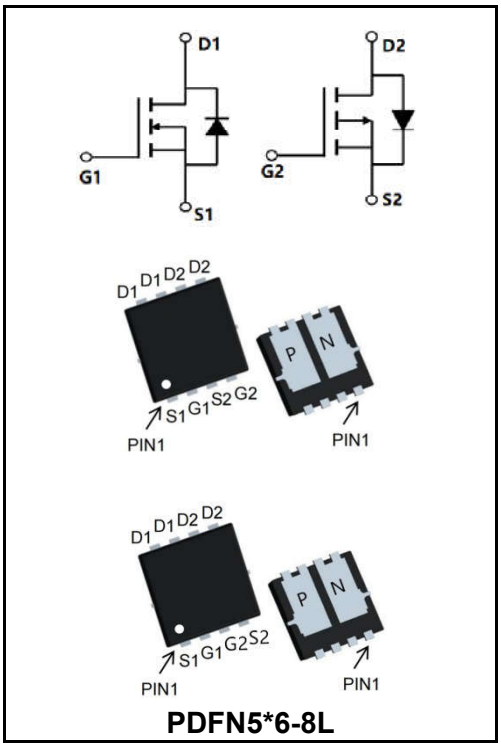
40V N+P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	21A
V_{DSS}	40V
R_{DSON}-typ(@V_{GS}=10V)	< 17mΩ(Type:13.5 mΩ)
I_D	-18A
V_{DSS}	-40V
R_{DSON}-typ(@V_{GS}=-10V)	< 45mΩ(Type:35 mΩ)



PDFN5*6-8L

Application

- Wireless charging
- Boost driver
- Brushless motor

Product Specification Classification

Part Number	Package	Marking	Pack
YFW15G04NF	PDFN5*6-8L	YFW 15G04NF XXXXX	5000PCS/Tape
YFW15G04NF-A	PDFN5*6-8L	YFW 15G04NF-A XXXXX	5000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		N-Ch	P-Ch	
Drain-Source Voltage	V_{DS}	40	-40	V
Gate - Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current, V_{GS} @ 10V[1]@T_C=25℃	I_D	21	-18	A
Continuous Drain Current, V_{GS} @ 10V[1]@T_C=100℃	I_D	17.5	-14	A
Pulsed Drain Current[2]	I_{DM}	38	-32	A
Single Pulse Avalanche Energy[3]	E_{AS}	66	66	mJ
Avalanche Current	I_{AS}	28.8	-23.2	A
Total Power Dissipation[4]@T_C=25℃	P_D	25	31.3	W
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C
Thermal Resistance Junction-Ambient [1]	$R_{\theta JA}$	62		°C/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	5		°C/W

N-Channel Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	BV_{DSS}	40	44	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	$\Delta BV_{DSS/\Delta TJ}$	-	0.032	-	V/℃
Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=15A	$R_{DS(ON)}$	-	13.5	17	mΩ
	V_{GS}=4.5V, I_D=10A		-	18.4	24	
Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	$V_{GS(th)}$	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	-4.8	-	mV/℃
Drain-Source Leakage Current	V_{DS}=32V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	1	uA
	V_{DS}=32V , V_{GS}=0V , T_J=55℃		-	-	5	
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V_{DS} = 5V, I_D = 15A	g_{fs}	-	34	-	S
Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	R_g	-	2.1	-	Ω
Total Gate Charge(4.5V)	V_{DS}=32V V_{GS}=4.5V I_D=15A	Q_g	-	10	-	nC
Gate-Source Charge		Q_{gs}	-	2.55	-	
Gate-Drain Charge		Q_{gd}	-	4.8	-	
Turn-on delay time	V_{DD} =20V V_{GS}=10V R_G = 3.3Ω I_D= 15A	$t_{d(on)}$	-	2.8	-	ns
Rise Time		T_r	-	12.8	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	21.2	-	
Fall Time		t_f	-	6.4	-	
Input Capacitance	V_{DS}=15V V_{GS}=0V f=1MHz	C_{iss}	-	1013	-	pF
Output Capacitance		C_{oss}	-	107	-	
Reverse Transfer Capacitance		C_{rss}	-	76	-	
Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	40	A
Pulsed Source Current[2,5]		I_{SM}	-	-	85	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	V_{SD}	-	-	1.2	V
Reverse Recovery Time	IF=15A , dI/dt=100A/μs , T_J=25℃	t_{rr}	-	10	-	nS
Reverse Recovery Charge		Q_{rr}	-	3.1	-	nC

