

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	40mΩ@10V	10A
	45mΩ@4.5V	

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-60V	70mΩ@-10V	-9.5A
	105mΩ@-4.5V	

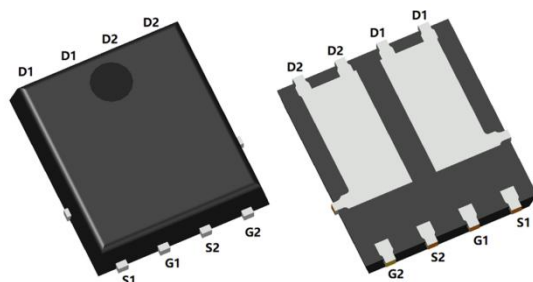
Feature

- Advanced trench technology
- Excellent $R_{DS(on)}$
- Low gate charge

Application

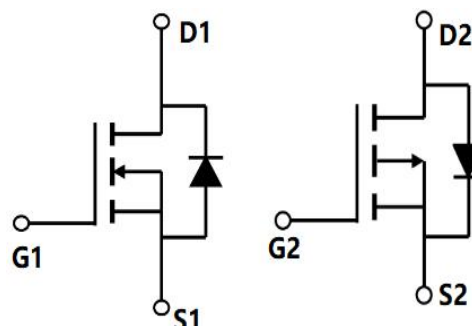
- Battery Protection
- Load Switch
- Uninterruptible Power Supply

Package



PDFN5*6-8L

Circuit diagram



Marking



Absolute maximum ratings (T_c=25°C unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V _{DS}	60	-60	V
Gate-Source Voltage	V _{GS}	±20	±20	V
Continuous Drain Current ¹⁾ (N-Mos:V _{GS} =10V; P-Mos:V _{GS} =-10V, T _A =25°C)	I _D	10	-9.5	A
Continuous Drain Current ¹⁾ (N-Mos:V _{GS} =10V; P-Mos:V _{GS} =-10V, T _A =70°C)	I _D (70°C)	5.2	-4.3	A
Pulsed Drain Current ²⁾	I _{DM}	30	-27	A
Single Pulse Avalanche Energy ^{3,4)}	E _{AS}	25.5	35.3	mJ
Power Dissipation ⁵⁾ (T _A =25°C)	P _D	1.5	1.5	W
Thermal Resistance Junction to Ambient	R _{θJA}	83.3	83.3	°C/W
Operating Junction Temperature	T _J	-55 ~ +150	-55 ~ +150	°C
Storage Temperature	T _{STG}	-55 ~ +150	-55 ~ +150	°C

N-CH Electrical characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	60			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =48V, V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.6	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =4A		35	40	mΩ
		V _{GS} =4.5V, I _D =2A		38	45	
Dynamic characteristics ⁶⁾						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f =1MHz		1378		pF
Output Capacitance	C _{oss}			86		
Reverse Transfer Capacitance	C _{rss}			64		
Total Gate Charge	Q _g	V _{DS} =48V, V _{GS} =4.5V, I _D =4A		12.6		nC
Gate-Source Charge	Q _{gs}			3.2		
Gate-Drain Charge	Q _{gd}			6.3		
Turn-on delay time	t _{d(on)}	V _{DS} =30V, V _{GS} =10V, I _D =4A R _G =3.3Ω		8		nS
Turn-on rise time	t _r			14.2		
Turn-off delay time	t _{d(off)}			24.4		
Turn-off fall time	t _f			4.6		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				10	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =1A			1.2	V

