

Product Summary

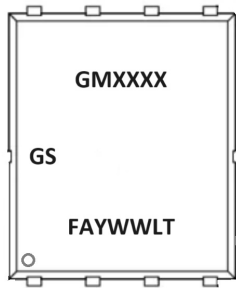
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
40	6.8 @ $V_{GS} = 10V$	59 ⁽¹⁾

Features

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

Application

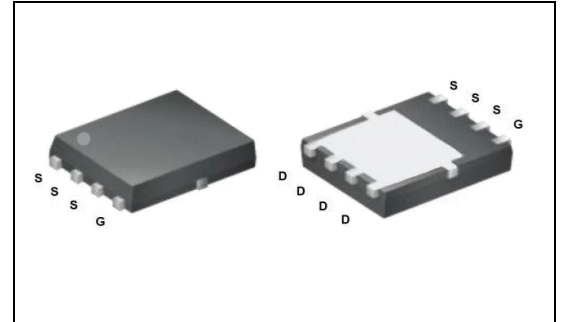
- DC/DC conversion
- Power switch
- Motor drives
- Li- Battery Protection



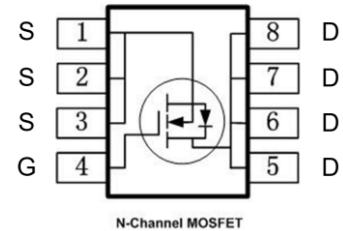
PDFN5060

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

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	40	V
Gate-source voltage	V_{GS}	±20	
Continuous drain current	$T_C=25^\circ\text{C}^{(1)}$	59	A
	$T_C=100^\circ\text{C}^{(1)}$	37	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	232	
Avalanche energy, single pulse ⁽³⁾	E_{AS}	53	mJ
Power dissipation	$T_C=25^\circ\text{C}$	39	W
	$T_A=100^\circ\text{C}$	16	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	°C

Thermal Characteristic

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	3.2	°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	$R_{\theta JA}$	60	

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

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0, I _D = 250 μA	40			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.2	1.6	2.5	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		5.6	6.8	mΩ
		V _{GS} = 4.5 V, I _D = 15 A		8.0	9.9	
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 30 A		17		S
Gate resistance	R _g	f = 1 MHz		5.2		Ω
Dynamic ⁽⁵⁾						
Total gate charge V _{GS} = 10V	Q _g	V _{DS} = 20 V, I _D = 20 A, V _{GS} = 10 V		9.0		nC
Total gate charge V _{GS} = 4.5V	Q _g			3.9		
Gate-source charge	Q _{gs}			1.8		
Gate-drain charge	Q _{gd}			0.8		
Turn-on delay time	t _{d(on)}	V _{DS} = 20 V, I _D = 20 A, V _{GS} = 10 V, R _{GEN} = 3 Ω		2.0		ns
Rise time	t _r			2.4		
Turn-off delay time	t _{d(off)}			14		
Fall time	t _f			7.9		
Input capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz		570		pF
Output capacitance	C _{oss}			359		
Reverse transfer capacitance	C _{rss}			20		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 2 A		0.74	1.2	V
Reverse recovery time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		27		ns
Reverse recovery charge	Q _{rr}			7.8		nC

Notes

- (1) Limited by maximum junction temperature.
- (2) Pulse width limited by maximum junction temperature.
- (3) V_{DS} = 20 V, V_{GS} = 10 V, L = 1.0 mH.
- (4) Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
- (5) Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