Note :
1、The data tested by surface mounted on a 1 inch^2 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 test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=10A
4、The power dissipation is limited by 150℃ junction temperature
5、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

P-Channel Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	BV_{DSS}	-40	-46	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	$\Delta BV_{DSS/\Delta TJ}$	-	-0.012	-	V/℃
Static Drain-Source On-Resistance[2]	V_{GS}=-10V, I_D=-15A	$R_{DS(ON)}$	-	35	45	mΩ
	V_{GS}=-4.5V, I_D=-4A		-	48	60	
Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	$V_{GS(th)}$	-1.2	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	4.32	-	mV/℃
Drain-Source Leakage Current	V_{DS}=-32V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	1	uA
	V_{DS}=-32V , V_{GS}=0V , T_J=55℃		-	-	5	
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V_{DS} = -5V, I_D = -8A	g_{fs}	-	12.6	-	S
Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	R_g	-	13	16	Ω
Total Gate Charge(-4.5V)	V_{DS}=-20V V_{GS}=-4.5V I_D=-12A	Q_g	-	9	-	nC
Gate-Source Charge		Q_{gs}	-	2.54	-	
Gate-Drain Charge		Q_{gd}	-	3.1	-	
Turn-on delay time	V_{DD} =-15V V_{GS}=-10V R_G = 3.3Ω I_D=-1A	$t_{d(on)}$	-	19.2	-	ns
Rise Time		T_r	-	12.8	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	48.6	-	
Fall Time		t_f	-	4.6	-	
Input Capacitance	V_{DS}=-15V V_{GS}=0V f=1MHz	C_{iss}	-	1004	-	pF
Output Capacitance		C_{oss}	-	108	-	
Reverse Transfer Capacitance		C_{rss}	-	80	-	
Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	-20	A
Pulsed Source Current[2,5]		I_{SM}	-	-	-40	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	V_{SD}	-	-	-1	V

Note :
1、The data tested by surface mo unted on a 1 inch^2 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 test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}=-10A
4、The power dissipation is limited by 150℃ junction temperature
5 、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Ratings and Characteristic Curves

