Absolute Maximum Ratings

Symbol	Parameter		N- Channel	P- Channel	Unit
	Common Ratings (Tc=25℃ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		30	-30	V
V_{GSS}	Gate-Source Voltage		±20		V
T_J	Junction Temperature Range		-55 to 175		℃
T_{STG}	Storage Temperature Range		-55 to 175		℃
I_S	Source Current-Continuous(Body	Tc=25°C	20	-19	A
	Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25°C	60	-60	A
I_D	Continuous Drain Current	Tc=25°C	20	-19	A
		Tc=100°C	14	-13.5	A
P_D	Maximum Power Dissipation	Tc=25°C	18.7	25	W
		Tc=100°C	9.3	12.5	W

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

Symbol	Parameter	Test Conditions	HYG170C03LR1			Unit
			Min	Typ.	Max	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_{DS}=250 A	30	-		V
I_{DSS}	Drain-to-Source LeakageCurrent	V_{DS}=30V,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	1.8	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}=10A	-	15	19	m
		V_{GS}=4.5V,I_{DS}=8A	-	22	28	
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=1A,V_{GS}=0V	-	0.75	1.0	V
t_{rr}	Reverse Recovery Time	I_{SD}=10A,dI_{SD}/dt=100A/	-	6	-	ns
Q_{rr}	Reverse Recovery Charge		-	2	-	nC

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

Symbol	Parameter	Test Conditions	HYG170C03LR1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Frequency=1.0MHz	-	1.2	-	
C_{iss}	Input Capacitance	V_{GS}=0V,	-	446	-	pF
C_{oss}	Output Capacitance	V_{DS}=25V,	-	55.1	-	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	44.2	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V,R_G=2.5 I_{DS}=10A,V_{GS}=10V	-	6	-	ns
T_r	Turn-on Rise Time		-	32	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	11	-	
T_f	Turn-off Fall Time		-	2.7	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge (VGS=10V,)	V_{DS} =24V,I_D=10A	-	9.2	-	nC
Q_g	Total Gate Charge (VGS=4.5V)		-	4.6	-	
Q_{gs}	Gate-Source Charge		-	1.9	-	
Q_{gd}	Gate-Drain Charge		-	2.3	-	

