

Product Summary

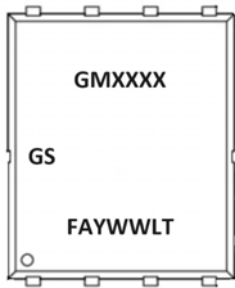
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
20	3.5 @ $V_{GS} = 10V$	70 ⁽¹⁾

Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Application

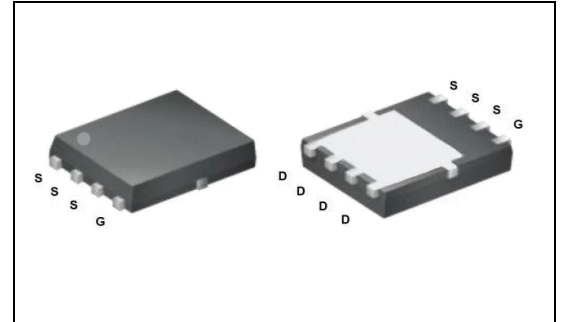
- PWM applications
- Load Switch
- Power management



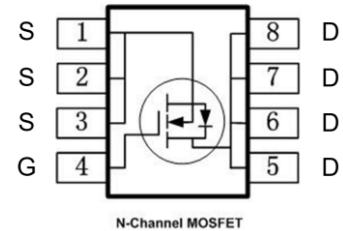
PDFN5060

NOTE:
 LOGO - GS
 GMXXXXX- Part number code
 F - Fab location code
 A - Assembly location code
 Y - Year code
 WW - Week code
 L&T - Assembly lot code

PDFN5060



Equivalent circuit



Absolute maximum rating@25°C

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	70	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	51	A
I_{DM}	Pulsed Drain Current ¹	220	A
EAS	Single Pulse Avalanche Energy ²	90	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation	45	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristic

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	2.7	°C/W
Thermal resistance, junction-to-ambient ⁽³⁾	Steady state	$R_{\theta JA}$	49	

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 20V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±12V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage ⁽³⁾	V _{DS} = V _{GS} , I _D = 250μA	0.5	0.8	1.1	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽³⁾	V _{GS} = 4.5V, I _D = 30A	-	2.6	3.5	mΩ
		V _{GS} = 2.5V, I _D = 20A	-	3.6	4.5	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 15V, f = 1MHz	-	3018	-	pF
C _{oss}	Output Capacitance		-	370	-	pF
C _{rss}	Reverse Transfer Capacitance		-	297	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 4.5V V _{DS} = 15V, I _D = 30A	-	43	-	nC
Q _{gs}	Gate Source Charge		-	4.4	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	12	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 4.5V, V _{DD} = 15V I _D = 30A, R _{GEN} = 1.8Ω	-	9.2	-	ns
t _r	Turn-On Rise Time		-	28	-	ns
t _{d(off)}	Turn-Off DelayTime		-	76	-	ns
t _f	Turn-Off Fall Time		-	43	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current ⁽⁴⁾		-	-	70	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	280	A
V _{SD}	Drain to Source Diode Forward Voltage ⁽³⁾	V _{GS} = 0V, I _S = 30A	-	-	1.2	V

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T_J=25°C, V_{DD}=15V, R_G=25 Ω, L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board, t≤10 sec