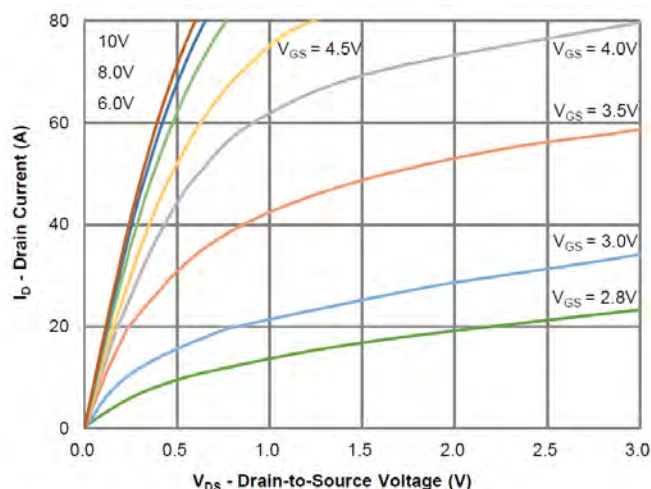


Figure 1: Output Characteristics

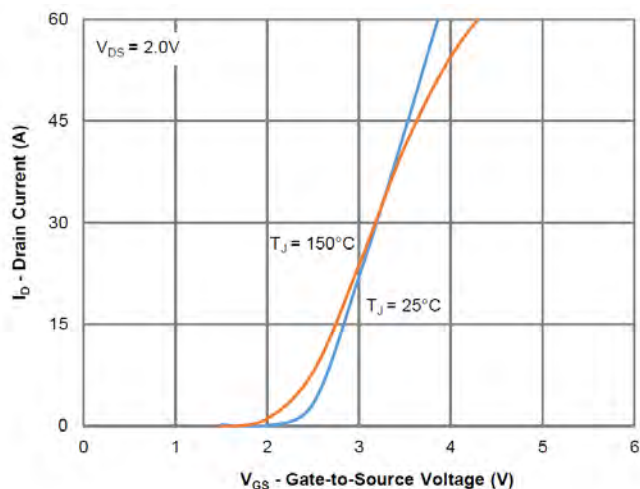


Figure 2: Transfer Characteristics

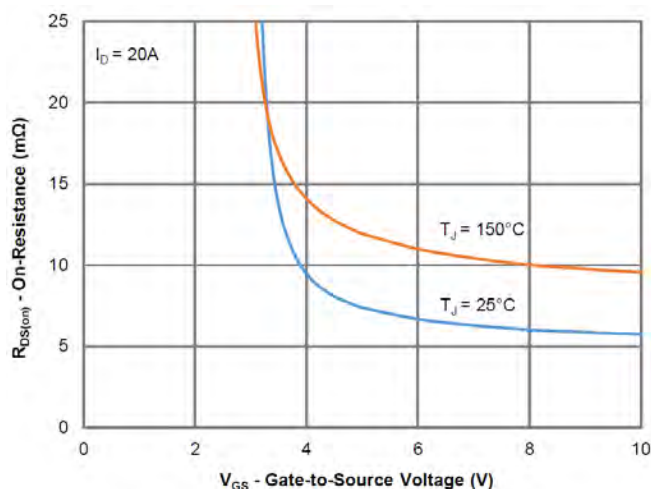


Figure 3: On-Resistance vs. Gate-Source Voltage

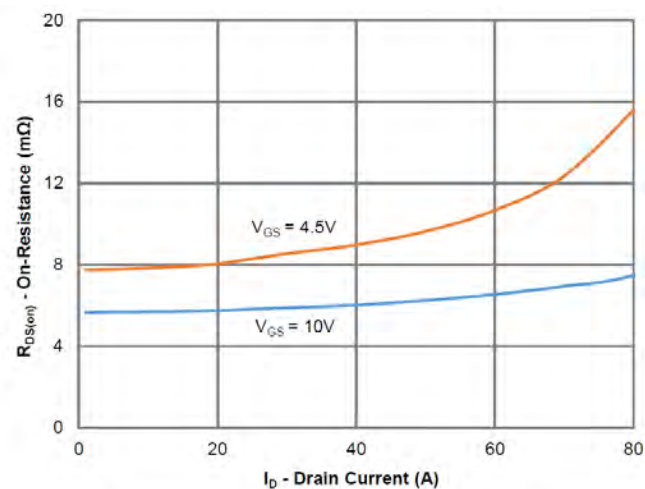


Figure 4: On-Resistance vs. Gate-Source Voltage