N-Mosfet Typical Operating Characteristics

Figure 1: Power Dissipation

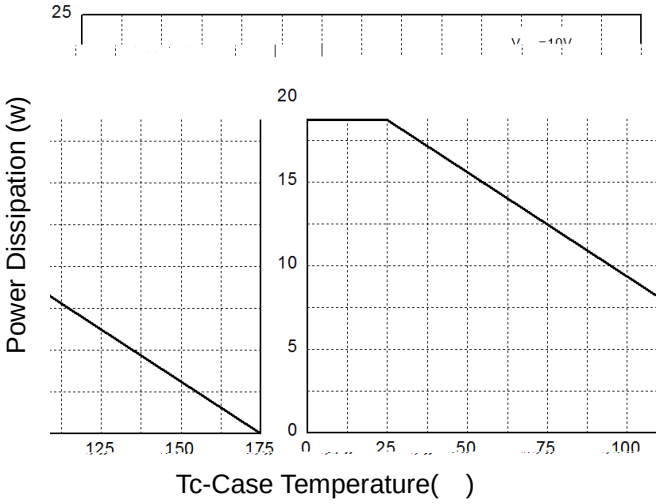


Figure 2: Drain Current

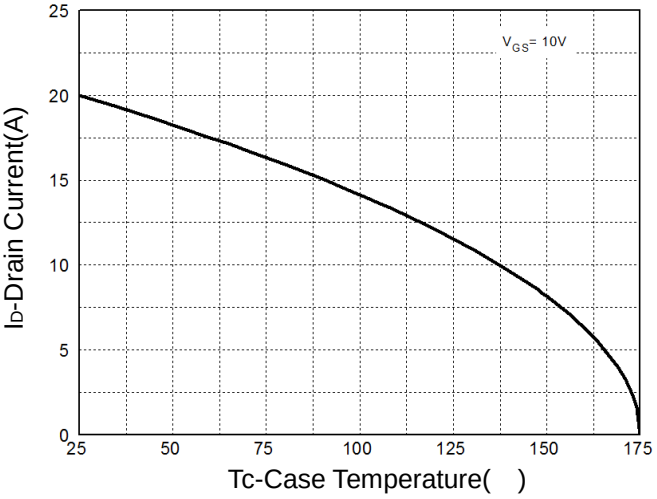


Figure 3: Safe Operation Area

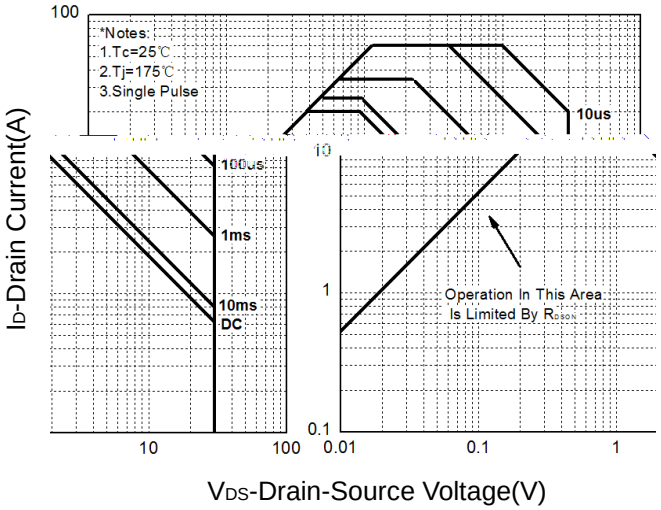


Figure 4: Thermal Transient Impedance

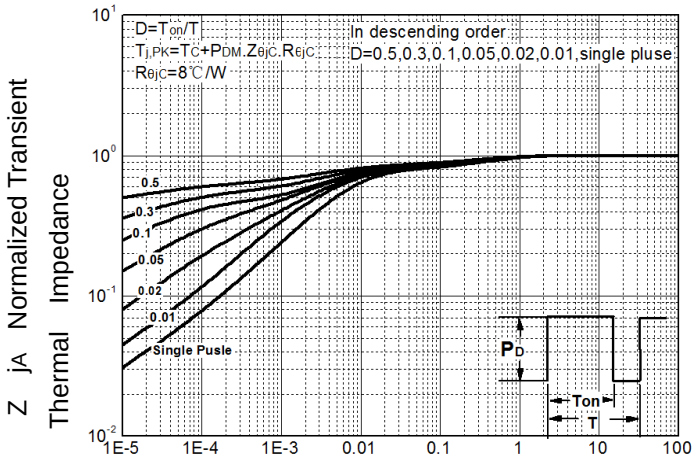


Figure 5: Output Characteristics

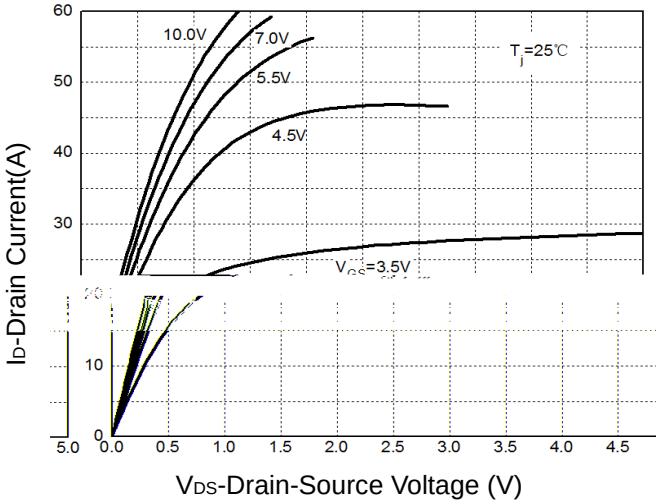
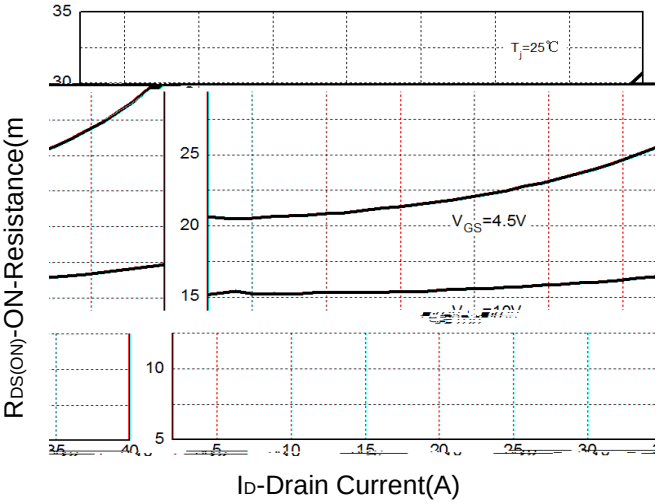


