

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
30V	15mΩ@10V	24A
	23mΩ@4.5V	

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
-30V	24mΩ@-10V	-21A
	38mΩ@-4.5V	

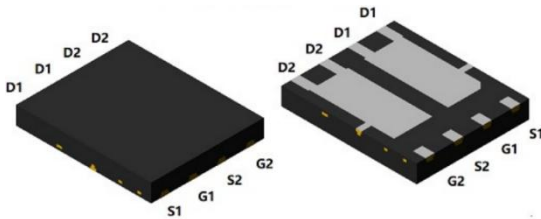
Feature

- Trench Power MOSFET
- Excellent $R_{DS(on)}$ and Low Gate Charge
- Fast Switching Speed

Application

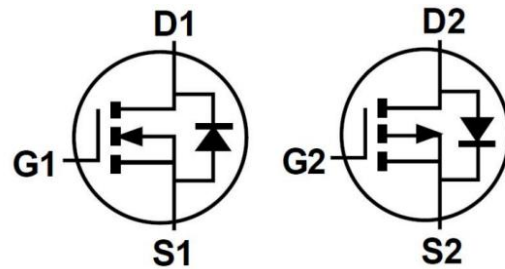
- Motor Control
- Inverters

Package

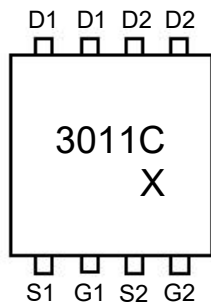


PDFN5X6-8L

Circuit diagram



Marking



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

Parameter	Symbol	N-Channel	p-Channel	Unit
Drain-Source Voltage	V _{DS}	30	-30	V
Gate-Source Voltage	V _{GS}	±20	±20	V
Continuous Drain Current(t≤10s)	I _D	24	-21	A
Single Pulse Avalanche Energy ³⁾	E _{AS}	129	169	mJ
Power Dissipation(t≤10s)	P _D	26	22	W
Thermal Resistance from Junction to Ambient(t≤10s)	R _{θJA}	4.81	5.68	°C/W
Junction Temperature	T _J	150		°C
Storage Temperature	T _{STG}	-55 ~ +150		°C

N-CH Electrical characteristics (TA=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	30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 24V, V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.5	2.5	V
Drain-source on-resistance ¹⁾	R _{DS(on)}	V _{GS} = 10V, I _D = 8A		11	15	mΩ
		V _{GS} = 4.5V, I _D = 6A		17	23	mΩ
Dynamic characteristics²⁾						
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz		940		pF
Output Capacitance	C _{oss}			131		
Reverse Transfer Capacitance	C _{rss}			109		
Total Gate Charge	Q _g	V _{DS} = 15V, V _{GS} = 4.5V, I _D = 8A		9.63		nC
Gate-Source Charge	Q _{gs}			3.88		
Gate-Drain Charge	Q _{gd}			3.44		
Turn-on delay time	t _{d(on)}	V _{DD} = 15V, V _{GS} = 10V, I _D = 8A, R _G = 1.5Ω		4.2		nS
Turn-on rise time	t _r			8.2		
Turn-off delay time	t _{d(off)}			31		
Turn-off fall time	t _f			4		
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	V _{GS} = 0V, I _S = 1A			1.2	V