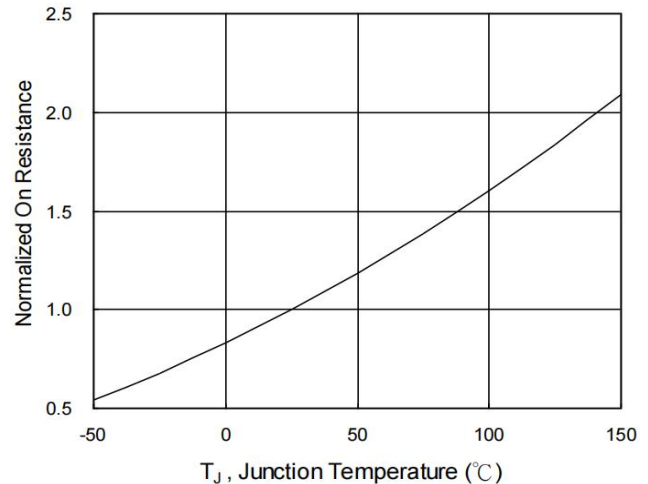
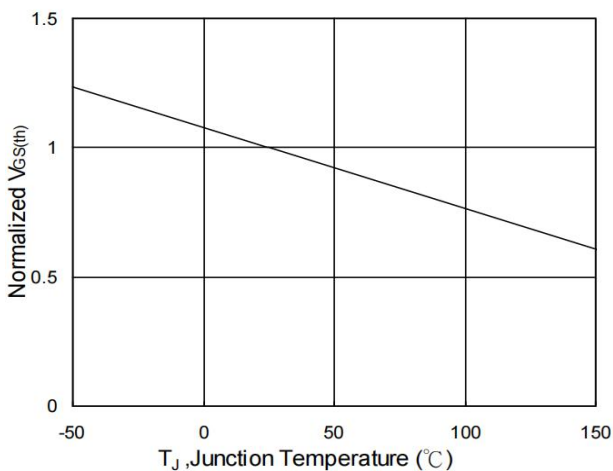
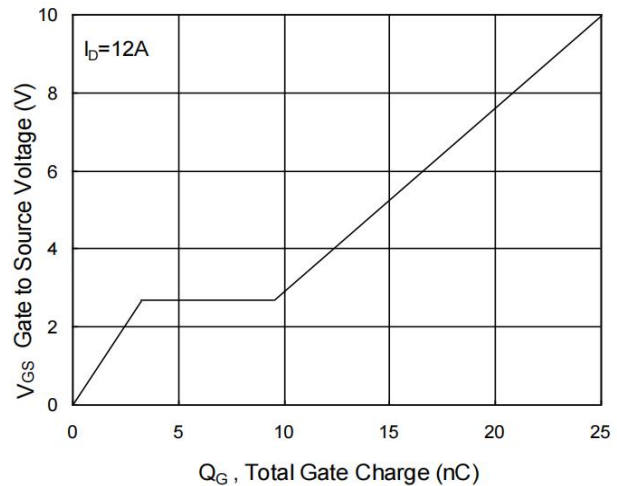
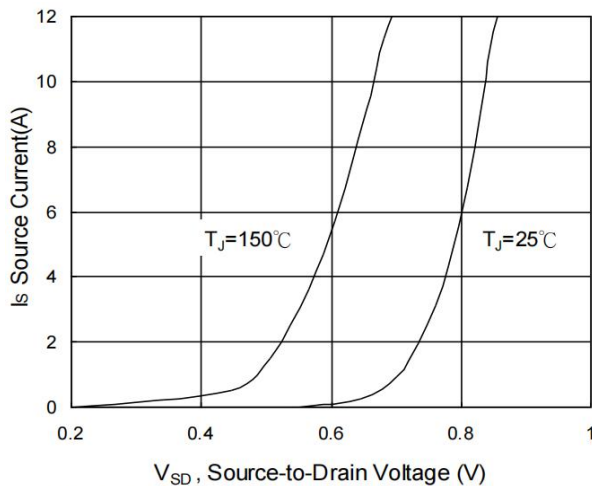
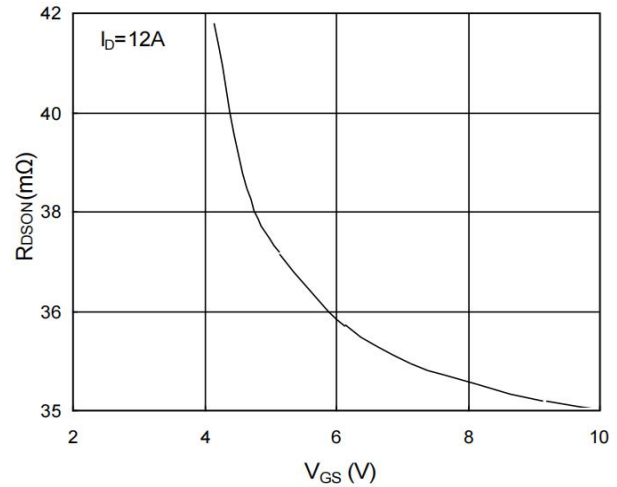
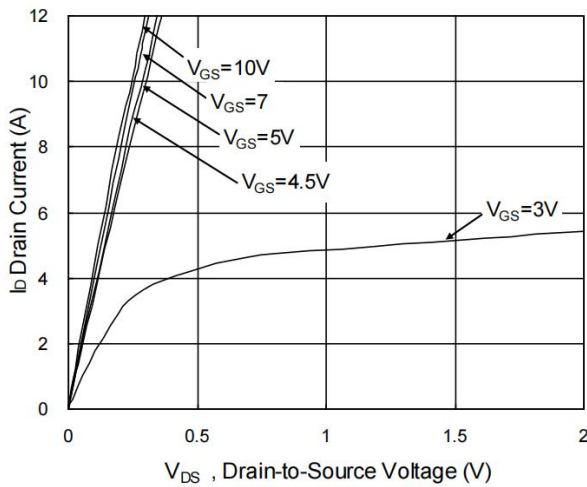
P-CH Electrical characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =-250μA	-60			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-48V, V _{GS} =0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.2	-1.5	-2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-3A		55	70	mΩ
		V _{GS} =-4.5V, I _D =-2A		75	105	
Dynamic characteristics ⁶⁾						
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f =1MHz		1447		pF
Output Capacitance	C _{oss}			97.3		
Reverse Transfer Capacitance	C _{rss}			70		
Total Gate Charge	Q _g	V _{DS} =-48V, V _{GS} =-4.5V I _D =-3A		9.86		nC
Gate-Source Charge	Q _{gs}			3.1		
Gate-Drain Charge	Q _{gd}			2.95		
Turn-on delay time	t _{d(on)}	V _{DS} =-15V, V _{GS} =-10V I _D =-1A, R _G =3.3Ω		28.8		nS
Turn-on rise time	t _r			19.8		
Turn-off delay time	t _{d(off)}			60.8		
Turn-off fall time	t _f			7.2		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				-9.5	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =-1A			-1.2	V