N-Typical Characteristics

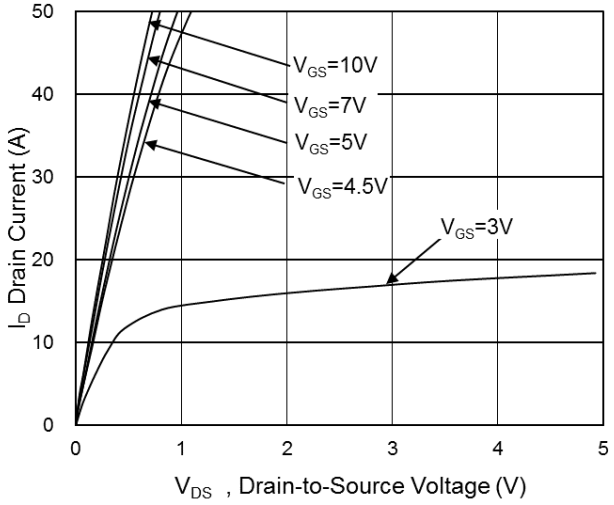


Fig.1 Typical Output Characteristics

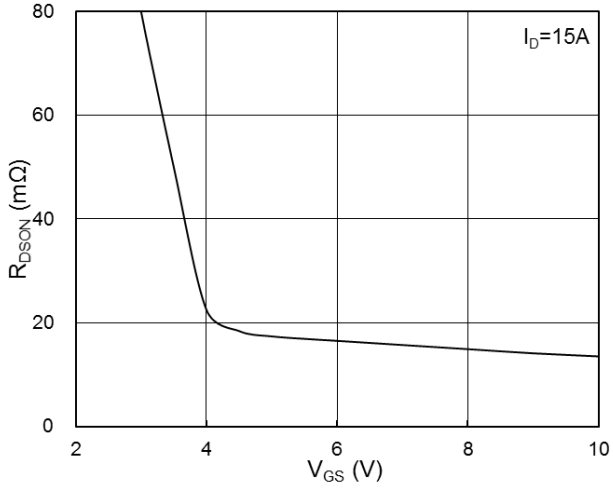


Fig.2 On-Resistance vs. G-S Voltage

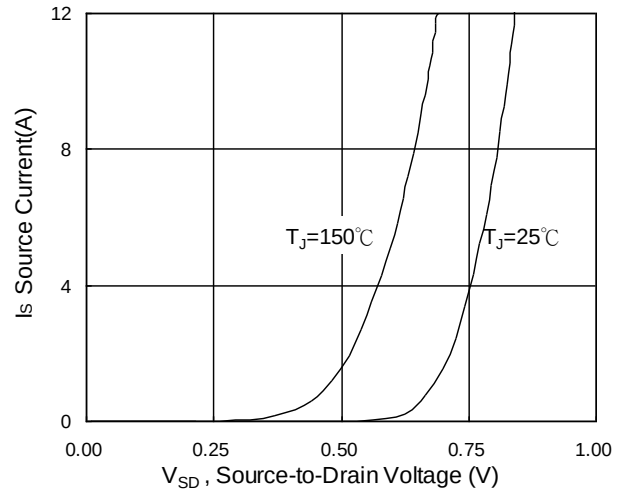


Fig.3 Forward Characteristics of Reverse

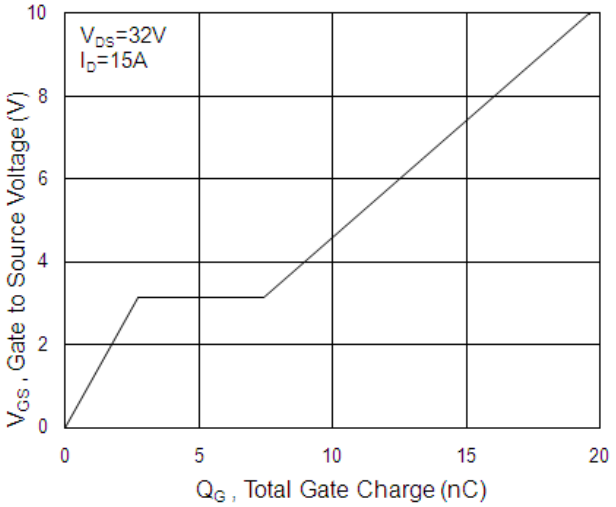


Fig.4 Gate-Charge Characteristics