Typical Performance Characteristics

Fig1. Power Dissipation Derating Curve

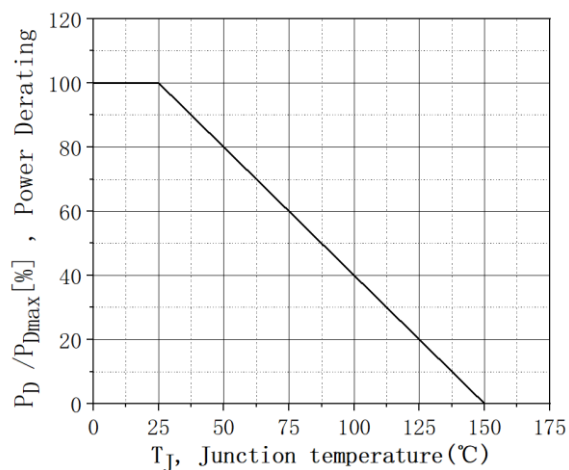


Fig2. Avalanche Energy Derating Curve vs. Junction Temperature

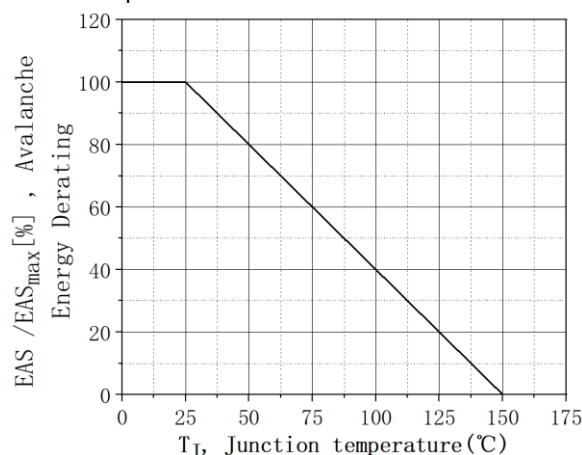


Fig3. Typical Output Characteristics@ $T_J = 25^{\circ}C$

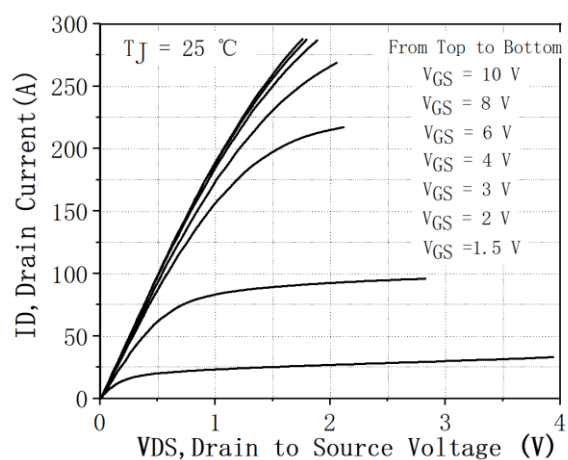


Fig4. Typical Output Characteristics@ $T_J = 125^{\circ}C$

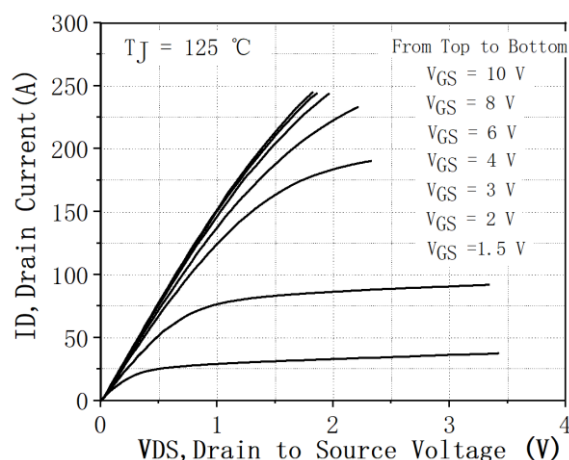


Fig5. Transconductance vs. Drain Current @ $T_J = -25/25/75/125^{\circ}C$

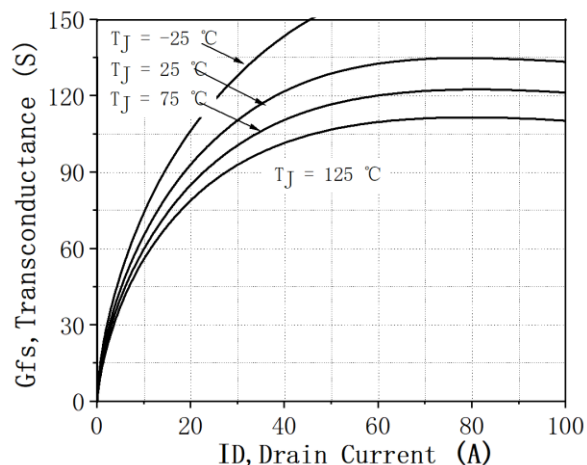
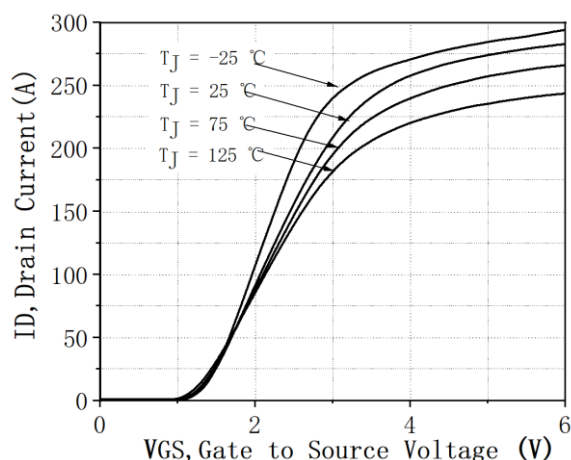


