GOSTONE

RoHS COMPLIANT

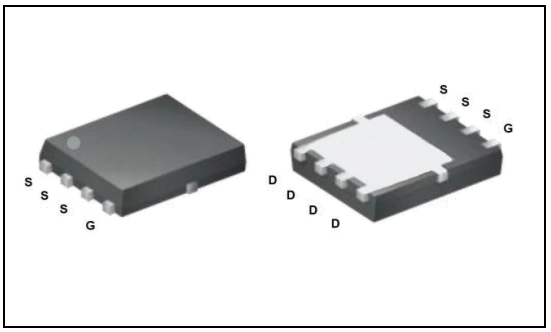
N-Channel 30V,2.2mΩ max,SGT Power MOSFET

GMS016N03F1

Product Summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
30	2.2 @ V_{GS} = 10V	120 (1)

PDFN5X6

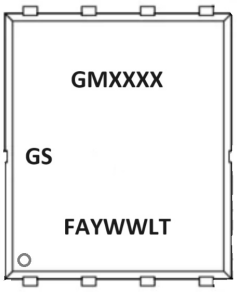


Features

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

Application

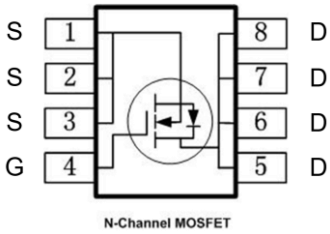
- DC/DC conversion
- Power switch
- Motor drives
- Li- Battery Protection



PDFN5X6

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

Equivalent circuit



Absolute maximum rating@25℃

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	30	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25℃(1)	I_D	120	A
	T_C=100℃(1)		85	
Pulsed drain current(2)		$I_{D,pulse}$	340	
Avalanche energy, single pulse(3)		E_{AS}	600	mJ
Power dissipation	T_C=25℃	P_D	75	W
	T_A=100℃		33	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

Thermal Characteristic

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	1.5	℃/W
Thermal resistance, junction-to-ambient (4)	Steady state	$R_{\theta JA}$	45	

Electrical Characteristics (TJ=25℃ 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	30			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	1.2	1.5	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} = 60 V, V_{GS} = 0 V			1	μA
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A		2.0	2.2	mΩ
	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 30 A		2.7	3.1	mΩ
Forward transconductance (5)	g_{fs}	V_{DS} = 5 V, I_D = 30 A		150		S
Gate resistance	R_g	f = 1 MHz		2.6		Ω
Dynamic(5)						
Total gate charge V_{GS} = 10V	Q_g	V_{DS} = 15 V, I_D = 30 A, V_{GS} = 10 V		38		nC
Gate-source charge	Q_{gs}			8		
Gate-drain charge	Q_{gd}			4.5		
Turn-on delay time	$t_{d(on)}$	V_{DS} = 15 V, I_D = 30 A, V_{GS} = 10 V, R_{GEN} = 1.6 Ω		16		ns
Rise time	t_r			44		
Turn-off delay time	$t_{d(off)}$			25		
Fall time	t_f			7		
Input capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		2790		pF
Output capacitance	C_{oss}			1210		
Reverse transfer capacitance	C_{rss}			37		
Reverse Diode Characteristics (5)						
Diode forward voltage	V_{SD}	V_{GS} = 0 V, I_F = 2 A		0.8	1.2	V
Reverse recovery time	t_{rr}	I_F = 20 A, di/dt = 100 A/μs		85		ns
Reverse recovery charge	Q_{rr}			78		nC

Notes

(1) Limited by maximum junction temperature.

(2) Pulse width limited by maximum junction temperature.