Figure 6: Drain-Source On Resistance



N-Mosfet Typical Operating Characteristics

Figure 7: On-Resistance vs. Temperature

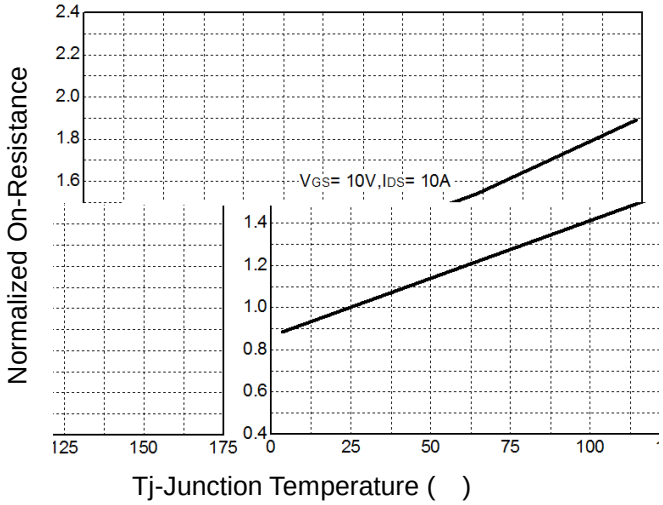


Figure 8: Source-Drain Diode Forward

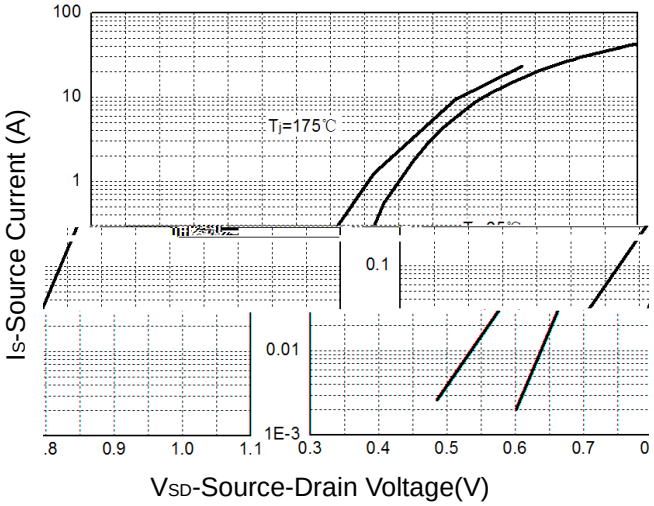


Figure 9: Capacitance Characteristics

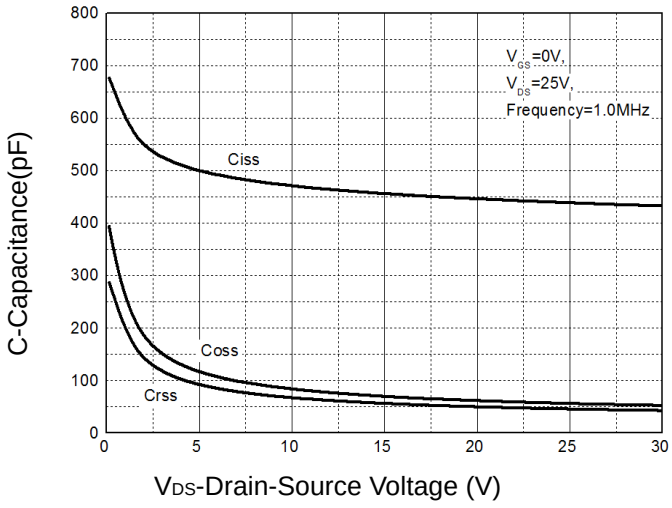
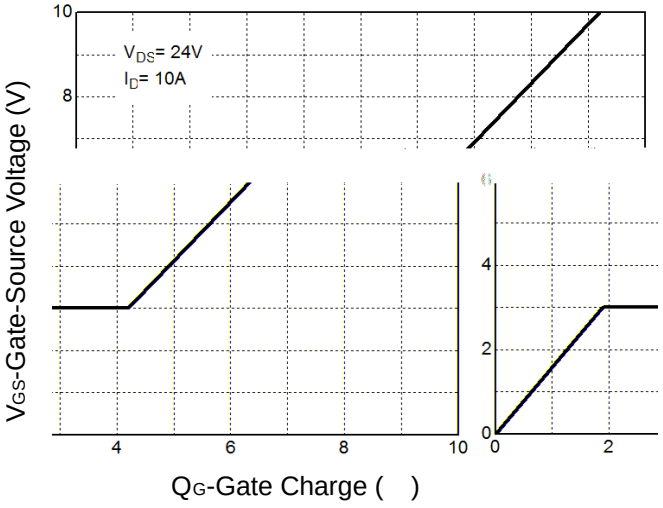
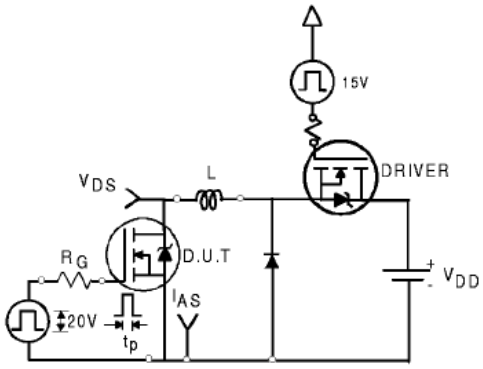