Fig6. Typical Transfer Characteristics @ $T_J = -25/25/75/125^{\circ}C$



Typical Performance Characteristics

Fig7. Static Drain - Source On - State Resistance vs. Drain Current @Tj= -25°C

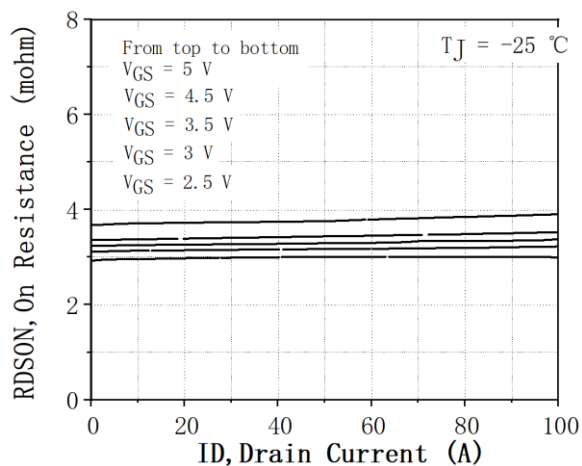


Fig8. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 25°C

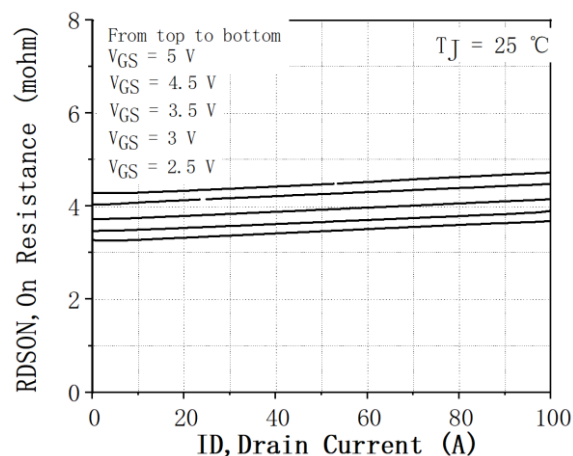


Fig9. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 75°C

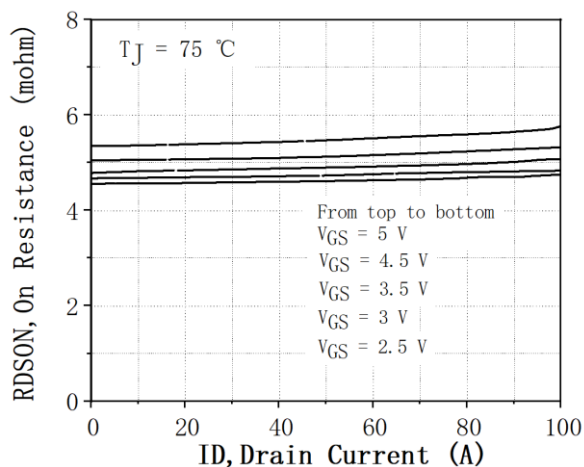


Fig10. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 125°C

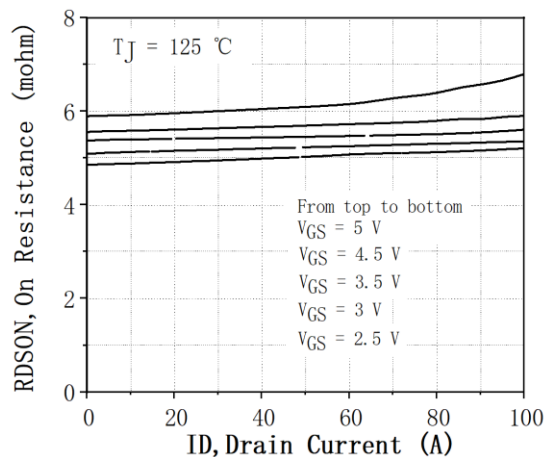


Fig11. Gate Charge Characteristics

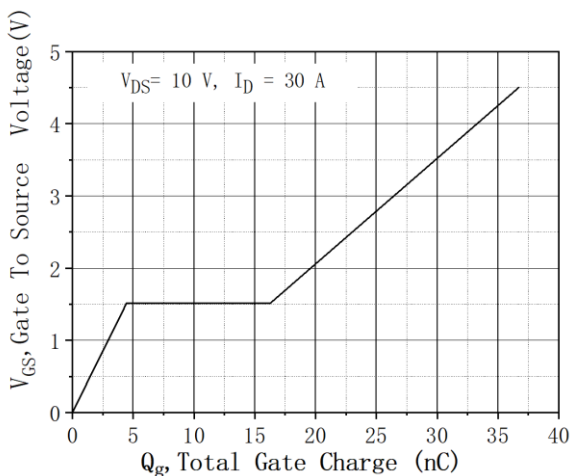
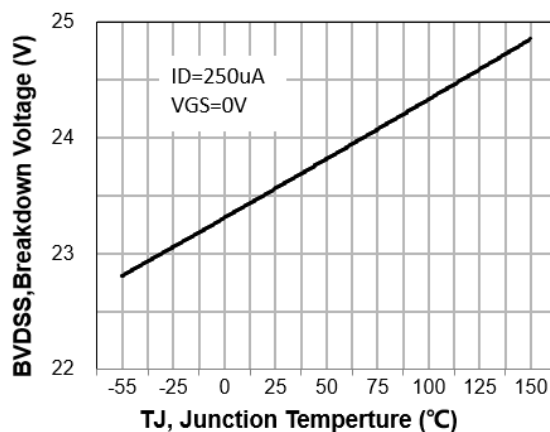