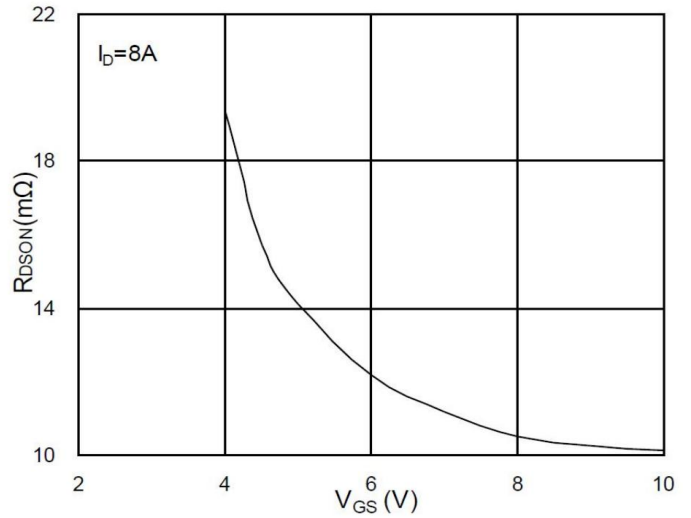
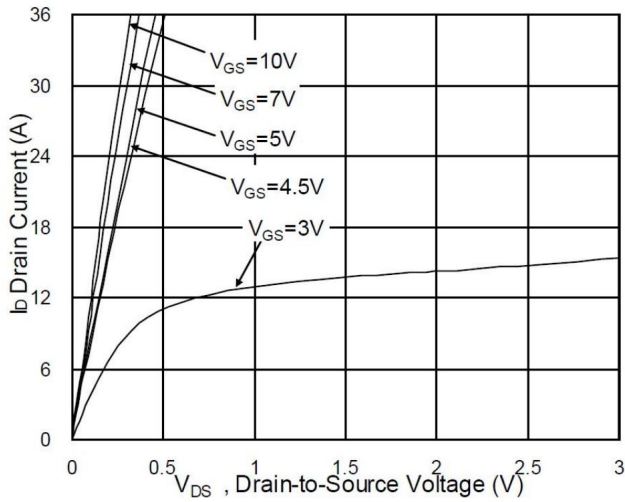
P-CH Electrical characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -24V, V_{GS} = 0V$			-1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.5	-2.5	V
Drain-source on-resistance ¹⁾	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -8A$		20	24	m Ω
		$V_{GS} = -4.5V, I_D = -6A$		29	38	m Ω
Dynamic characteristics²⁾						
Input Capacitance	C_{iss}	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$		1600		pF
Output Capacitance	C_{oss}			350		
Reverse Transfer Capacitance	C_{rss}			300		
Total Gate Charge	Q_g	$V_{DS} = -15V, V_{GS} = -4.5V, I_D = -8A$		30		nC
Gate-Source Charge	Q_{gs}			5.5		
Gate-Drain Charge	Q_{gd}			8		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -15V, V_{GS} = -10V, I_D = -1A, R_{GEN} = 6\Omega$		10		nS
Turn-on rise time	t_r			15		
Turn-off delay time	$t_{d(off)}$			110		
Turn-off fall time	t_f			70		
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	$V_{GS} = 0V, I_S = -1A$			-1.2	V

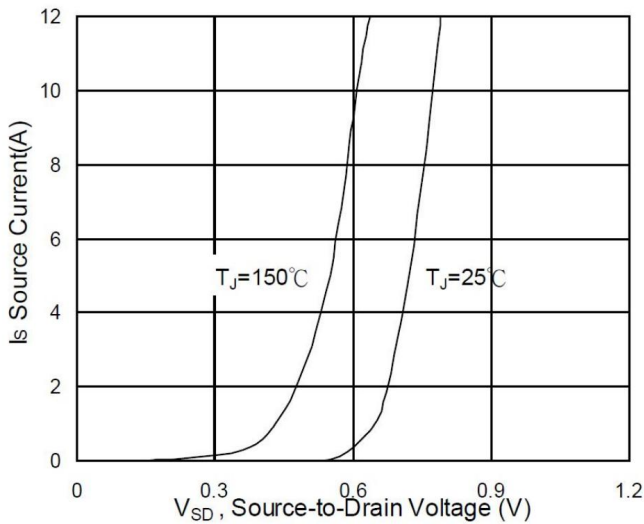
Notes:

- 1) Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 2) Guaranteed by design, not subject to production.
- 3) EAS data shows Max. rating . The test condition is $V_{DD} = -15V, V_{GS} = -10V, L = 0.5mH$.