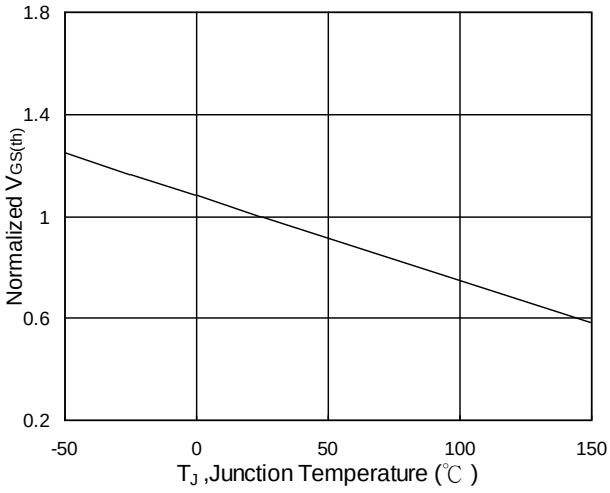


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

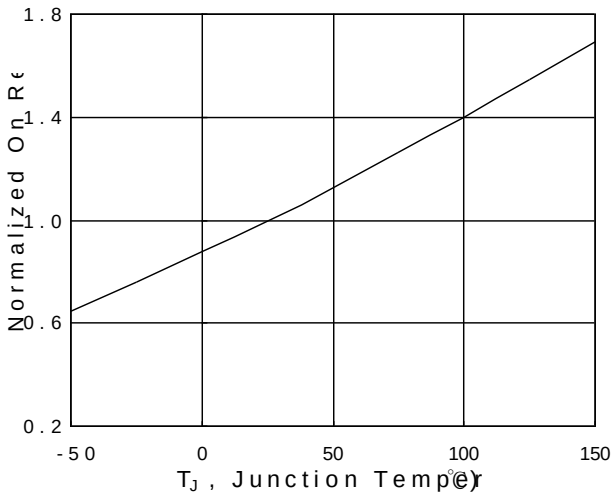


Fig.6 Normalized R_{DSON} vs. T_J

Ratings and Characteristic Curves

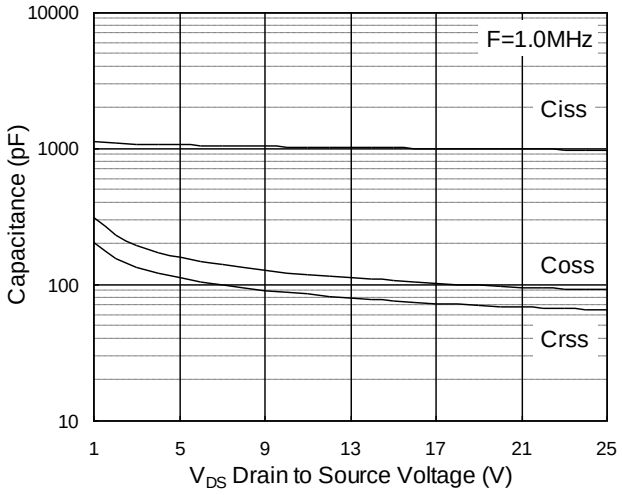


Fig.7 Capacitance

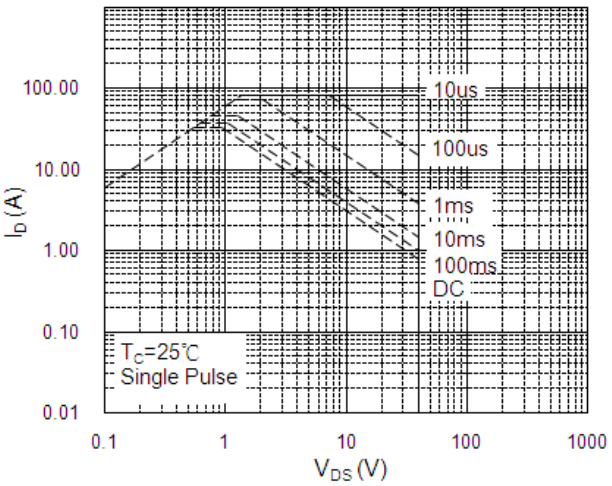