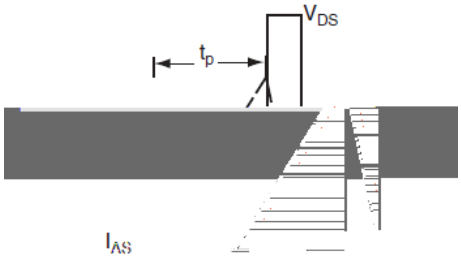
Figure 10: Gate Charge Characteristics



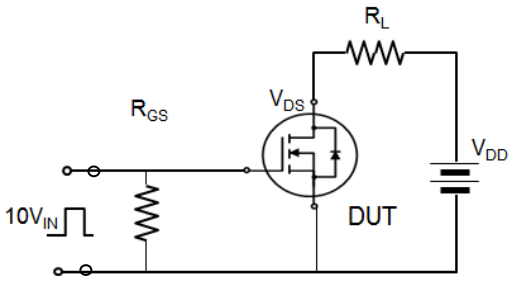
Avalanche Test Circuit

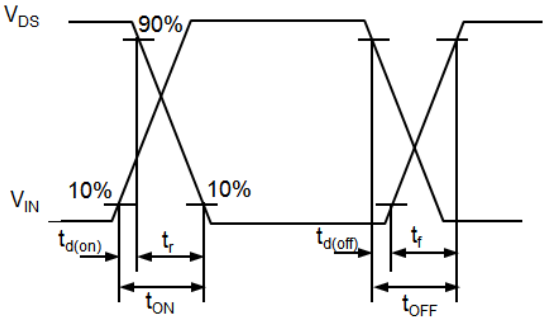


$$E_{AS} = \frac{1}{2} L I_{AS}^2$$

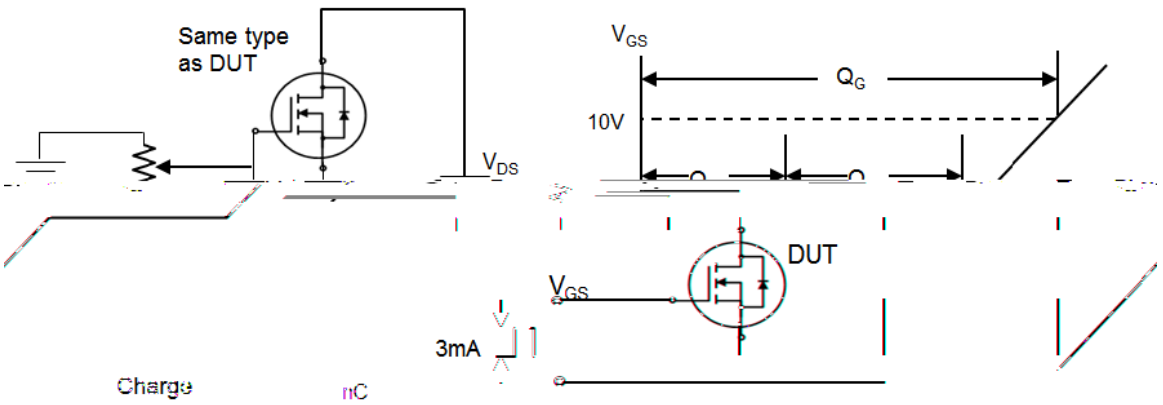


Switching Time Test Circuit





Gate Charge Test Circuit



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

Symbol	Parameter	Test Conditions	HYG170C03LR1			Unit
			Min	Typ.	Max	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_{DS}=-250 A	- 30	-		V
I_{DSS}	Drain-to-Source LeakageCurrent	V_{DS}=-30V,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	-1.9	-3	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}= 20V,V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$*	Drain-					