Fig12. Breakdown Voltage vs. Junction Temperature



Typical Performance Characteristics

Fig13. Gate Threshold Voltage vs. Junction Temperature

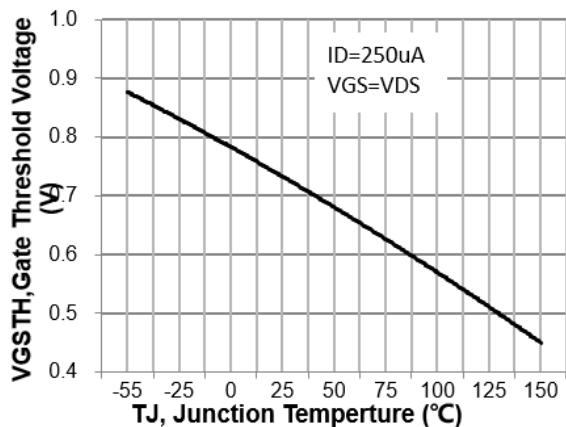


Fig14. On-Resistance Variation vs. Junction

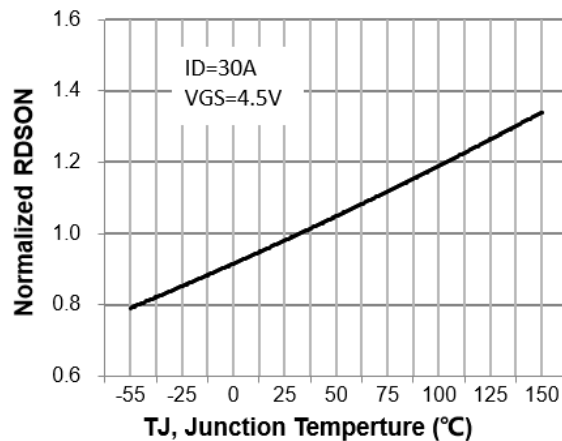


Fig15. Maximum Drain Current vs. Case Temperature

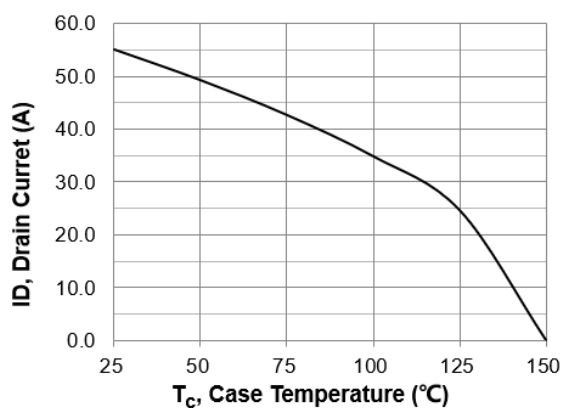
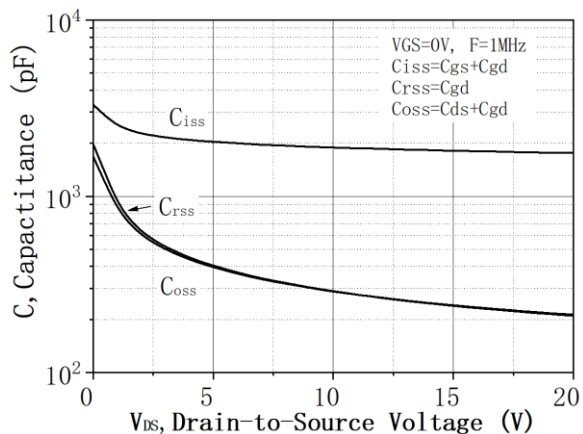