Fig.8 Safe Operating Area

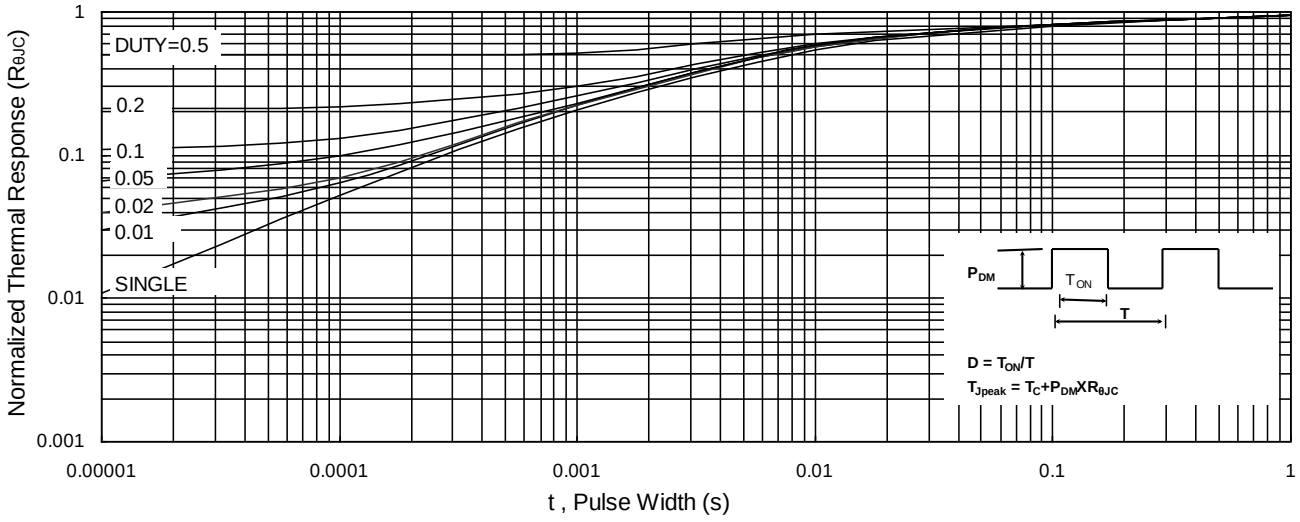


Fig.9 Normalized Maximum Transient Thermal Impedance

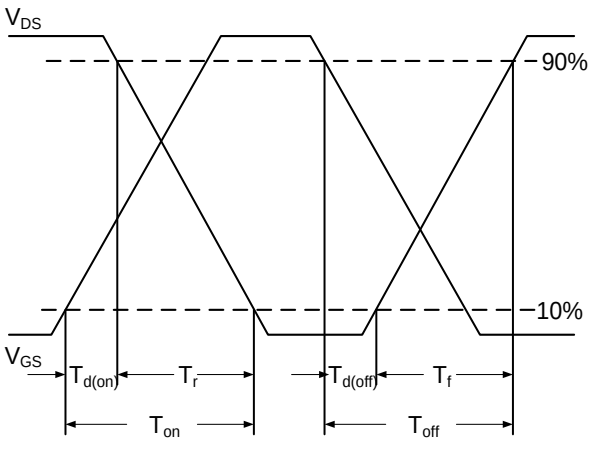


Fig.10 Switching Time Waveform

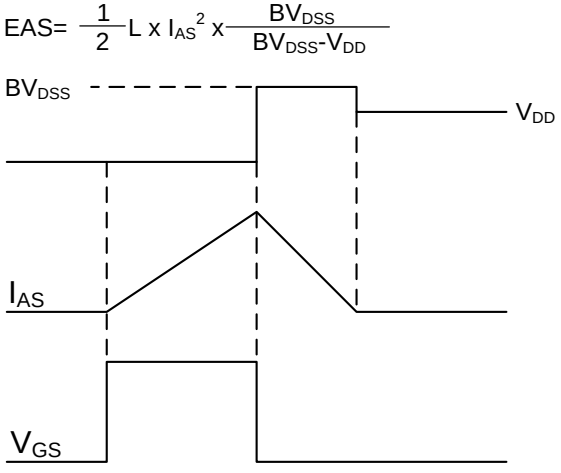


Fig.11 Unclamped Inductive Switching Waveform

Ratings and Characteristic Curves

P-Typical Characteristics