(3) V_{DS} = 15 V, V_{GS} = 10 V, L = 0.5 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

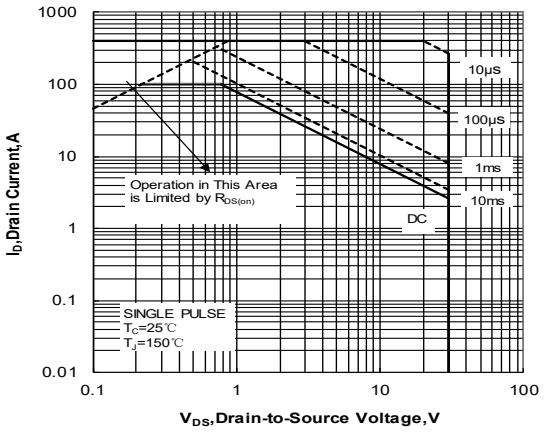


Figure 1 . Maximum Safe Operating Area

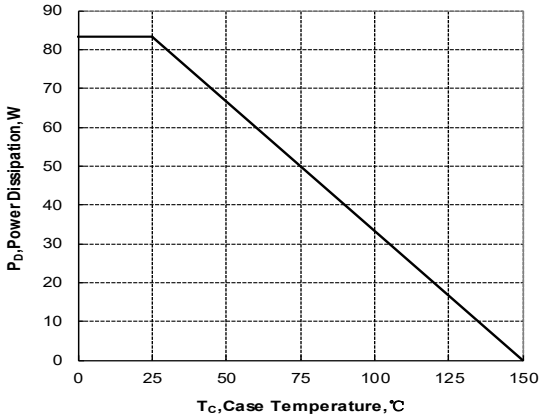


Figure 2. Maximum Power Dissipation vs Case Temperature

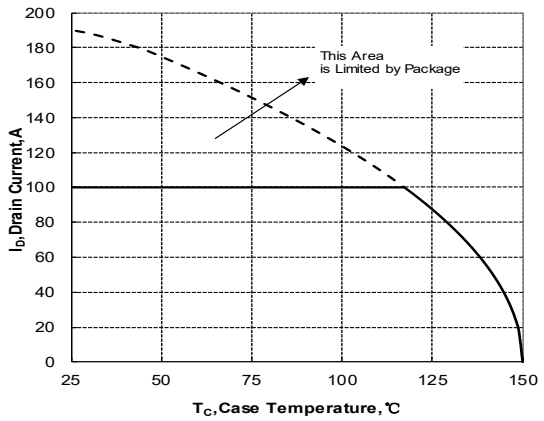


Figure 3. Maximum Continuous Drain Current vs Case Temperature