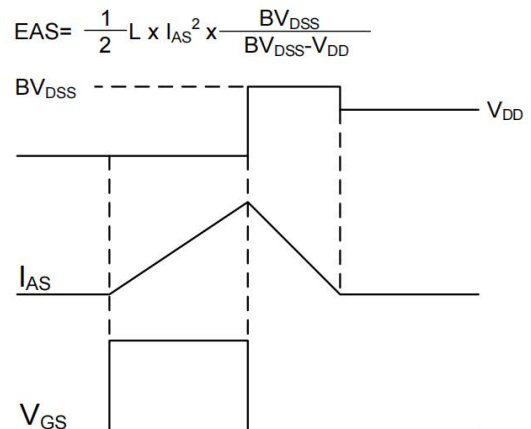
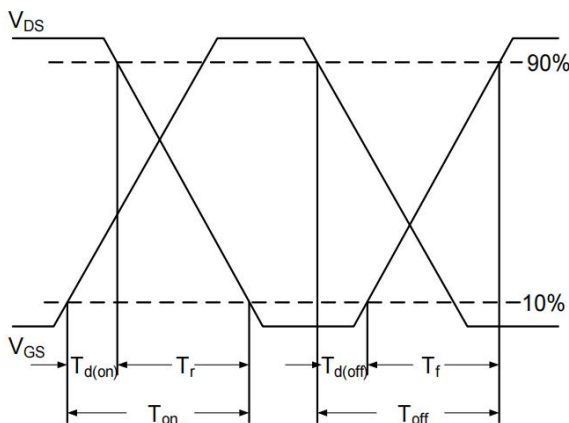
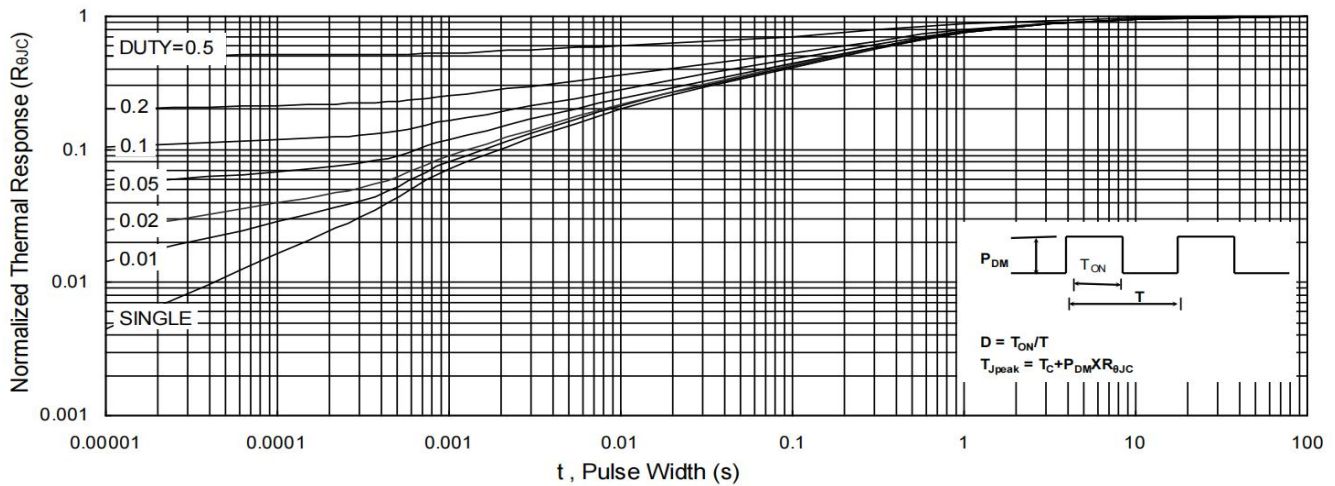
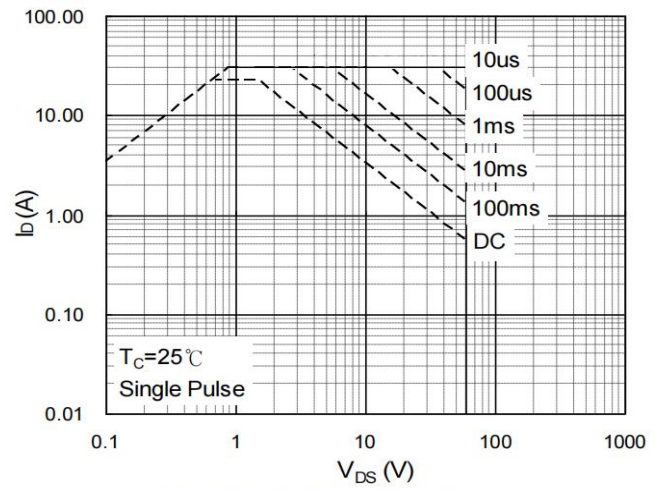
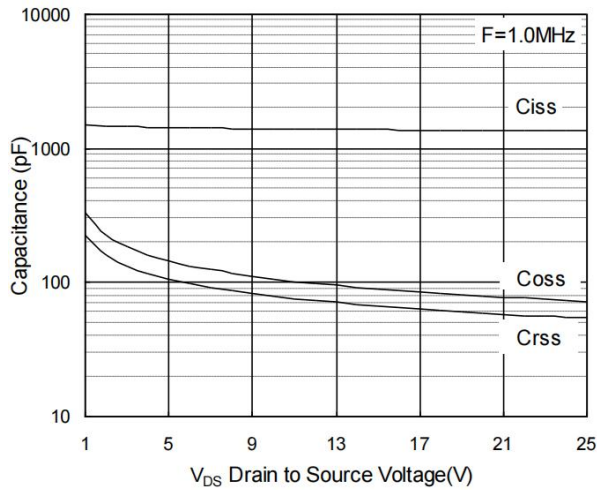
Notes:

- 1) The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
- 2) The data tested by pulsed , pulse width ≤300us , duty cycle ≤2%.
- 3) The EAS data shows Max. rating . The N-CH test condition is V_{DD} =25V, V_{GS} =10V, L=0.1mH, I_{AS} =22.6A.
- 4) The EAS data shows Max. rating . The P-CH test condition is V_{DD} =-25V, V_{GS} =-10V, L=0.1mH, I_{AS} =-26.6A.
- 5) The power dissipation is limited by 150°C junction temperature.
- 6) Guaranteed by design, not subject to production.

N-Channel Typical Characteristics



N-Channel Typical Characteristics



P-Channel Typical Characteristics

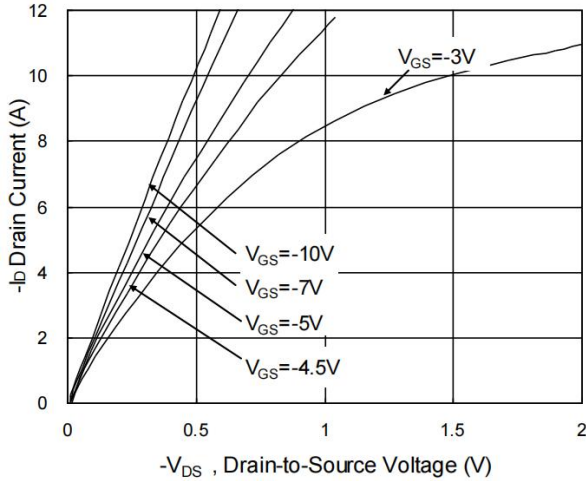


Fig.1 Typical Output Characteristics

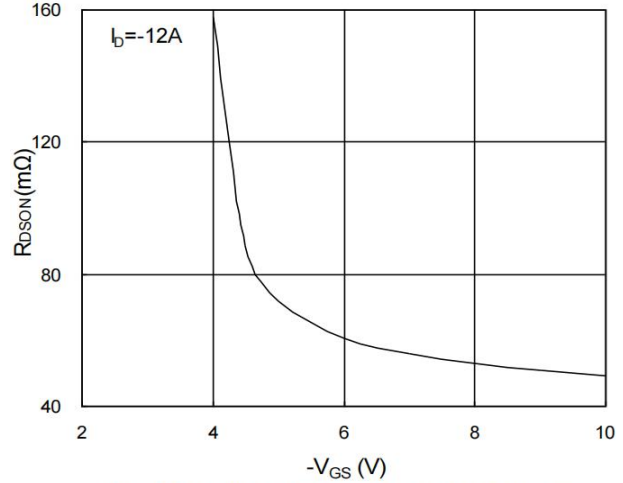


Fig.2 On-Resistance v.s Gate-Source

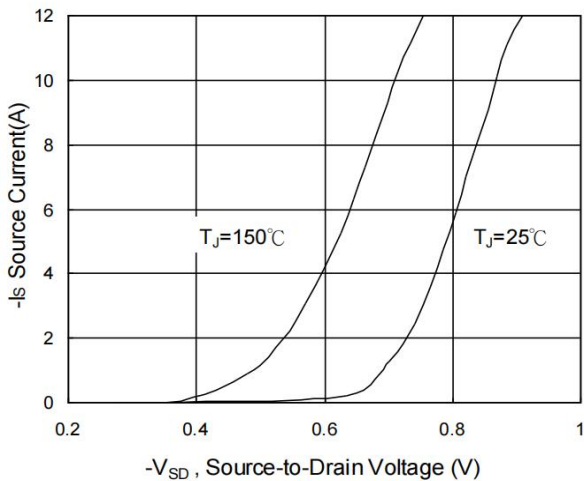


Fig.3 Forward Characteristics of Reverse

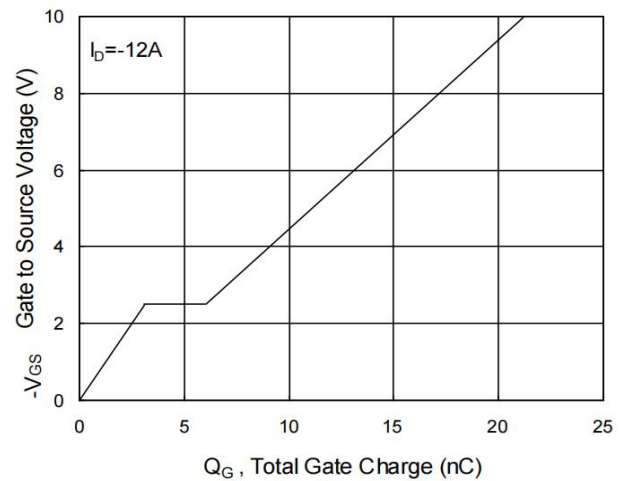


Fig.4 Gate-Charge Characteristics