Fig16. Typical Capacitance vs. Drain Source Voltage



Typical Performance Characteristics

Fig17. Safe Operating Area

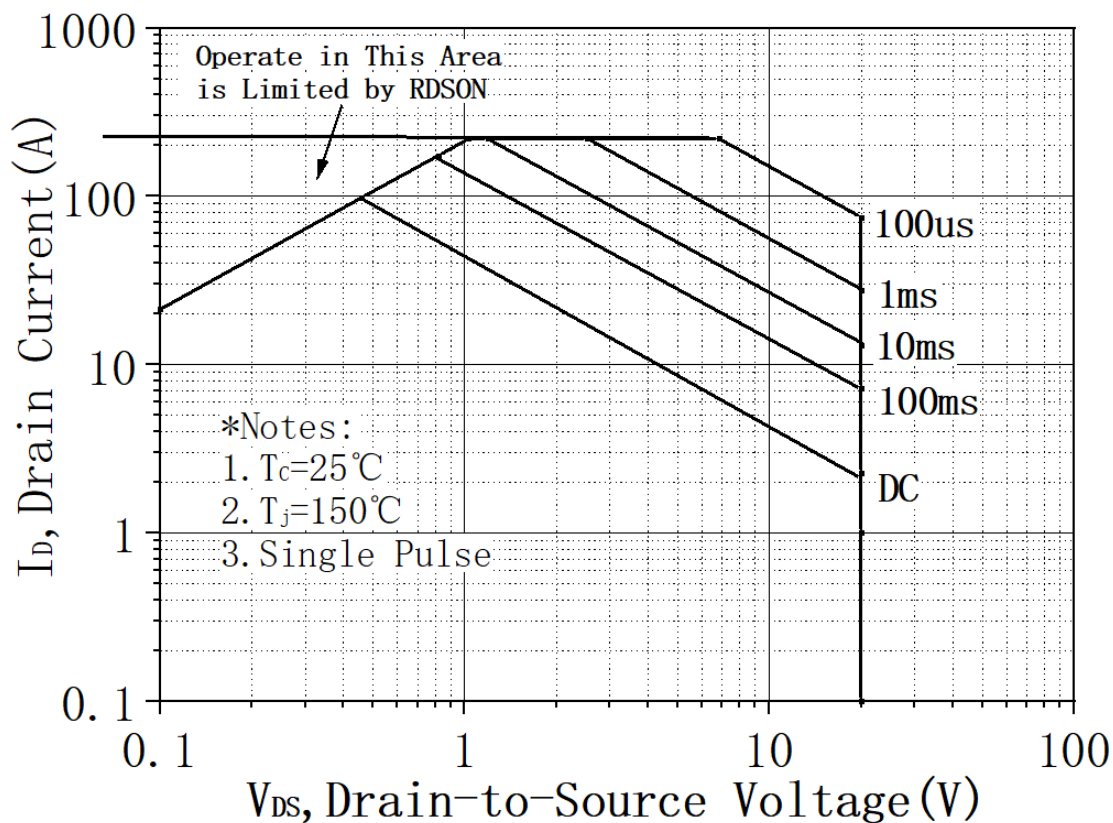