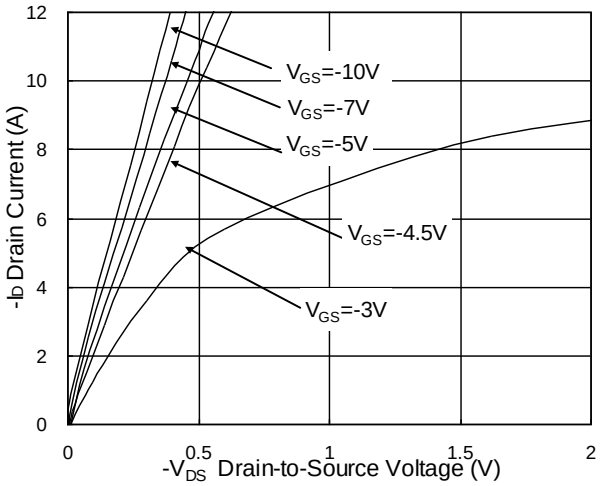


Fig.1 Typical Output Characteristics

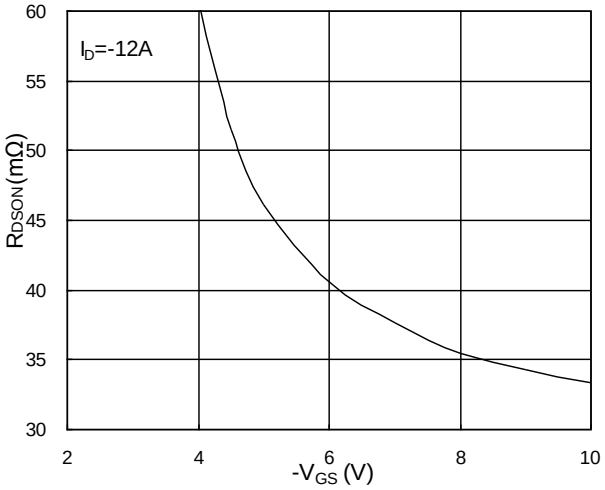


Fig.2 On-Resistance v.s Gate-Source

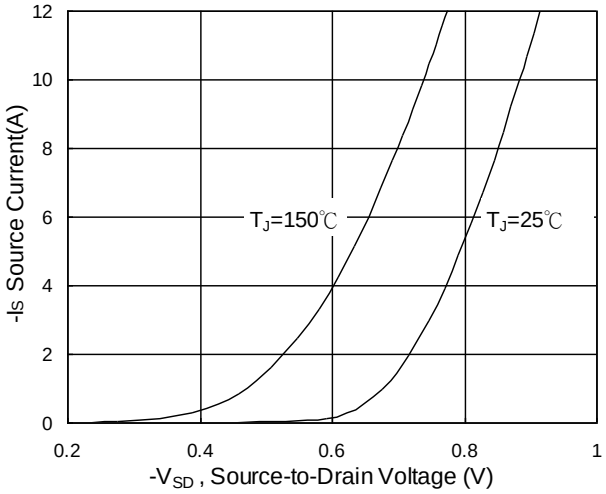


Fig.3 Forward Characteristics of Reverse

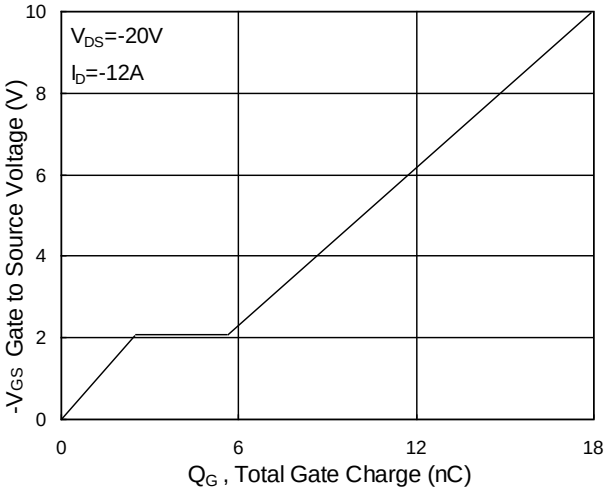


Fig.4 Gate-Charge Characteristics