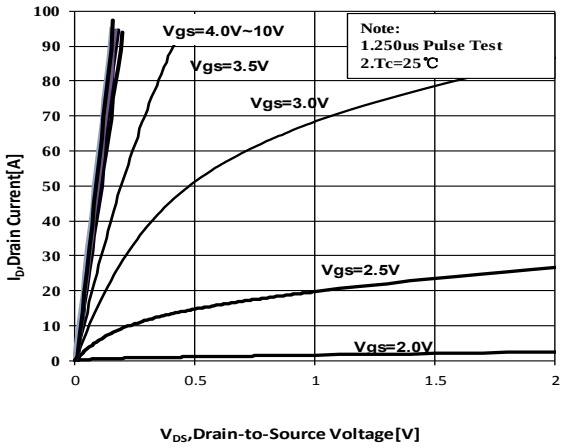


Figure 4. Typical output Characteristics

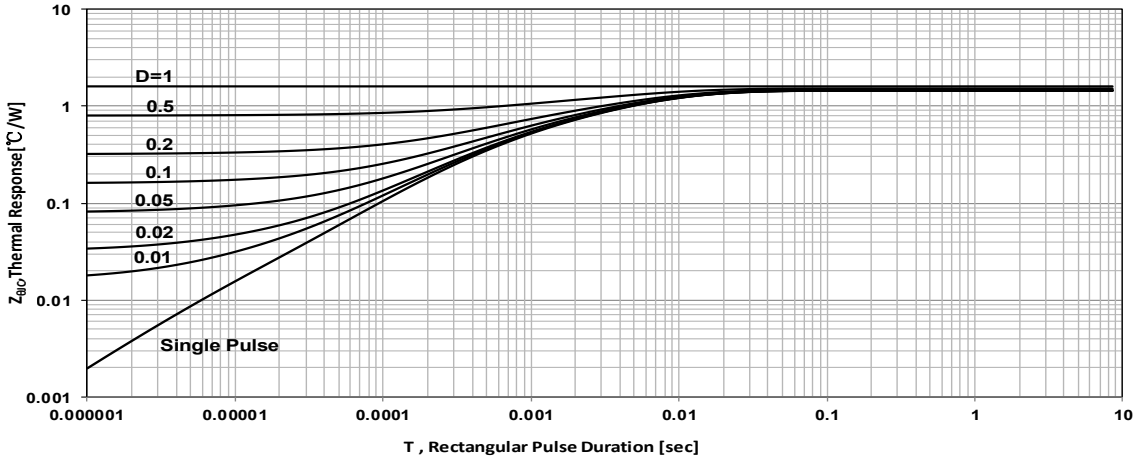


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

Typical Performance Characteristics

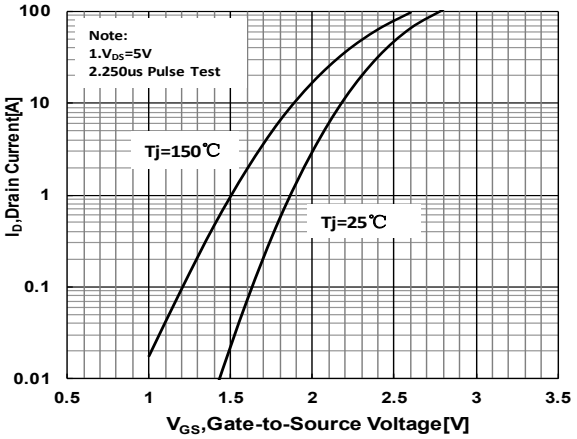


Figure 6 Typical Transfer Characteristics

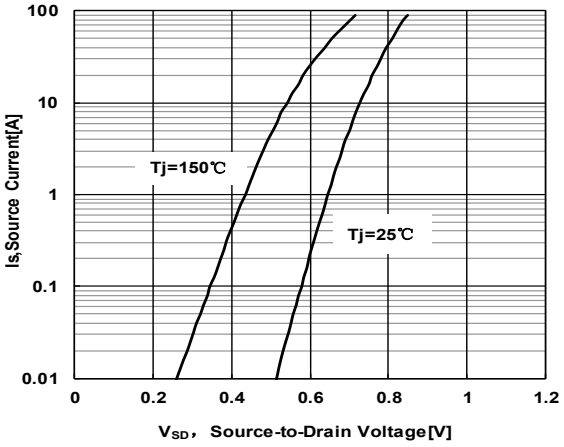