P-Mosfet Typical Operating Characteristics

Figure 1: Power Dissipation

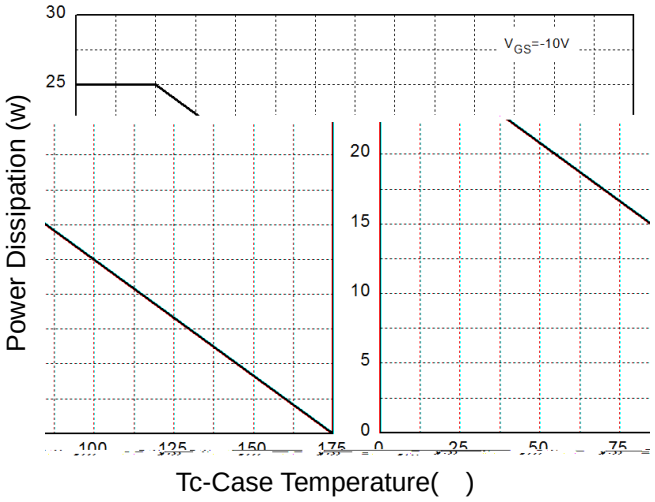


Figure 2: Drain Current

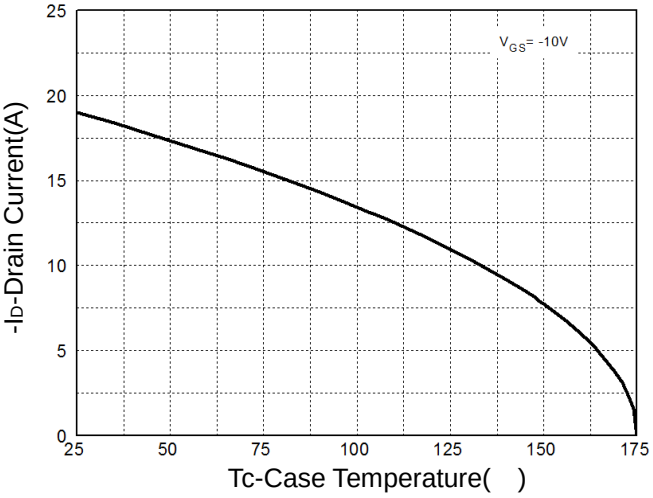


Figure 3: Safe Operation Area

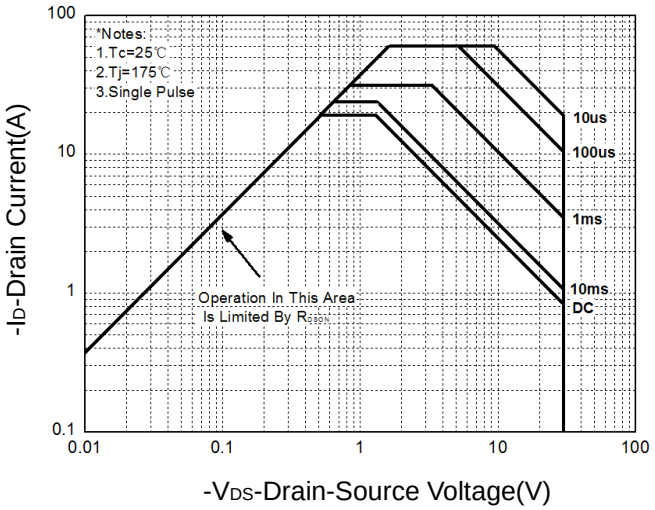


Figure 4: Thermal Transient Impedance

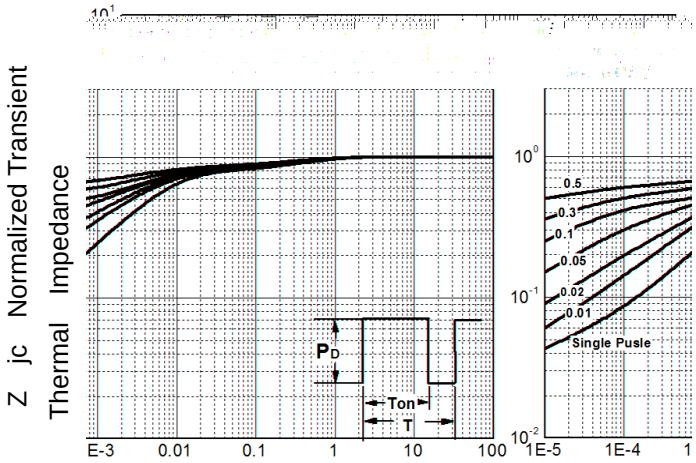


Figure 5: Output Characteristics

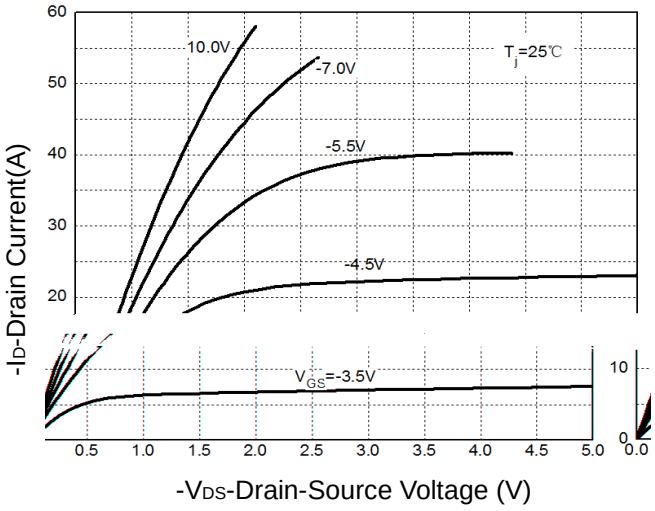
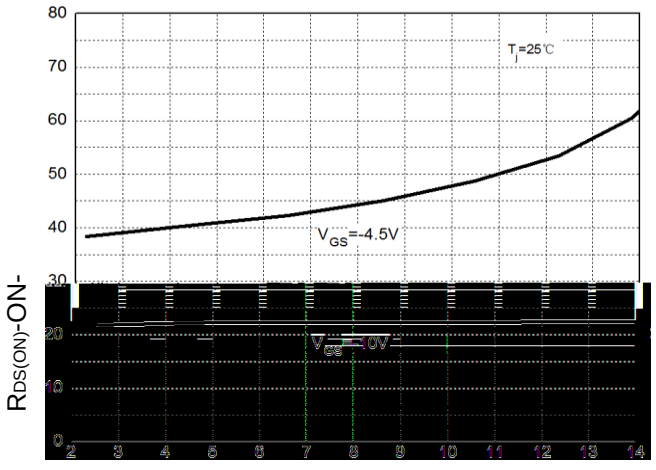