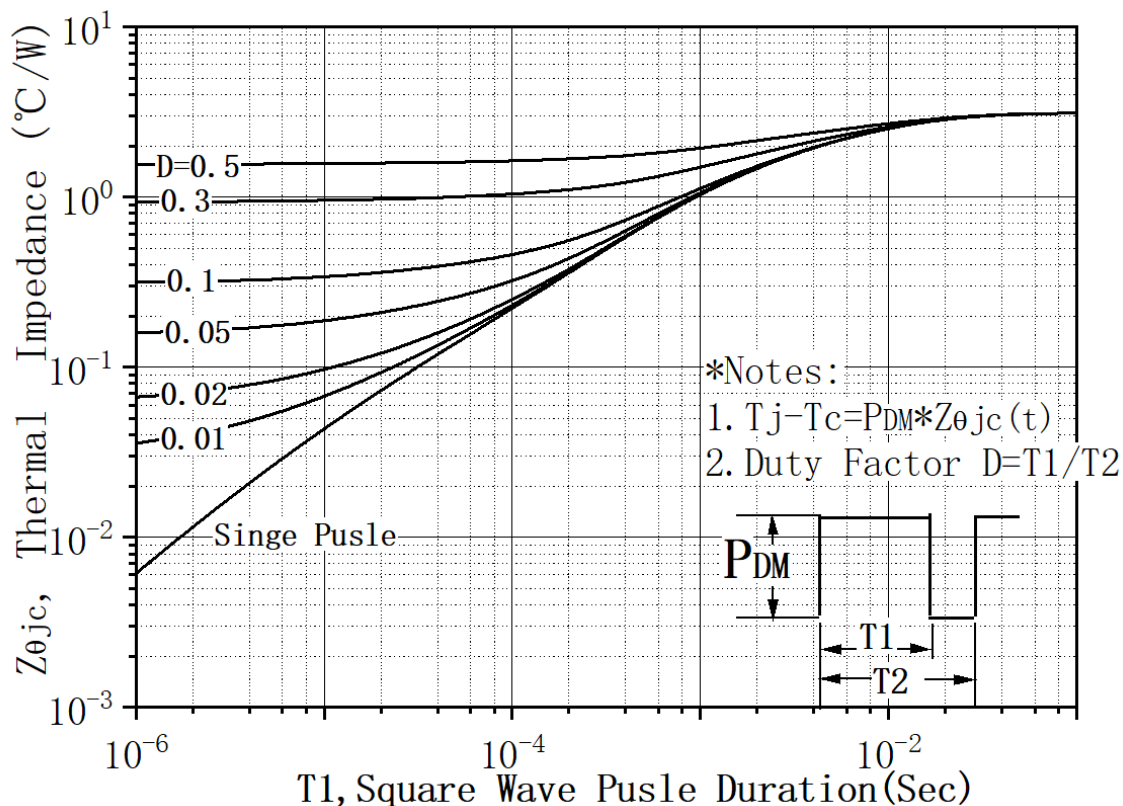
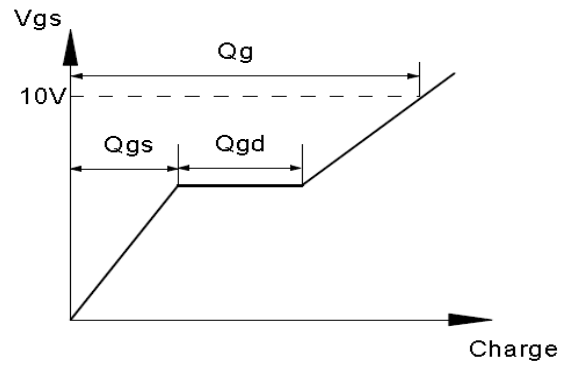
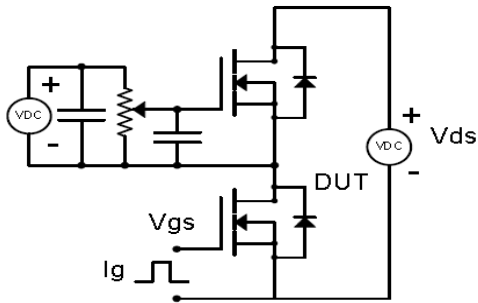