Figure 7 Typical Body Diode Transfer Characteristics

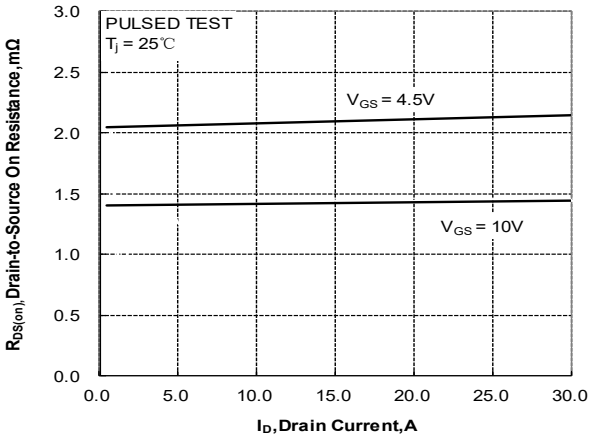


Figure 8. Drain-to-Source On Resistance vs Drain Current

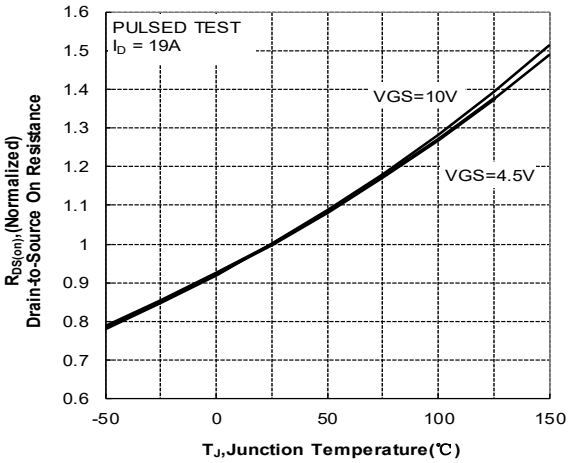


Figure 9. Normalized On Resistance vs Junction Temperature

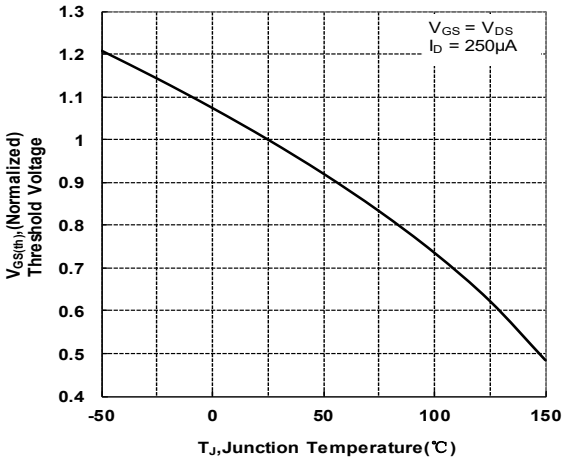


Figure10. Normalized Threshold Voltage vs Junction Temperature

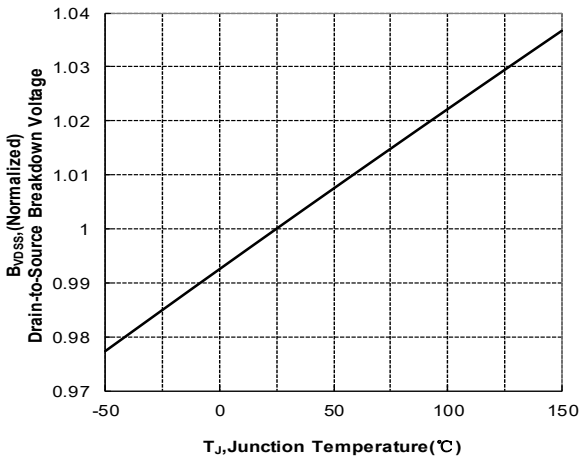