Figure 6: Drain-Source On Resistance



P-Mosfet Typical Operating Characteristics

Figure 7: On-Resistance vs. Temperature

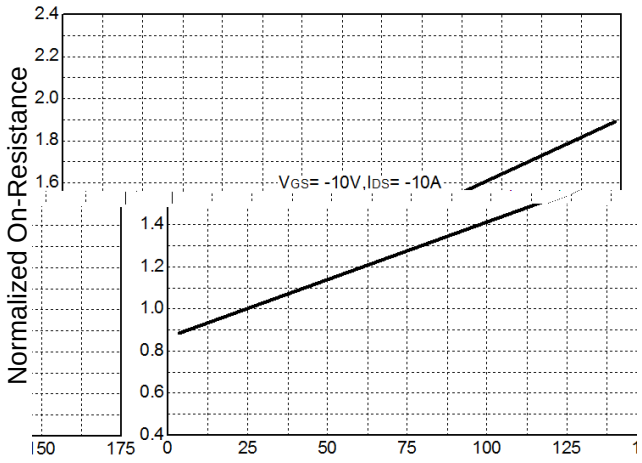


Figure 8: Source-Drain Diode Forward

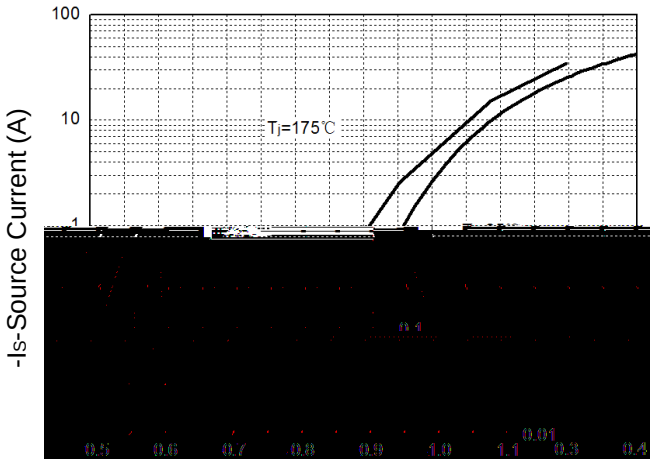


Figure 9: Capacitance Characteristics

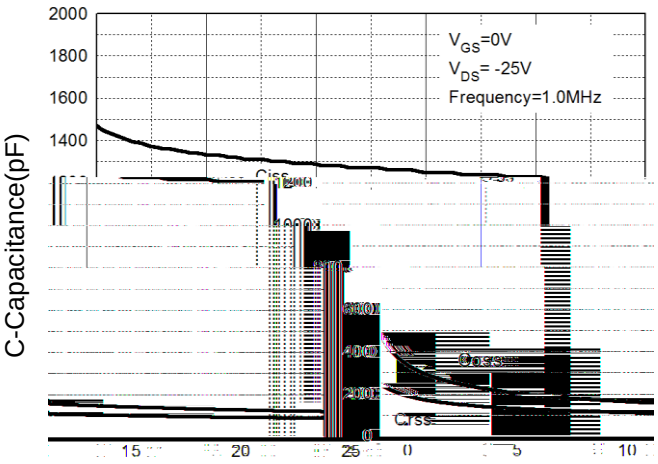
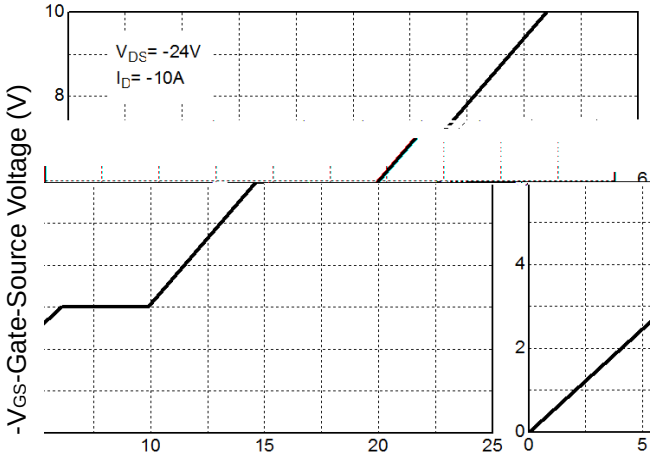
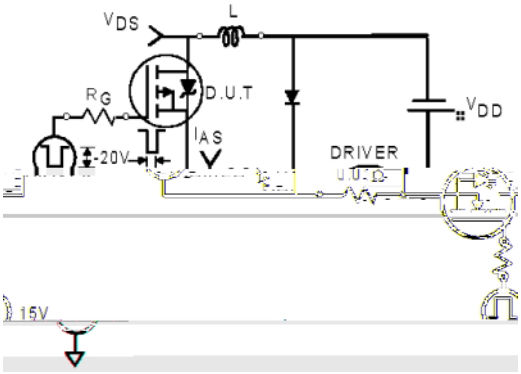
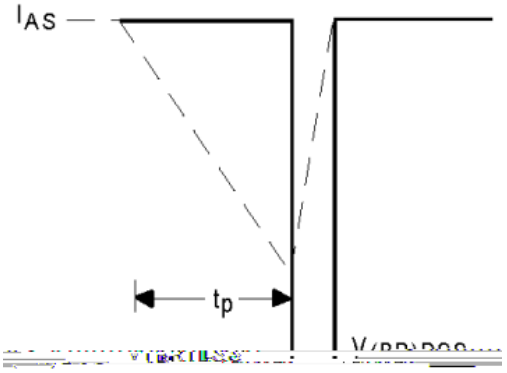