Fig18. Transient Thermal Response Curve

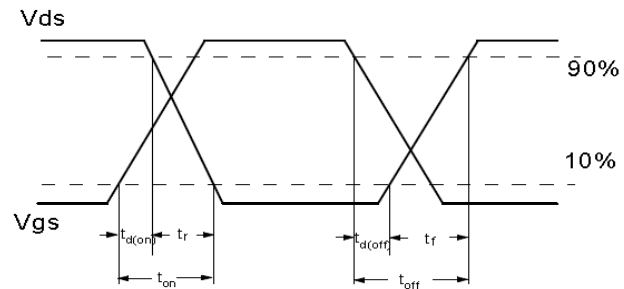
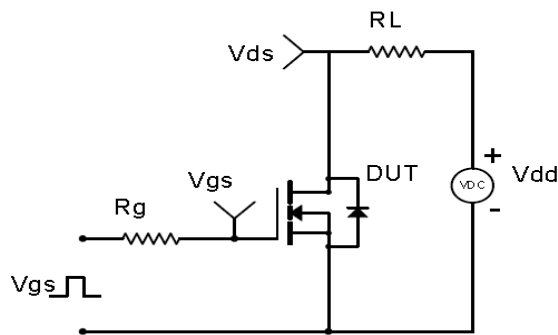


Test Circuit & Waveform

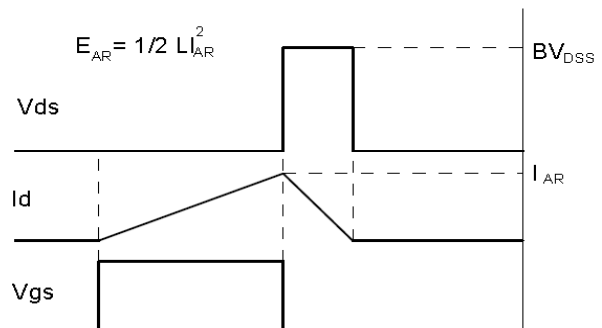
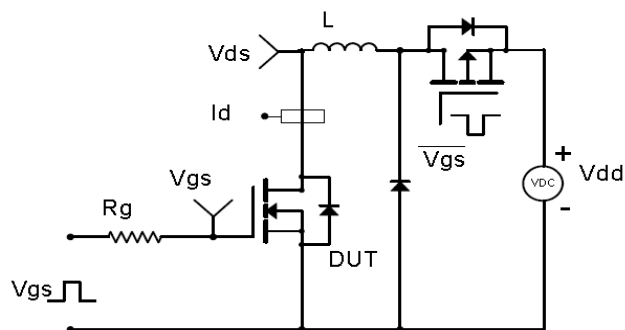
Gate Charge Test Circuit & Waveform