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

Typical Performance Characteristics

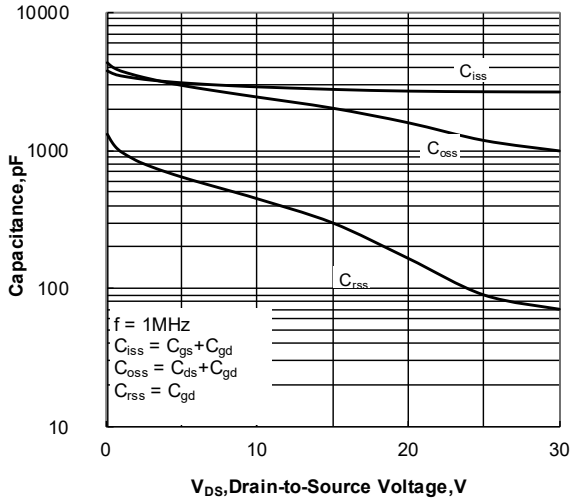


Figure 12. Capacitance Characteristics

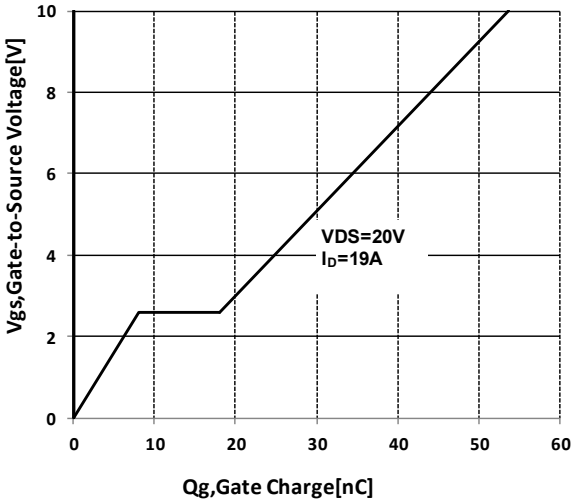
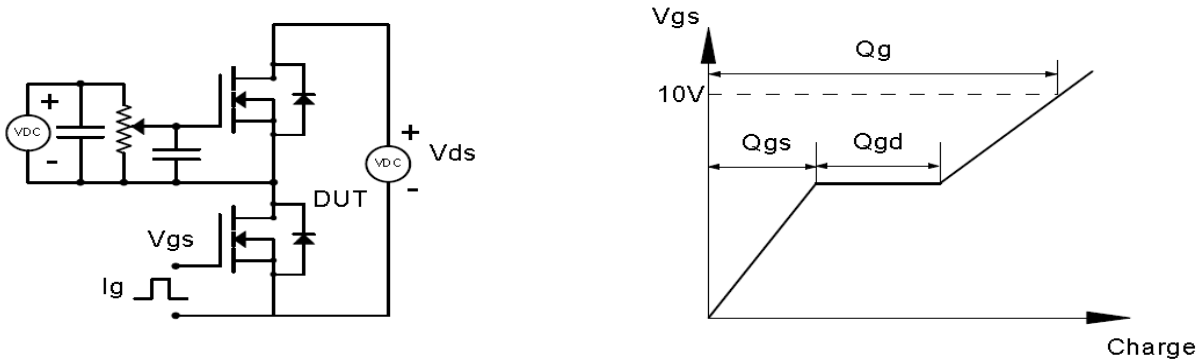


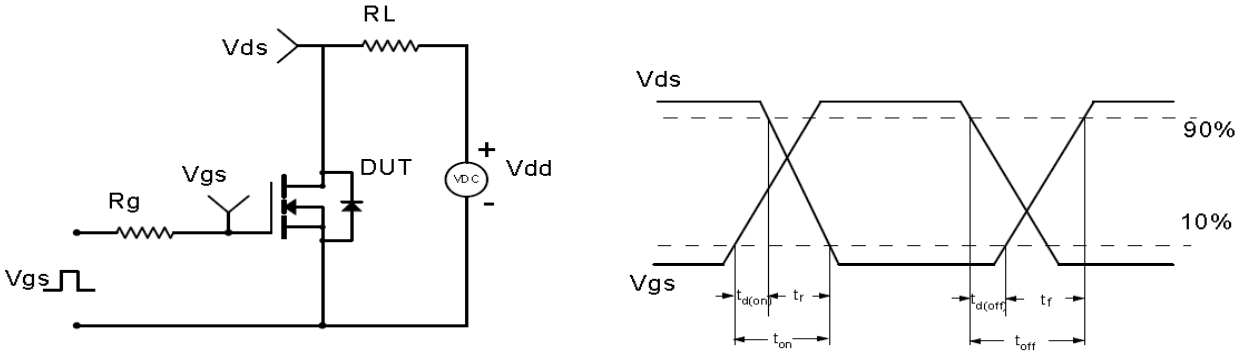
Figure 13 Typical Gate Charge vs Gate to Source Voltage