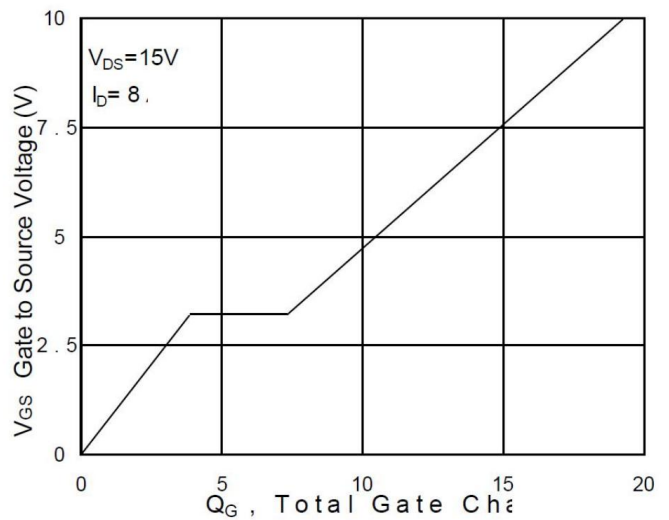
N- Channel Typical Characteristics



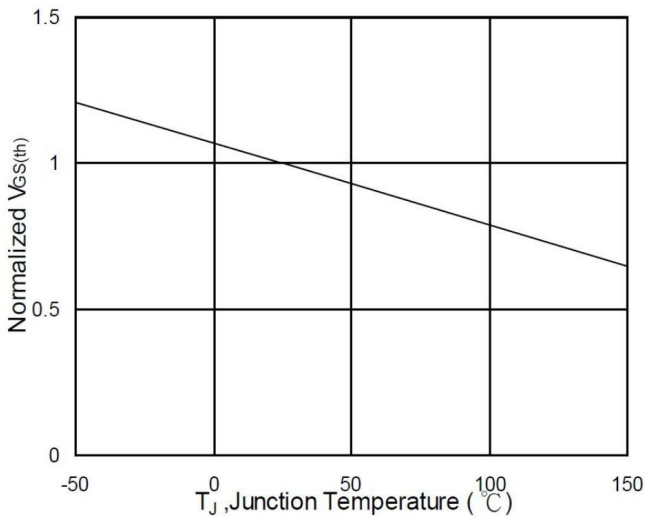
Typical Output Characteristics



On-Resistance vs. Gate-Source

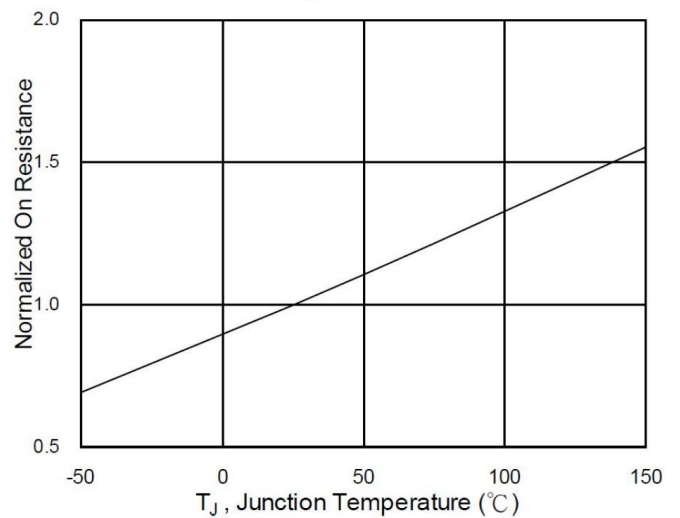


Forward Characteristics Of Reverse



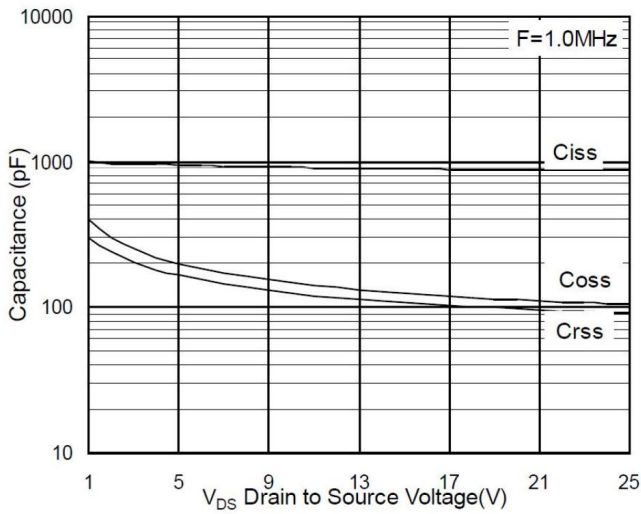
Normalized $V_{GS(th)}$ vs. T_J

Gate-Charge Characteristics