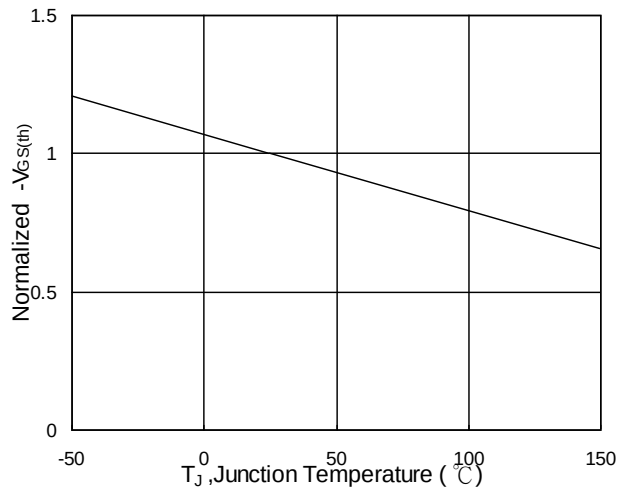


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

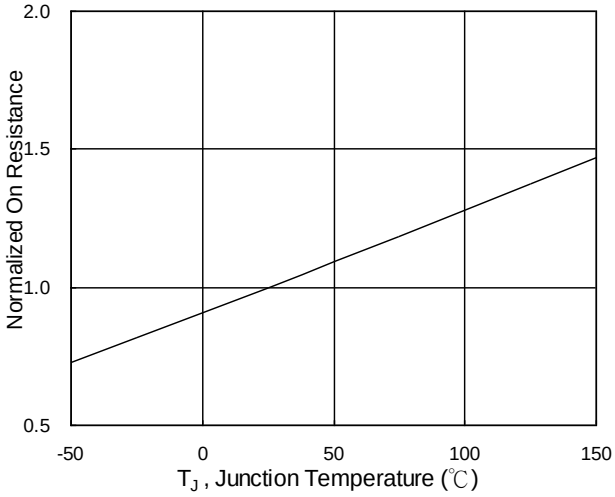


Fig.6 Normalized R_{DSON} v.s T_J

Ratings and Characteristic Curves

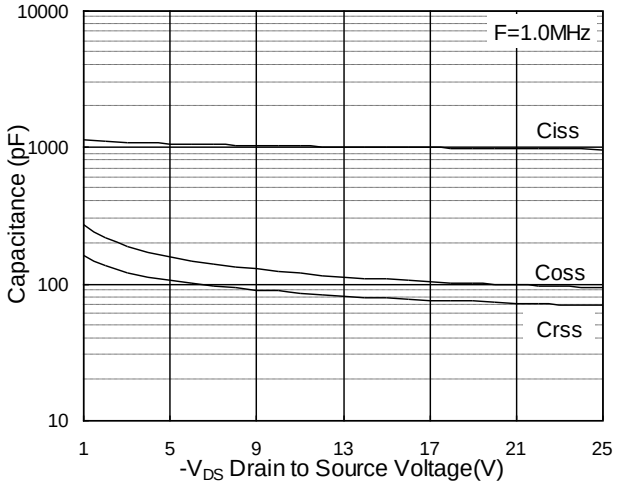


Fig.7 Capacitance

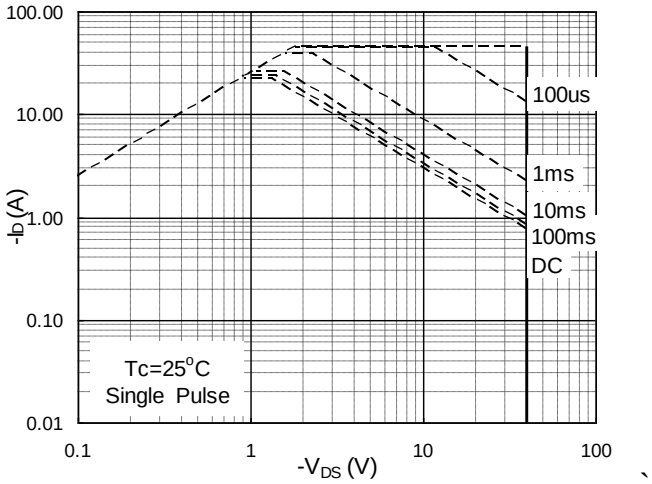
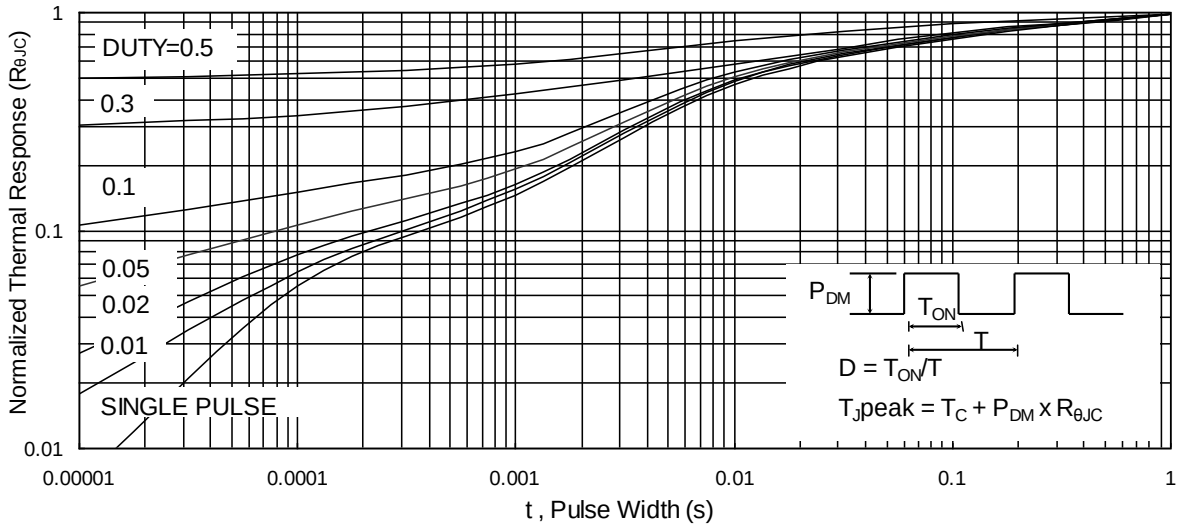