Test Circuit & Waveform

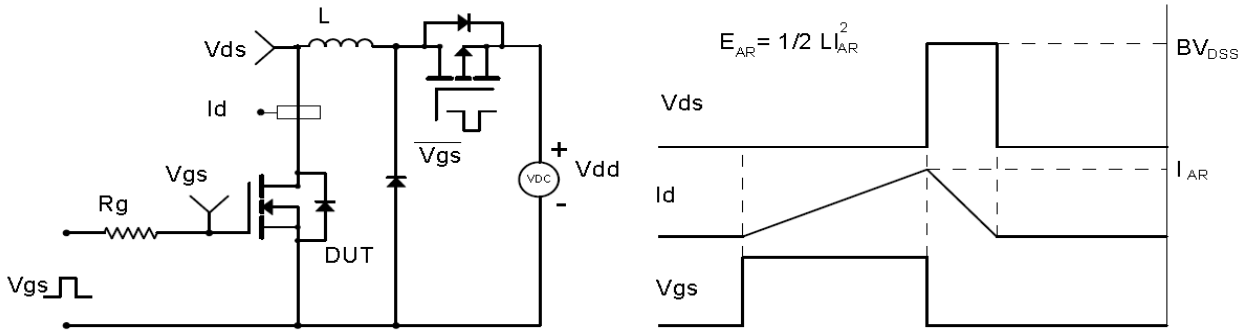
Gate Charge Test Circuit & Waveform



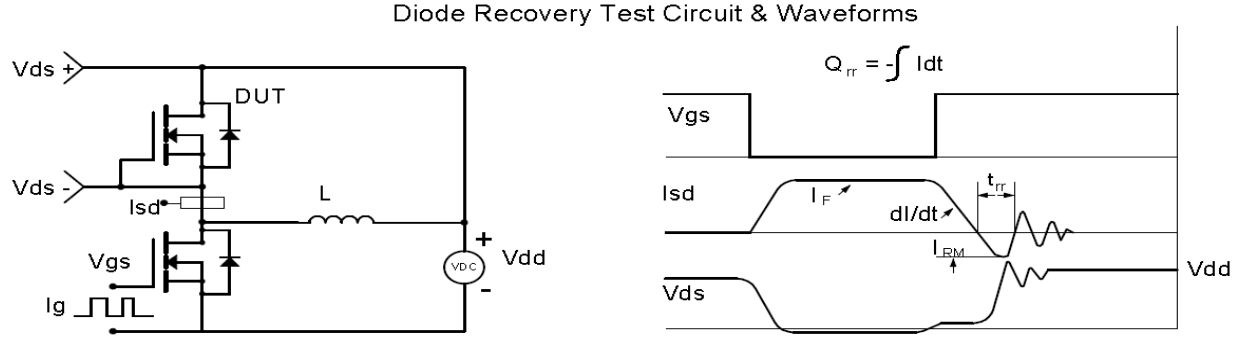
Resistive Switching Test Circuit & Waveforms



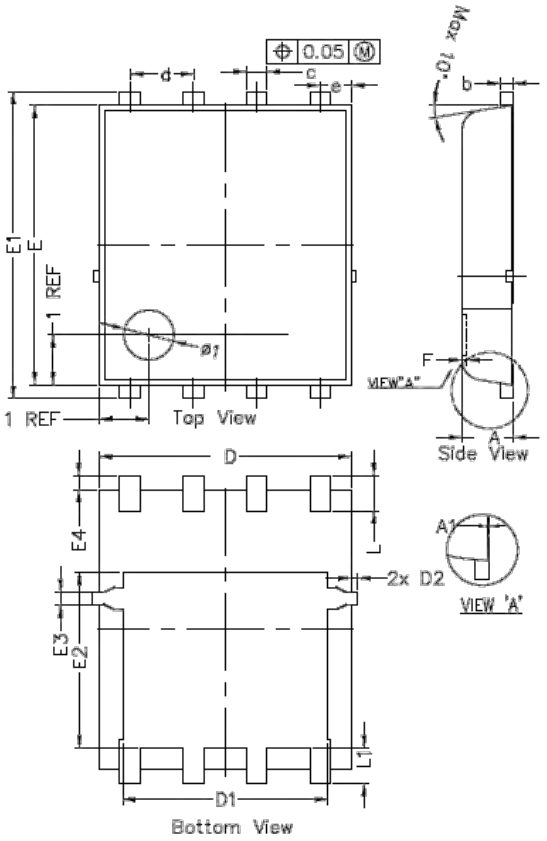
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Outline Drawing PDFN5X6



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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