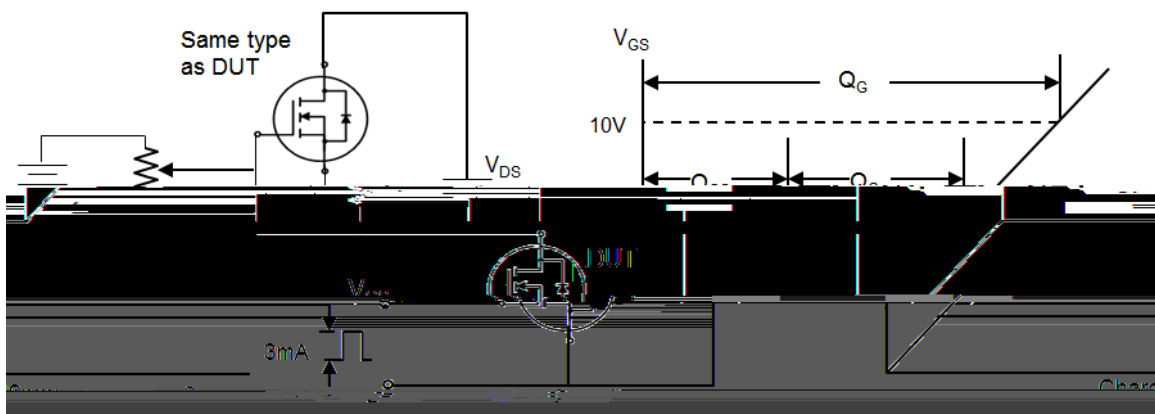
Avalanche Test Circuit



Switching Time Test Circuit



Gate Charge Test Circuit

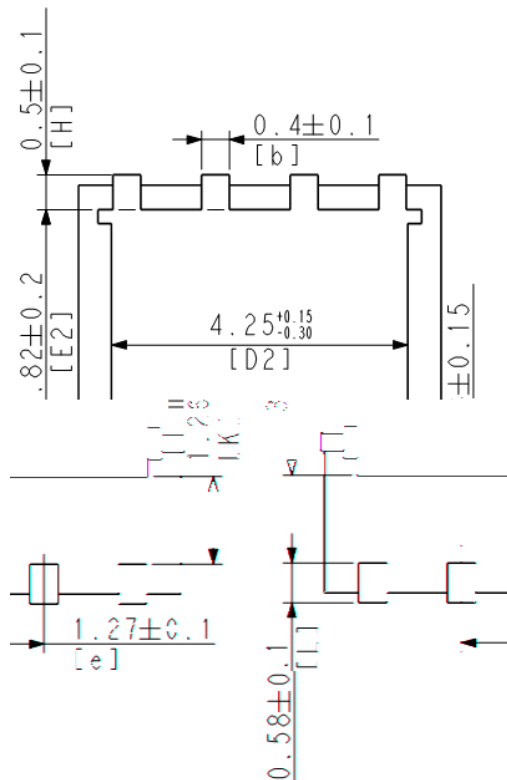
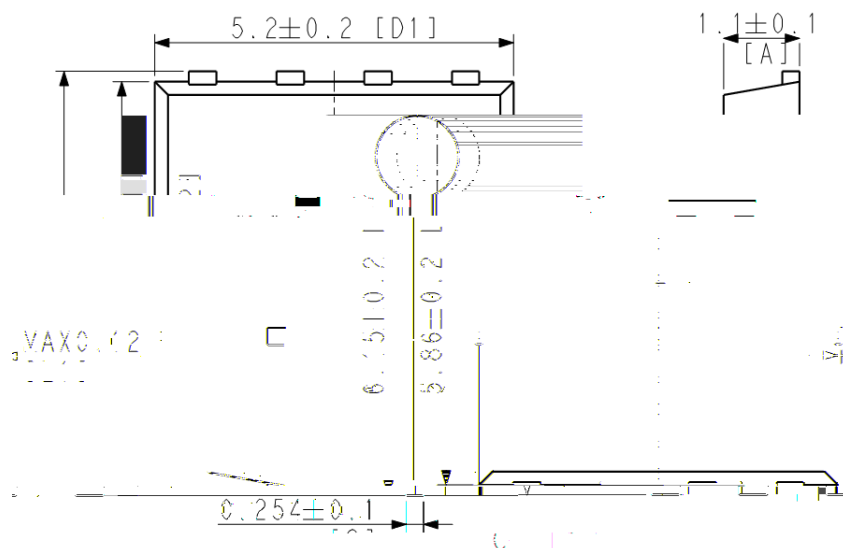


Device Per Unit

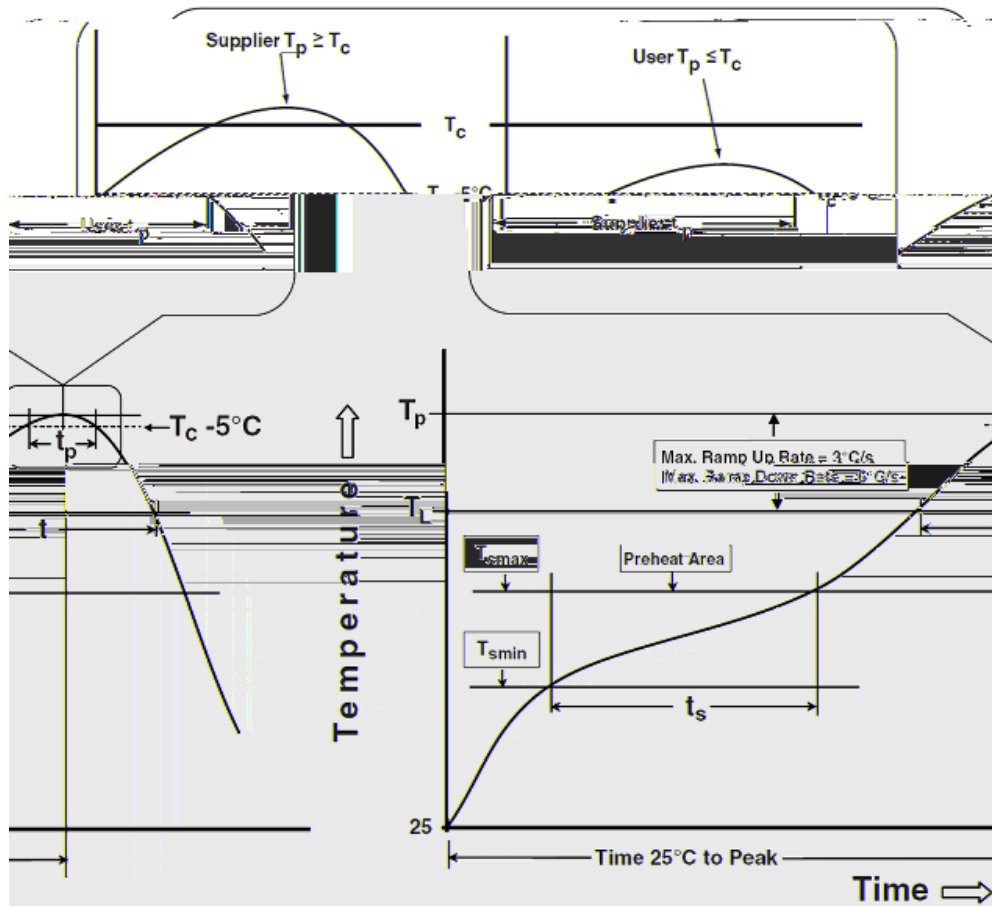
Package Type	Unit	Quantity
PPAK5*6-8L	Reel	5000

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})	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
	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

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