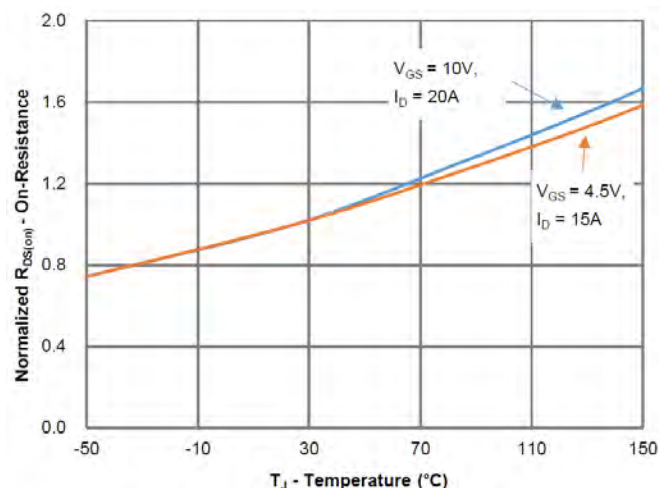


Figure 5: On-Resistance vs. Junction Temperature

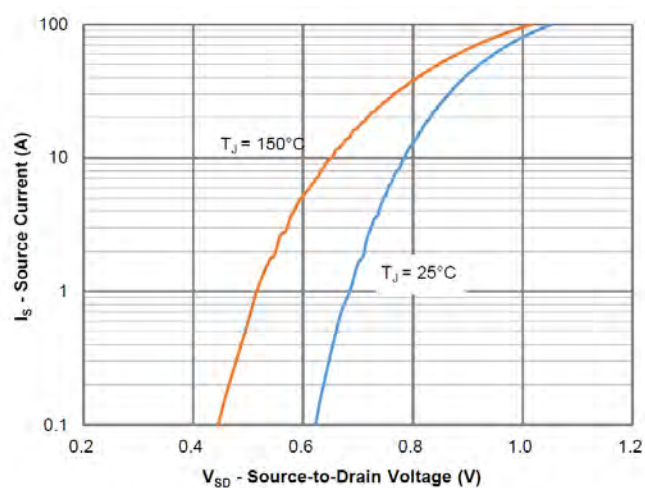


Figure 6: Source-Drain Diode Forward Voltage

Typical Performance Characteristics

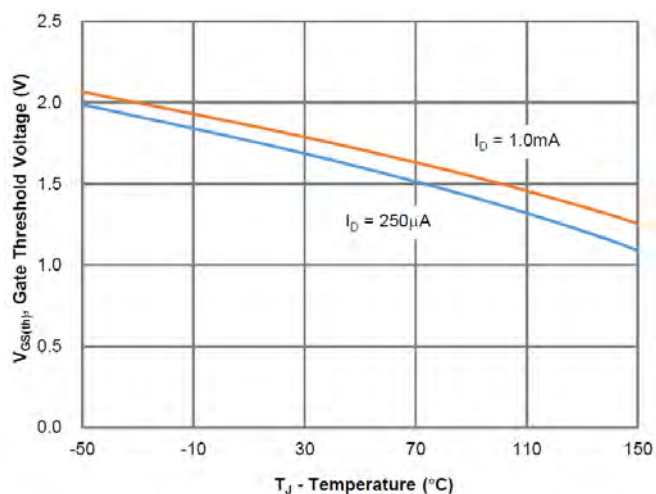


Figure 7: Gate Threshold Variation vs. Junction Temperature