Figure 10: Gate Charge Characteristics

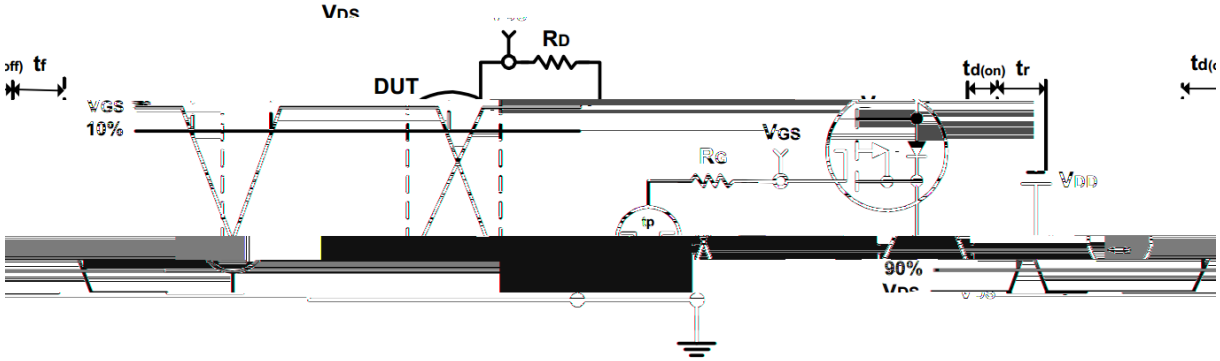


Avalanche Test Circuit

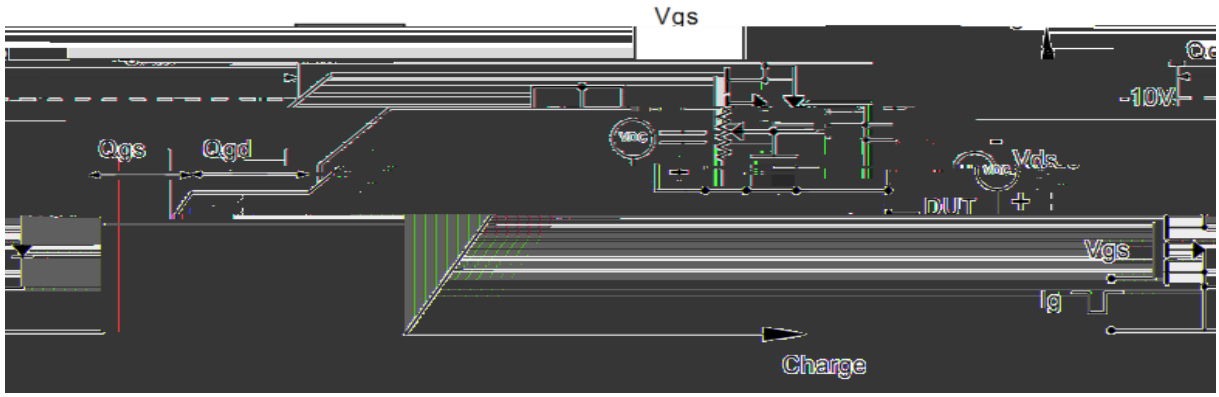




Switching Time Test Circuit



Gate Charge Test Circuit

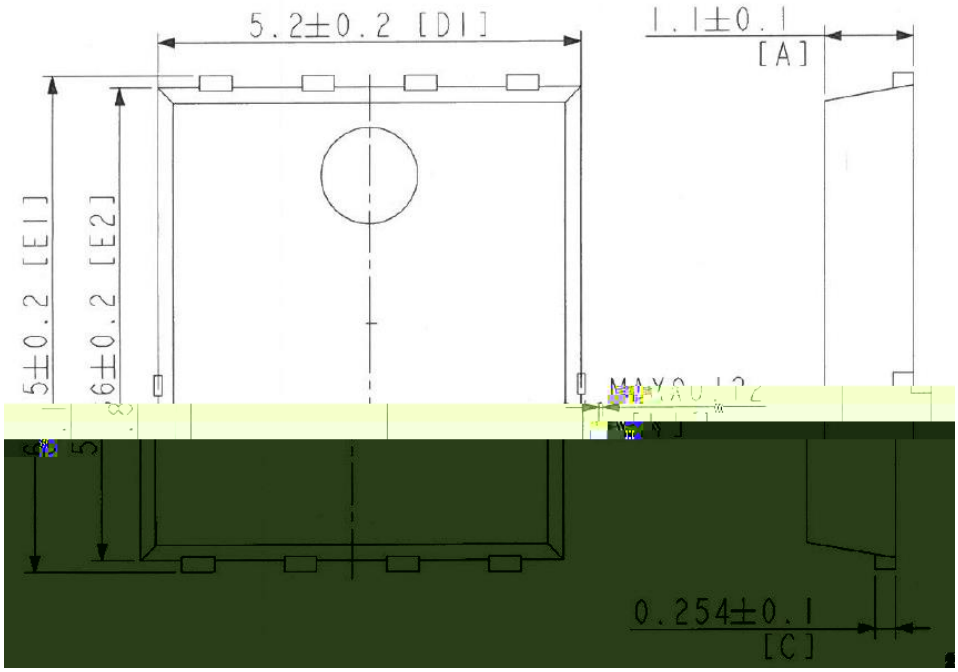


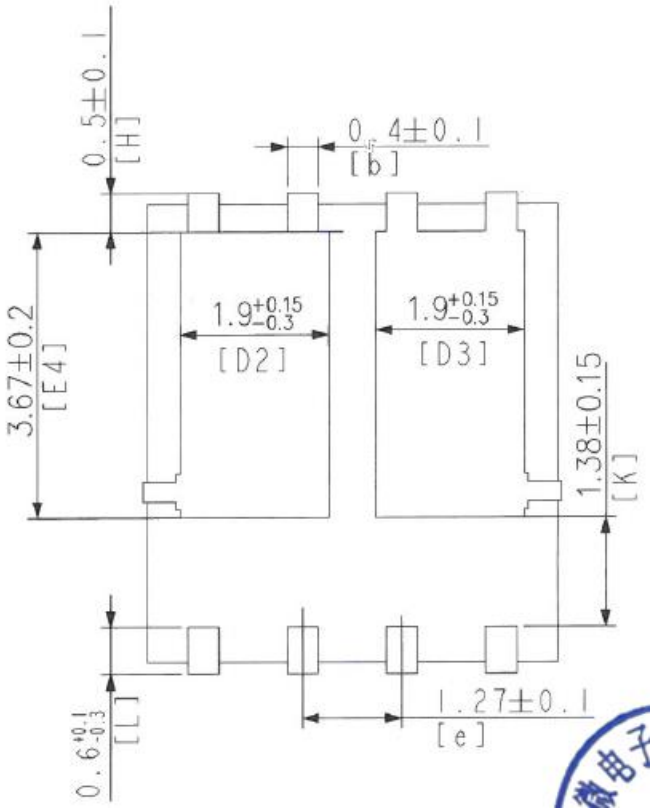
Device Per Unit

Package Type	Unit	Quantity