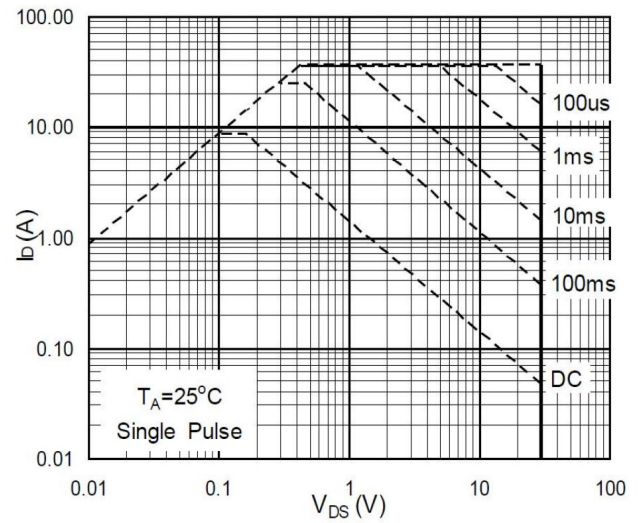


Normalized $R_{DS(on)}$ vs. T_J

N- Channel Typical Characteristics

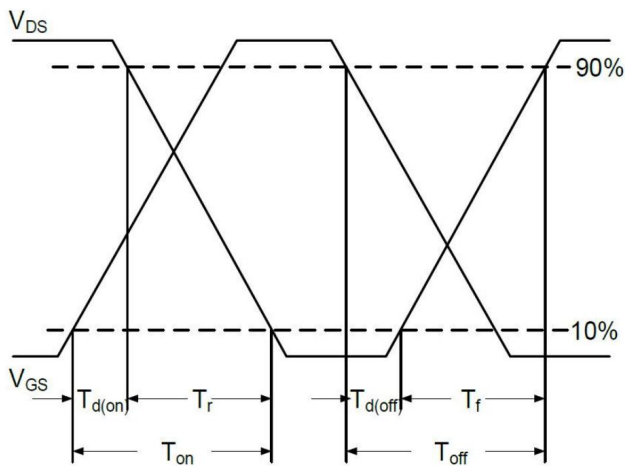


Capacitance

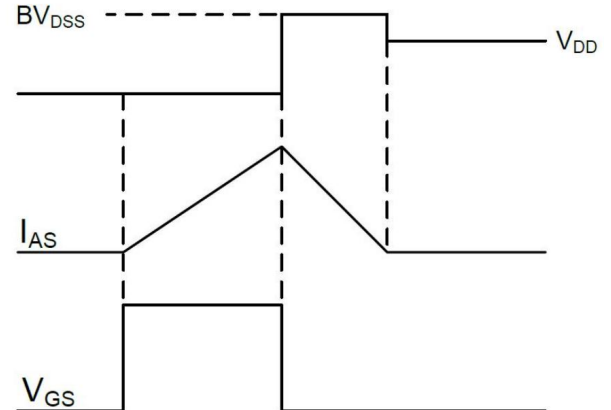


Safe Operating Area

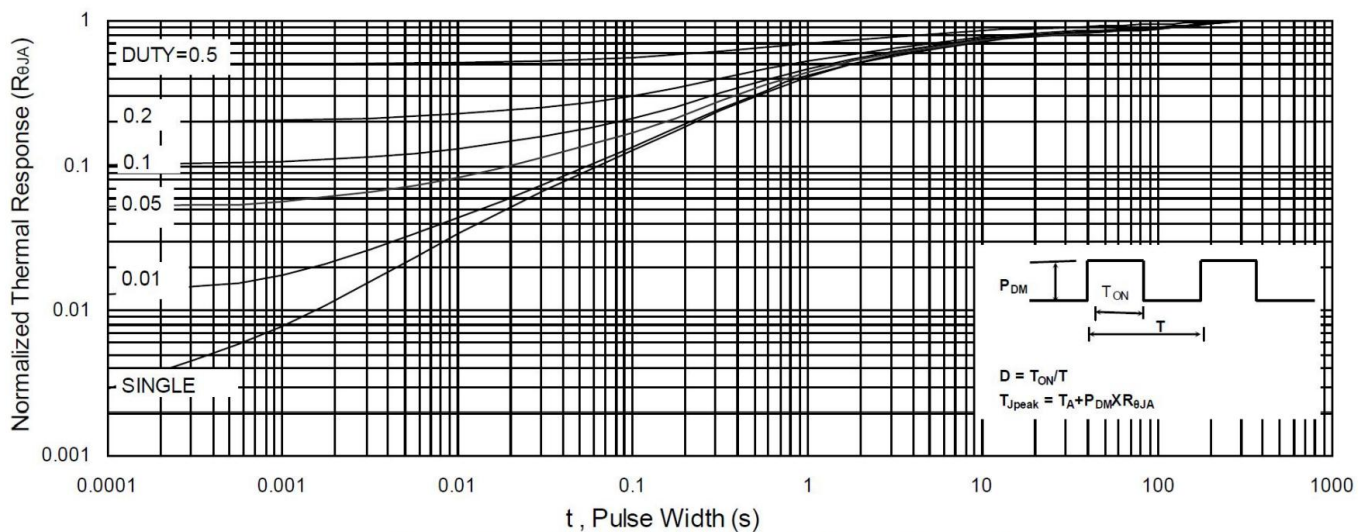
$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Switching Time Waveform