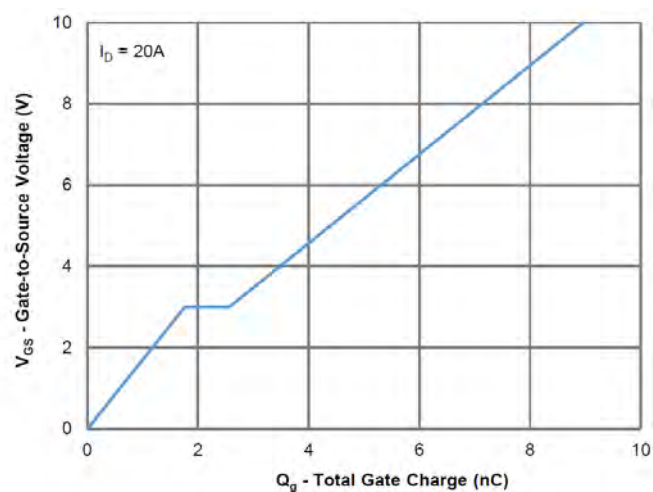


Figure 8: Gate Charge Characteristics

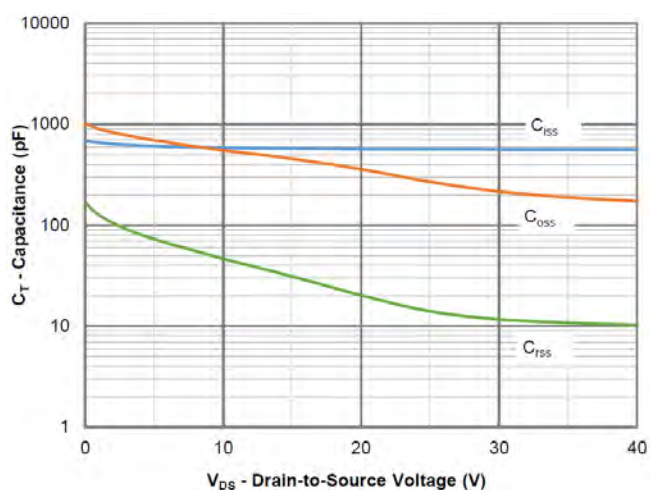


Figure 9: Capacitance Characteristics

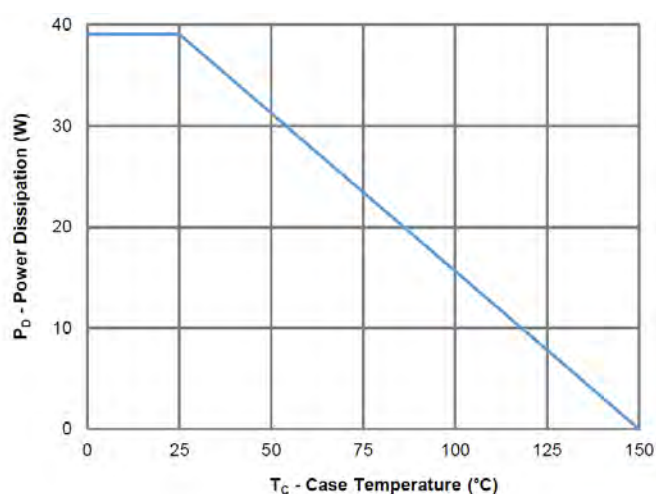


Figure 10: Power Derating

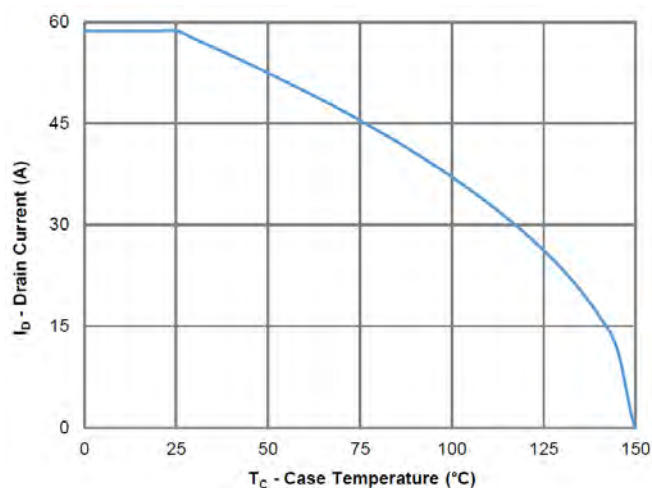


Figure 11: Current Derating

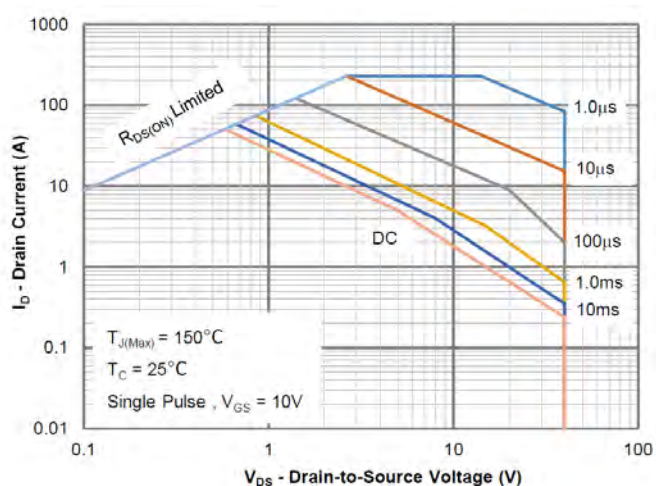