PDFN5*6-8L	Reel	5000

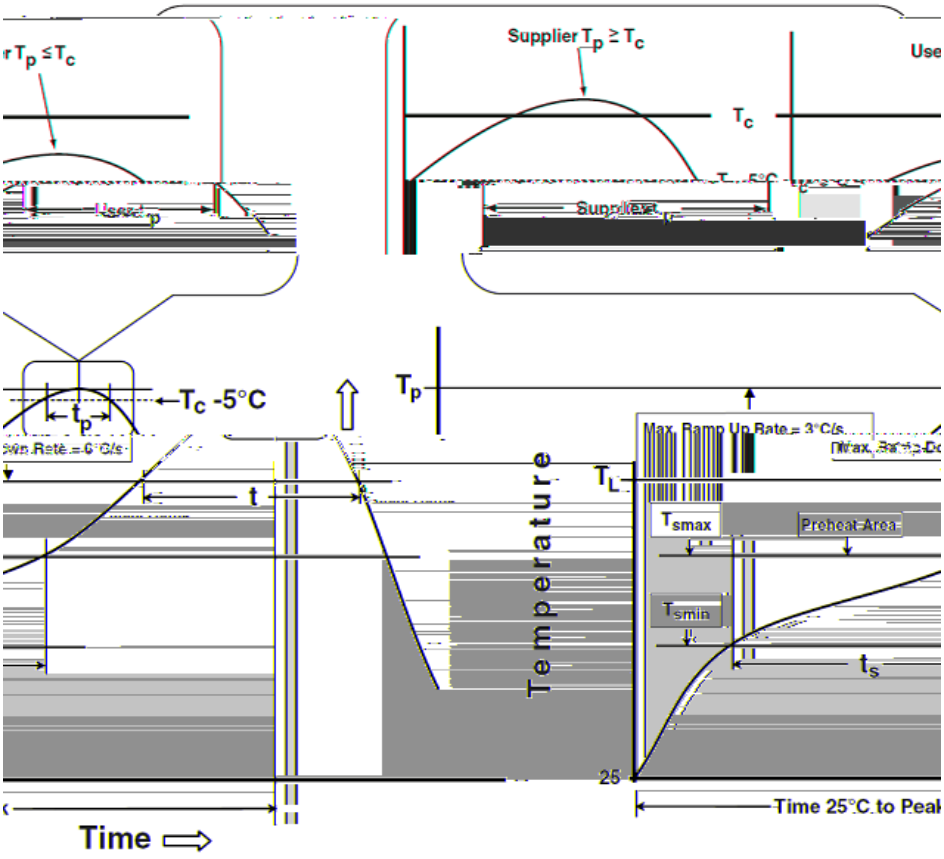
Package Information

PDFN5*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 \ 500Hrs\ 1000 Hrs, Bias @ 125°C
HTRB	JESD-22, A108	168 Hrs \ 500Hrs\ 1000 Hrs, Bias @ 125°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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