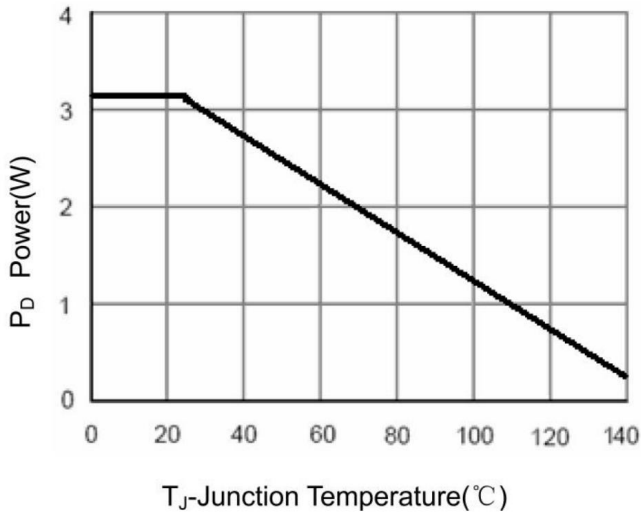


Unclamped Inductive Switching Waveform



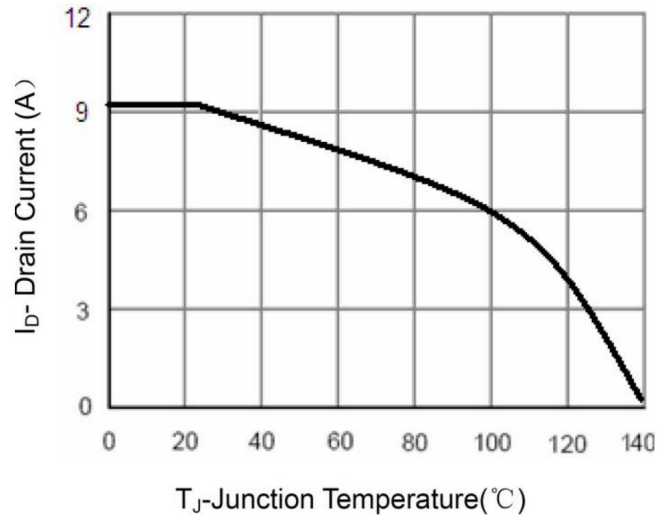
Normalized Maximum Transient Thermal Impedance

P- Channel Typical Characteristics



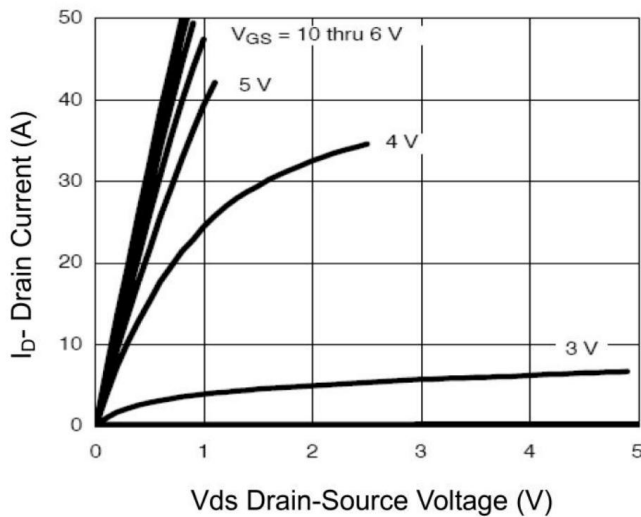
T_J -Junction Temperature($^{\circ}C$)