Figure 12: Safe Operating Area

Typical Performance Characteristics

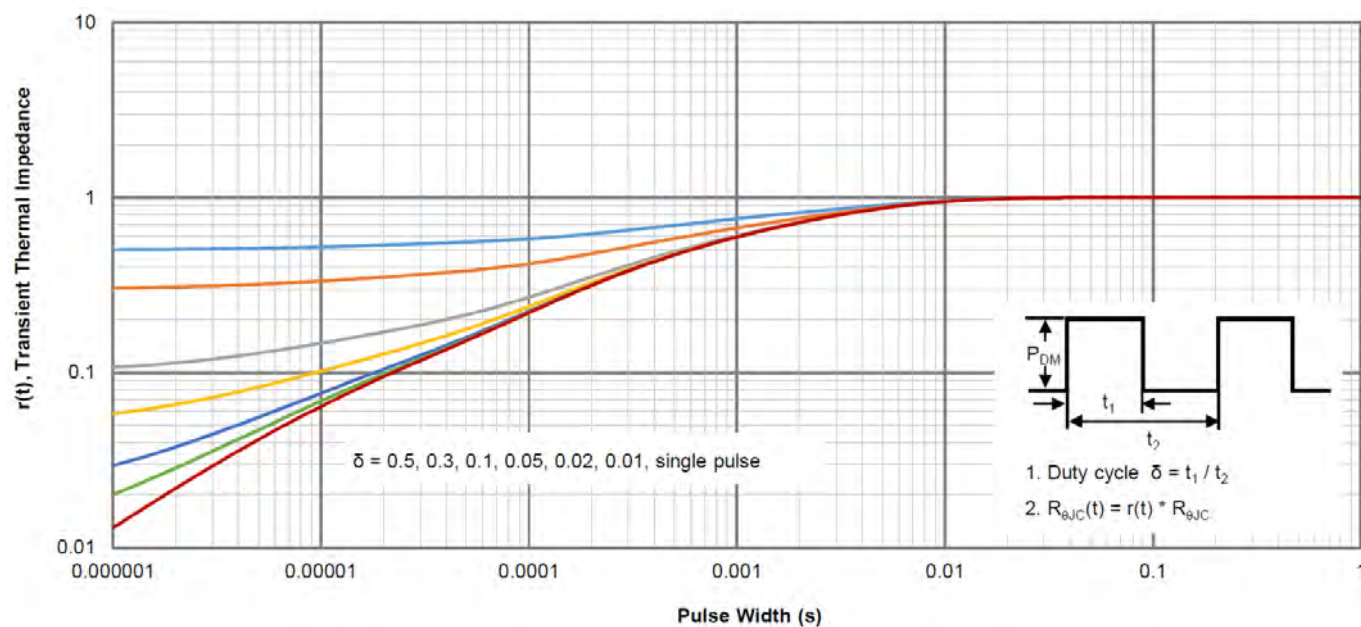
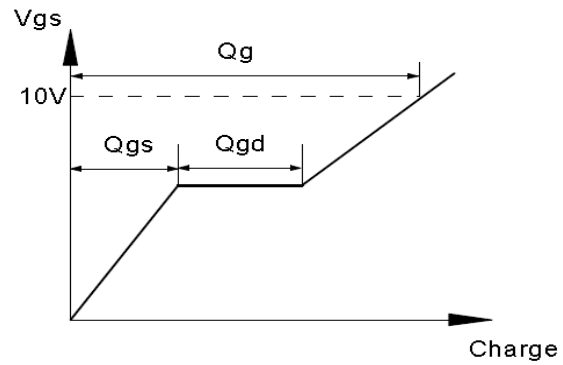
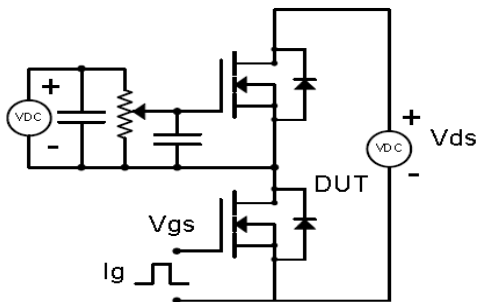


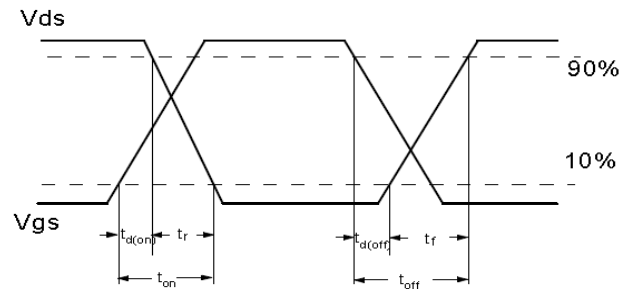
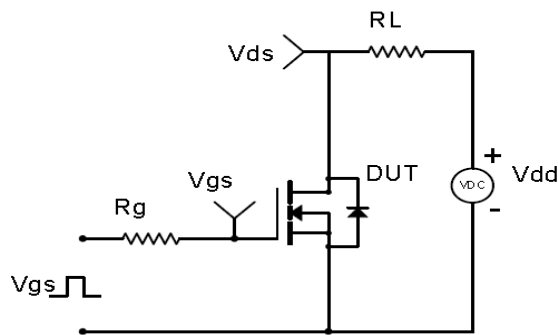
Figure 13: Normalized Maximum Transient Thermal Impedance