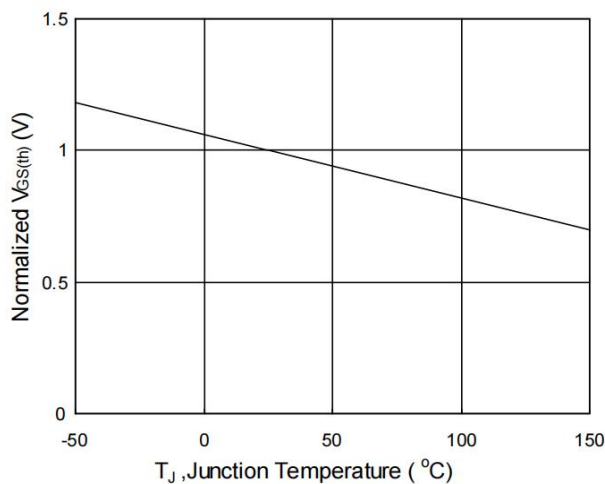


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

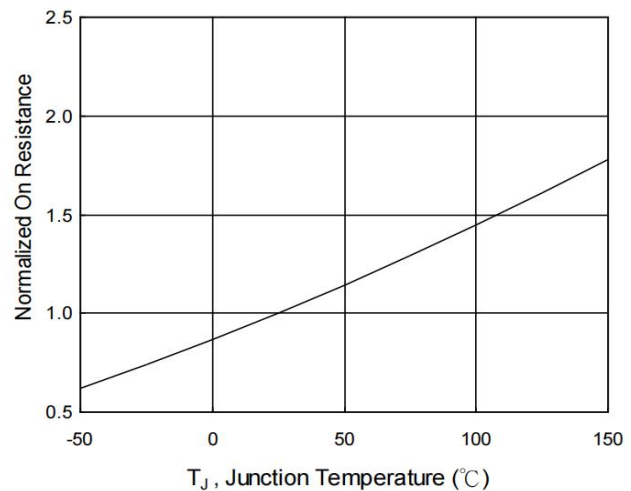
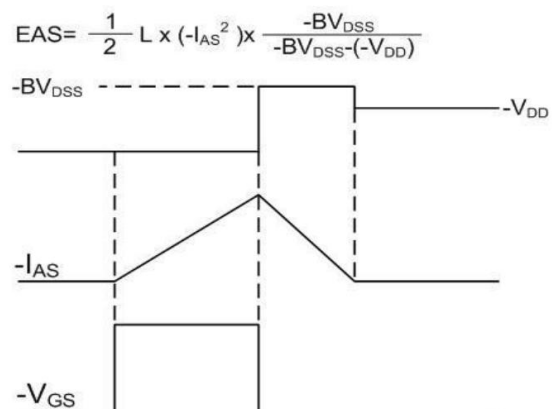
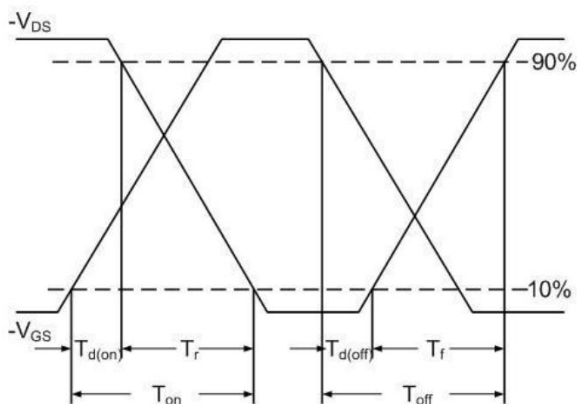
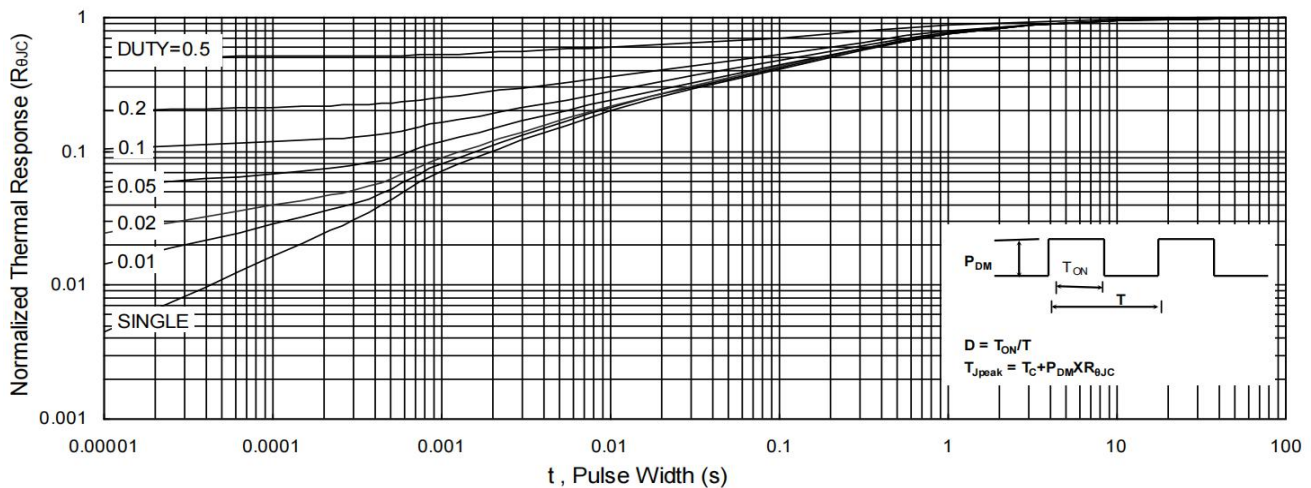
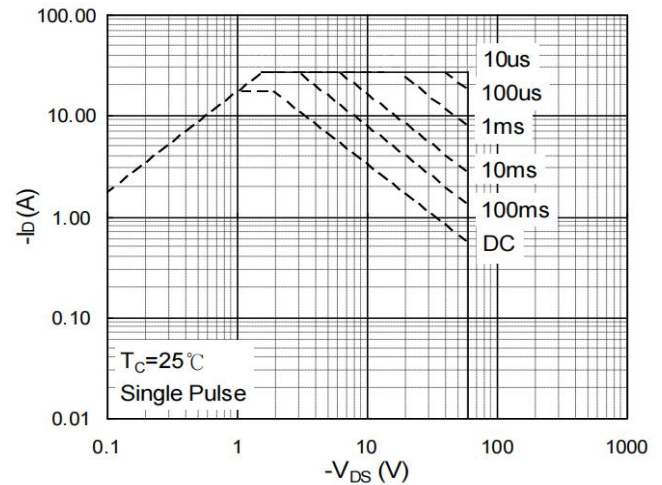
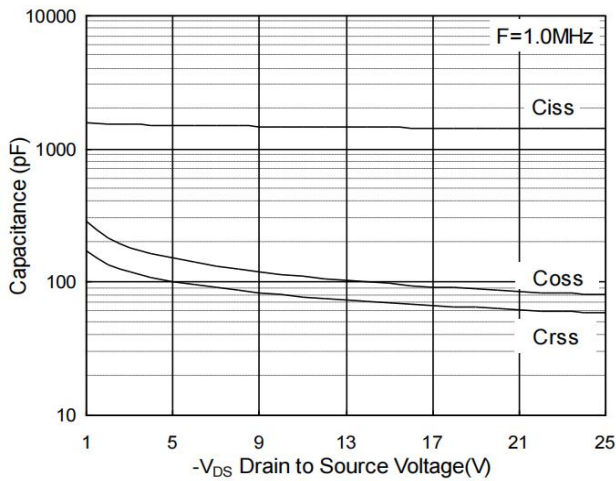
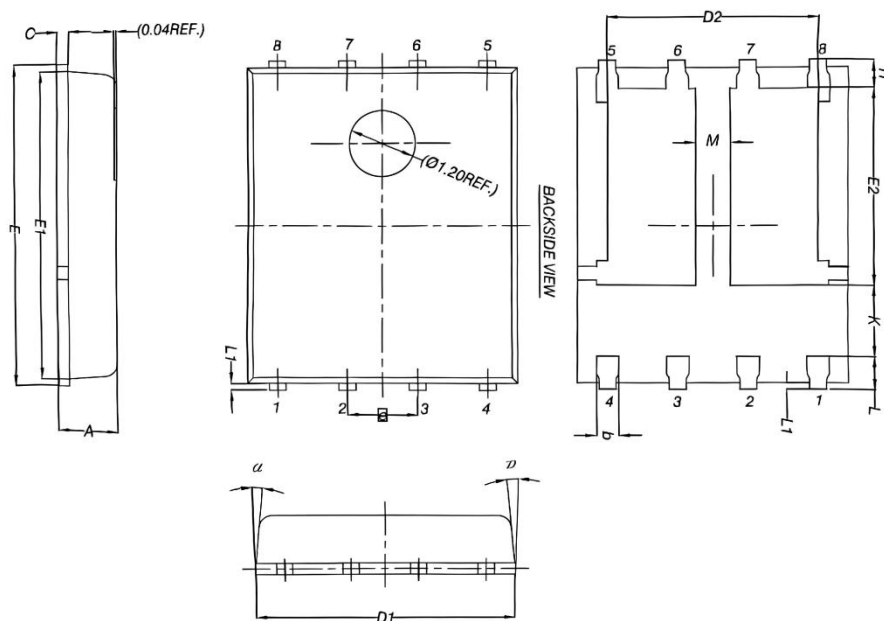


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

P- Channel Typical Characteristics



PDFN5*6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
b	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.012
D1	4.800	5.000	0.189	0.197
D2	3.610	3.960	0.142	0.156
E	5.900	6.100	0.232	0.240
E1	5.660	5.830	0.223	0.230
E2	3.370	3.580	0.133	0.141
e	1.270 BSC.		0.050 BSC.	
H	0.410	0.610	0.016	0.024
K	1.100	-	0.043	-
L	0.510	0.710	0.020	0.028
L1	0.060	0.200	0.002	0.008
M	0.500	-	0.020	-
a	10°	12°	10°	12°