Power Dissipation



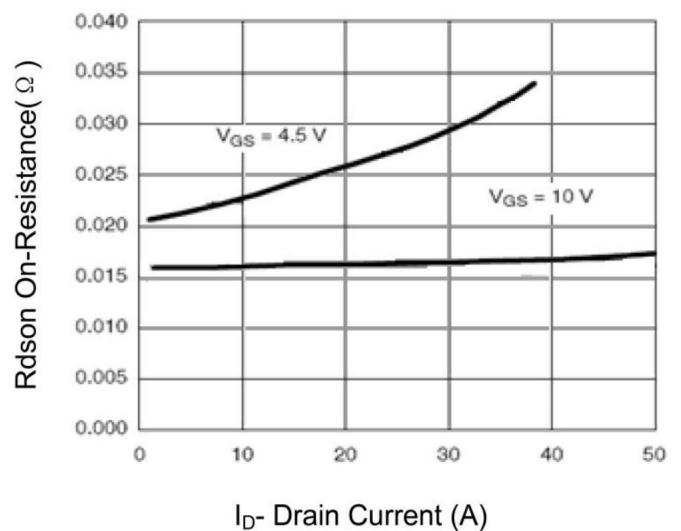
T_J -Junction Temperature($^{\circ}C$)

Drain Current



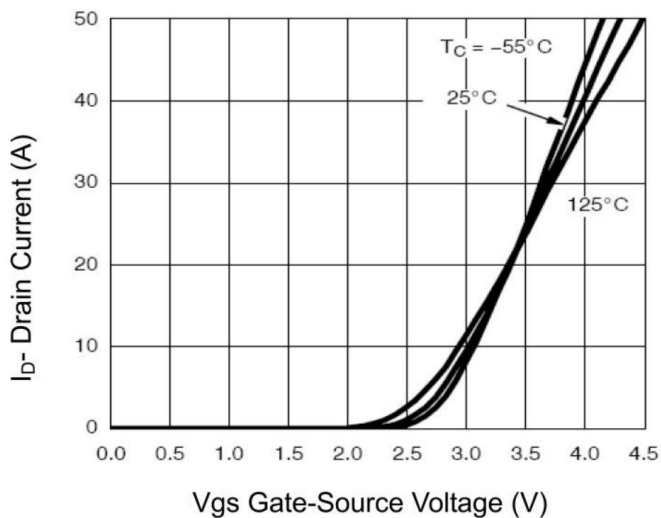
V_{DS} Drain-Source Voltage (V)

Output Characteristics



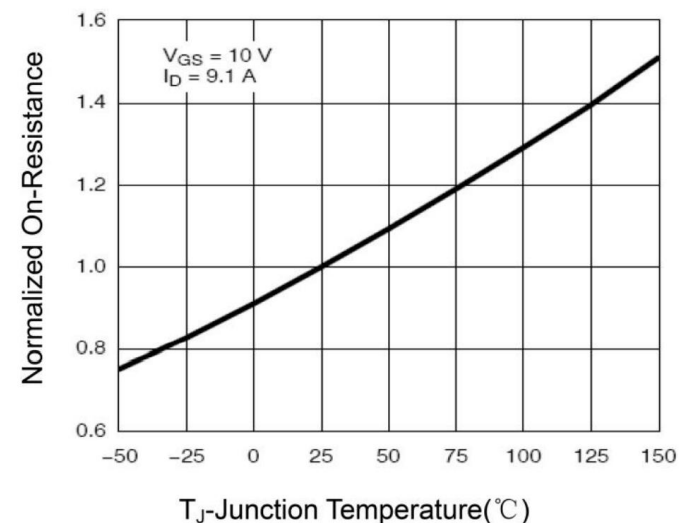
I_D - Drain Current (A)

Drain-Source On-Resistance



V_{GS} Gate-Source Voltage (V)