Test Circuit & Waveform

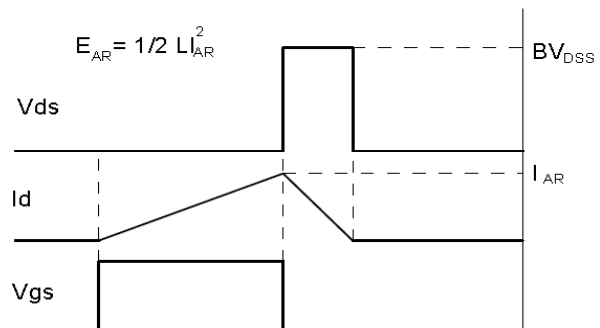
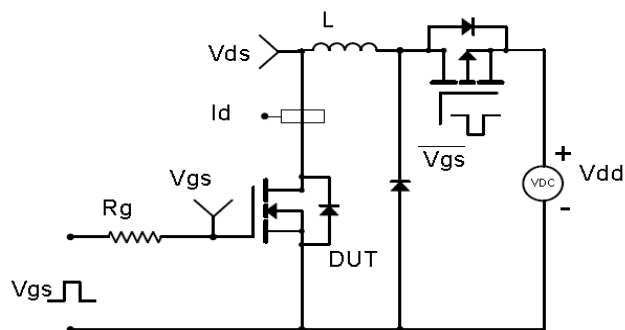
Gate Charge Test Circuit & Waveform



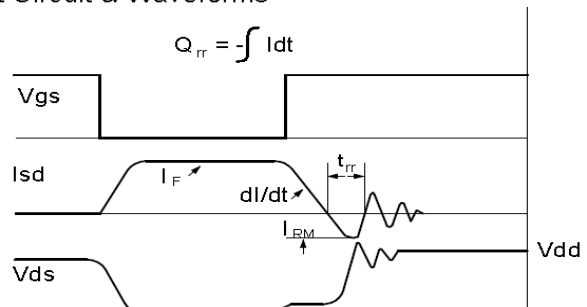
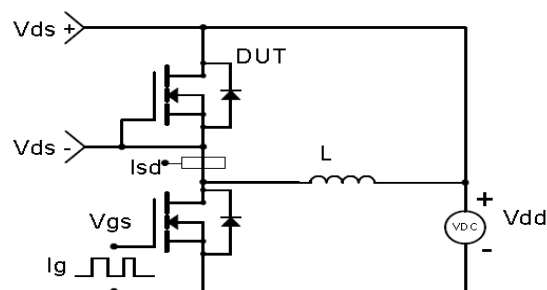
Resistive Switching Test Circuit & Waveforms

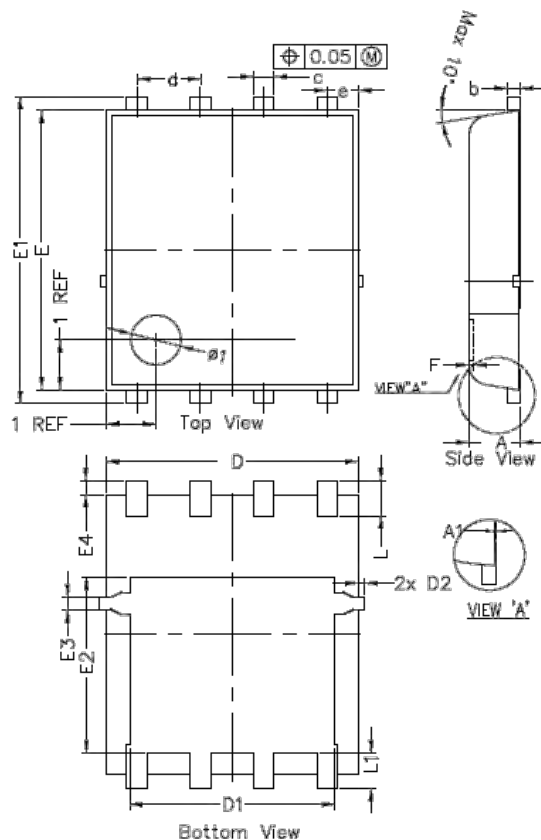


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



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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