Fig.8 Safe Operating Area



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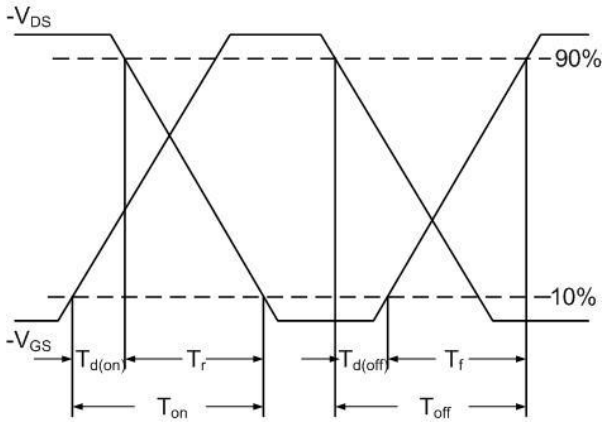


Fig.10 Switching Time Waveform

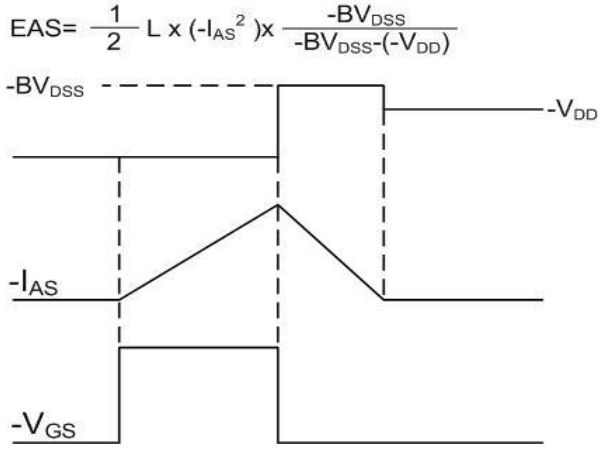
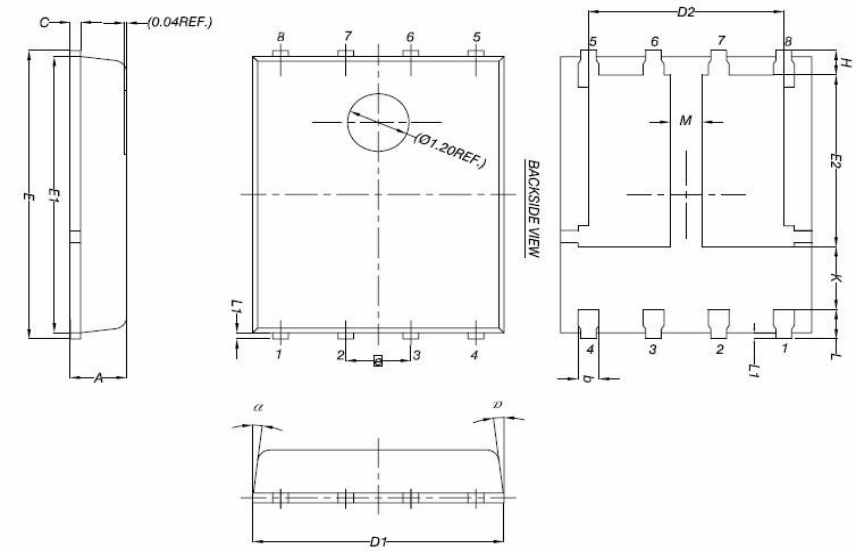


Fig.11 Unclamped Inductive Waveform

Package Outline Dimensions Millimeters

PDFN5*6-8L



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.66	5.76	5.83
E2	3.37	3.47	3.58
e	1.27BSC		
H	0.41	0.51	0.61
K	1.10	--	--
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
M	0.50	--	--
a	0°	--	12°