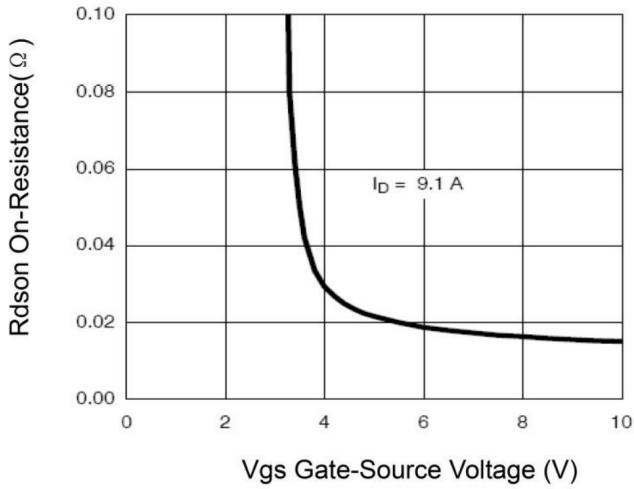
Transfer Characteristics



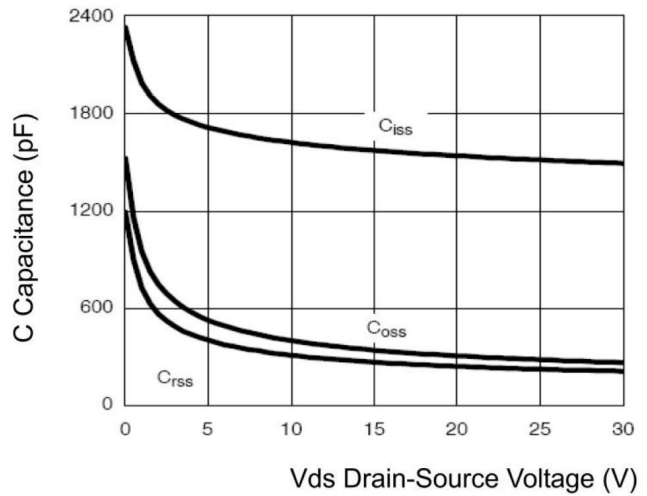
T_J -Junction Temperature($^{\circ}C$)