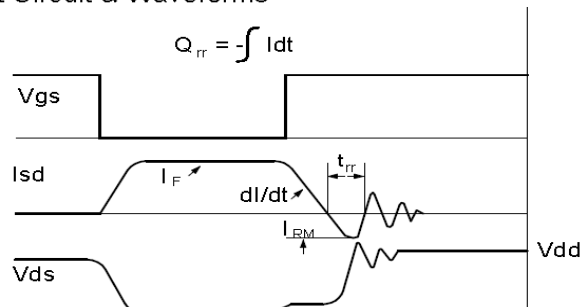
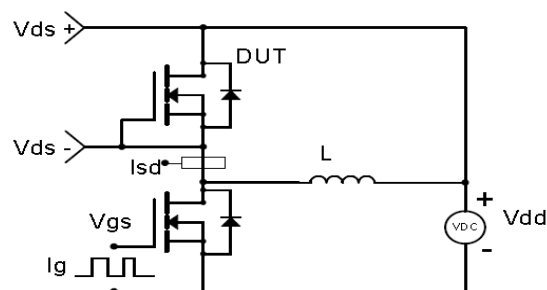
Resistive Switching Test Circuit & Waveforms

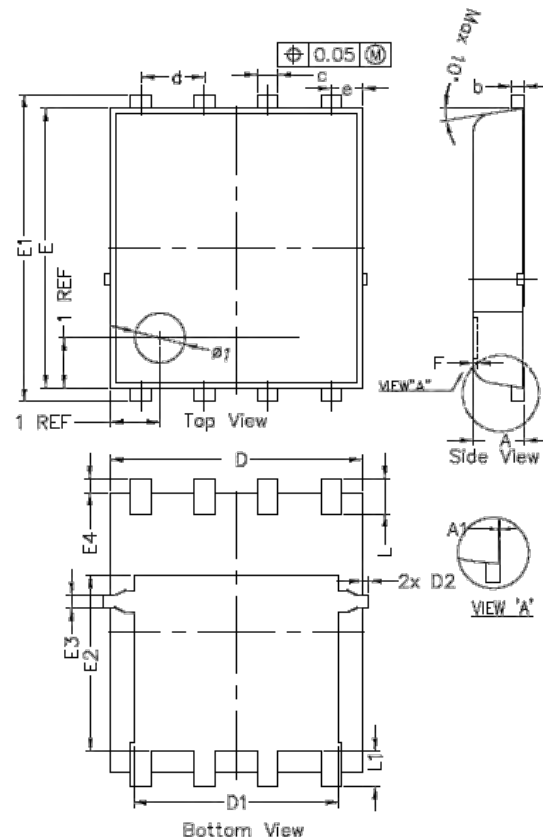


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Outline Drawing PDFN5060


Dim	Millimeters		
	Min	Nom	Max
A	0.900	1.000	1.100
A1	0.000	---	0.050
b	0.246	0.254	0.312
c	0.310	0.410	0.510
d	1.27BSC		
D	4.950	5.050	5.150
D1	4.000	4.100	4.200
D2	---	---	0.125
e	0.62BSC		
E	5.500	5.600	5.700
E1	6.050	6.150	6.250
E2	3.425	3.525	3.625
E3	0.150	0.250	0.350
E4	0.175	0.275	0.375
F	---	---	0.100
L	0.500	0.600	0.700
L1	0.600	0.700	0.800

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