Drain-Source On-Resistance

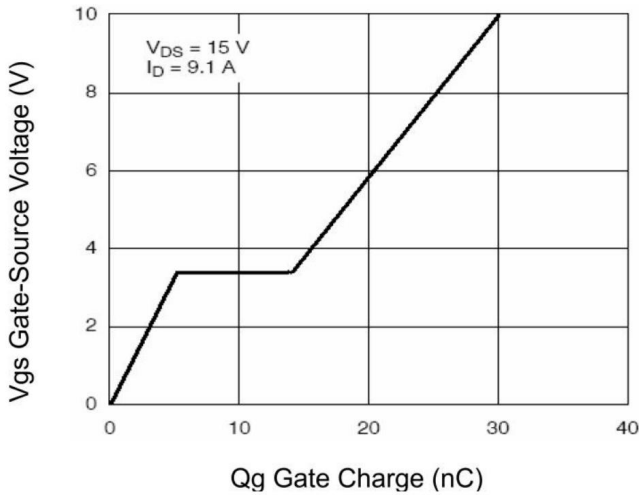
P- Channel Typical Characteristics



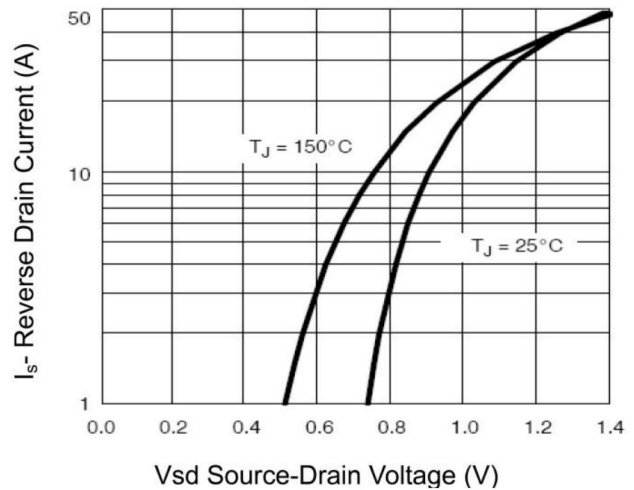
Rdson vs Vgs



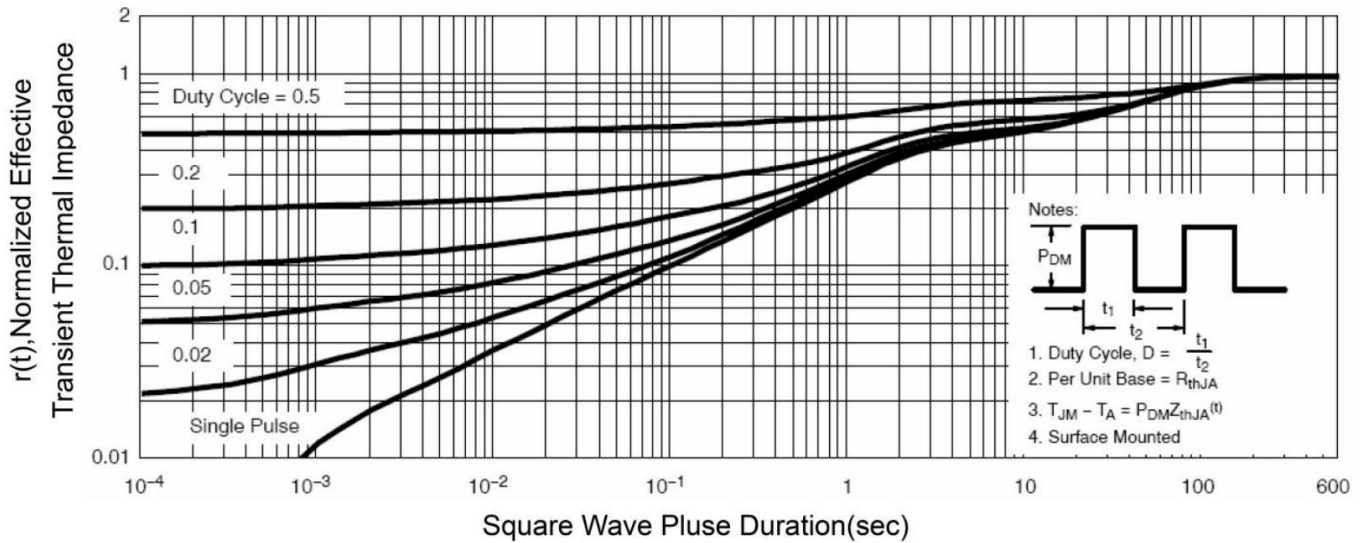
Capacitance vs Vds



Gate Charge

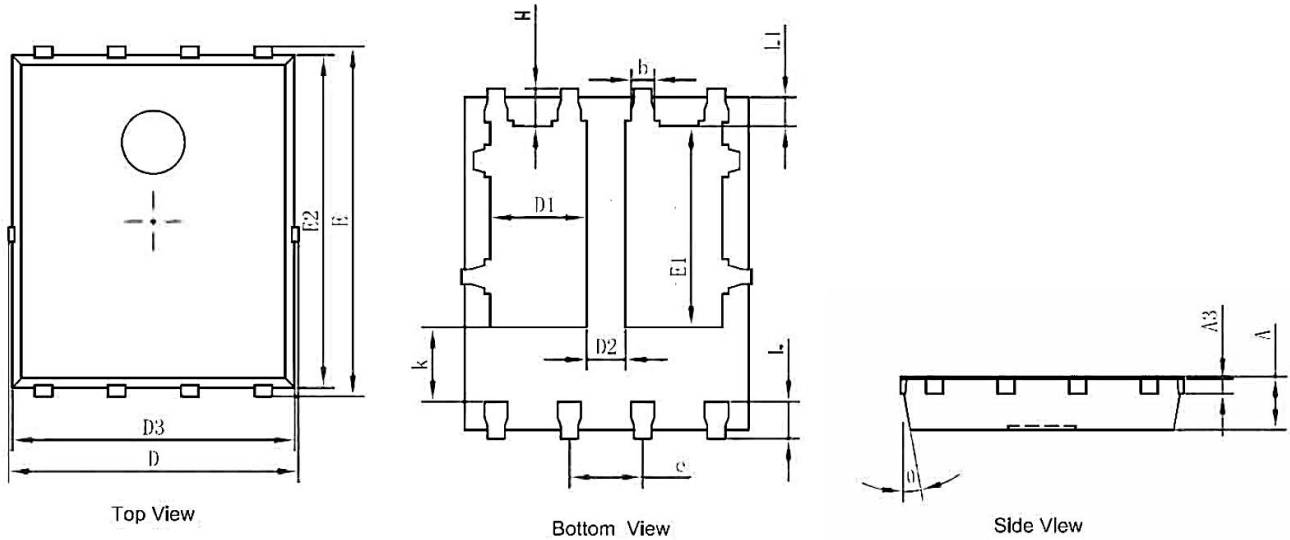


Source- Drain Diode Forward



Normalized Maximum Transient Thermal Impedance

PDFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254 REF		0.010 REF	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270 TYP		0.050 TYP	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°