GOSTONE

RoHS COMPLIANT

GMS048NE4F1

N-Channel 45V,4.8mΩ max,SGT Power MOSFET

Product Summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
45	4.8 @ V_{GS} = 10V	92 [1]

Features

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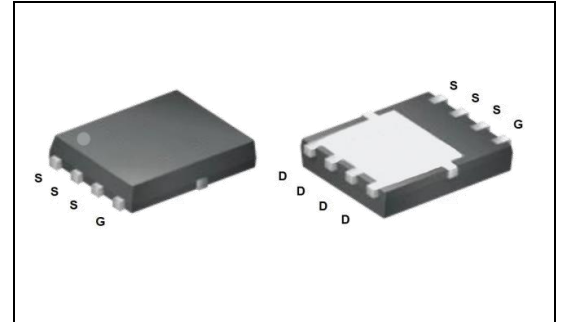- Fast switching speed
- 100% avalanche tested

Application

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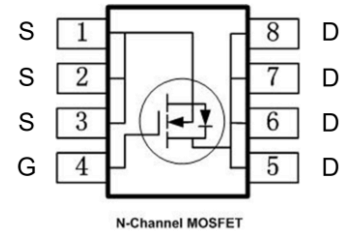- Li- Battery Protection

PDFN5060

GMXXXX

GS

FAYWWLT
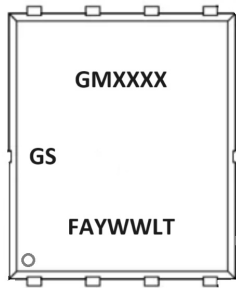
PDFN5060

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

Equivalent circuit

S	1		8	D
S	2		7	D
S	3		6	D
G	4		5	D

N-Channel MOSFET

Absolute maximum rating@25℃

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	45	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25℃[1]	I_D	92	A
	T_C=100℃[1]		53	
Pulsed drain current[2]		$I_{D,pulse}$	326	
Avalanche energy, single pulse[3]		E_{AS}	116	mJ
Power dissipation	T_C=25℃	P_D	54	W
	T_A=100℃		22	
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	$R_{θJC}$	2.3	℃/W
Thermal resistance, junction-to-ambient [4]	Steady state	$R_{θJA}$	50	

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	45			V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ μA	2.0	3.0	4.0	V
Gate-body leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm20$ 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		4.3	4.8	mΩ
Forward transconductance [5]	g_{fs}	$V_{DS} = 5$ V, $I_D = 30$ A		15		S
Gate resistance	R_g	f = 1 MHz		4.2		Ω
Dynamic[5]						
Total gate charge $V_{GS} = 10$V	Q_g	$V_{DS} = 20$ V, $I_D = 20$ A, $V_{GS} = 10$ V		14		nC
Total gate charge $V_{GS} = 4.5$V	Q_g			8.7		
Gate-source charge	Q_{gs}			4.6		
Gate-drain charge	Q_{gd}			2.9		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 20$ V, $I_D = 20$ A, $V_{GS} = 10$ V, $R_{GEN} = 3$ Ω		5.7		ns
Rise time	t_r			11		
Turn-off delay time	$t_{d(off)}$			14		
Fall time	t_f			8.0		
Input capacitance	C_{iss}	$V_{DS} = 20$ V, $V_{GS} = 0$ V, f = 1 MHz		982		pF
Output capacitance	C_{oss}			593		
Reverse transfer capacitance	C_{rss}			25		
Reverse Diode Characteristics [5]						
Diode forward voltage	V_{SD}	$V_{GS} = 0$ V, $I_F = 2$ A		0.7	1.2	V
Reverse recovery time	t_{rr}	$I_F = 20$ A, di/dt = 100 A/μs		30		ns
Reverse recovery charge	Q_{rr}			13		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.

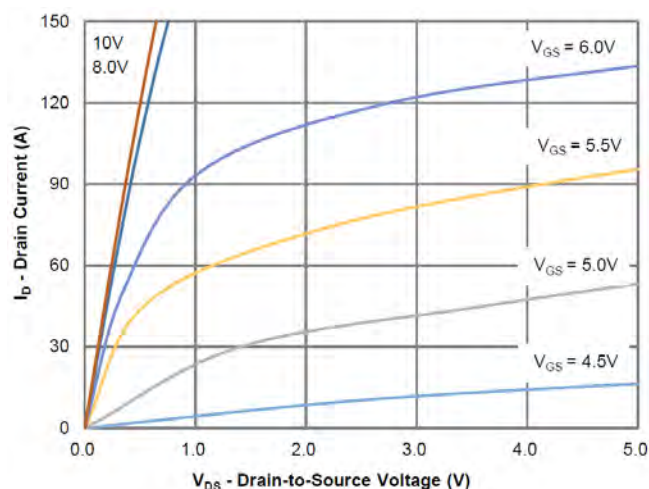## Typical Performance Characteristics
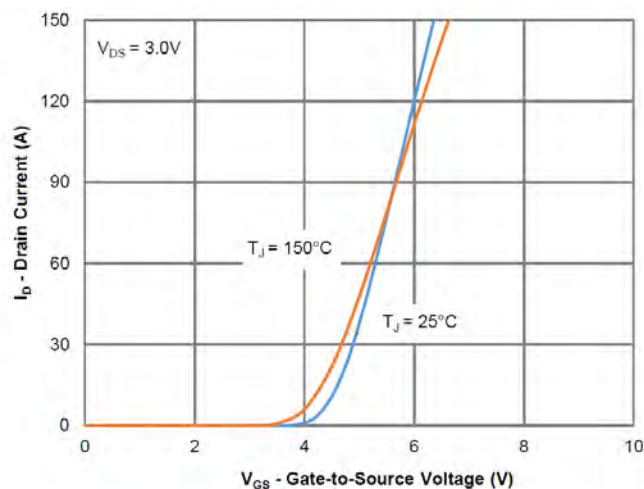

Figure 1: Output Characteristics
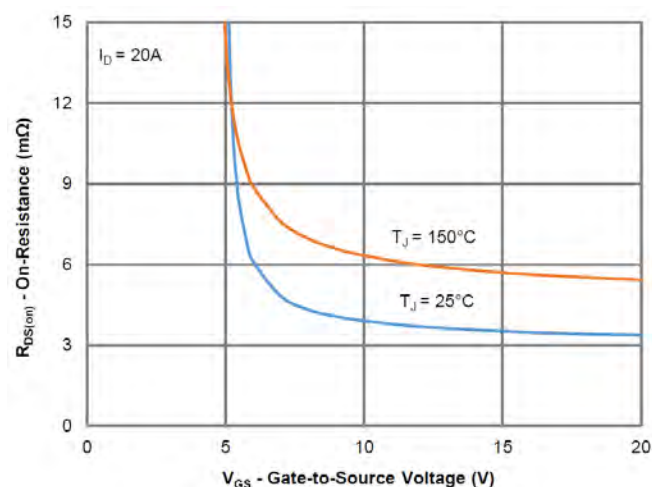

Figure 2: Transfer Characteristics

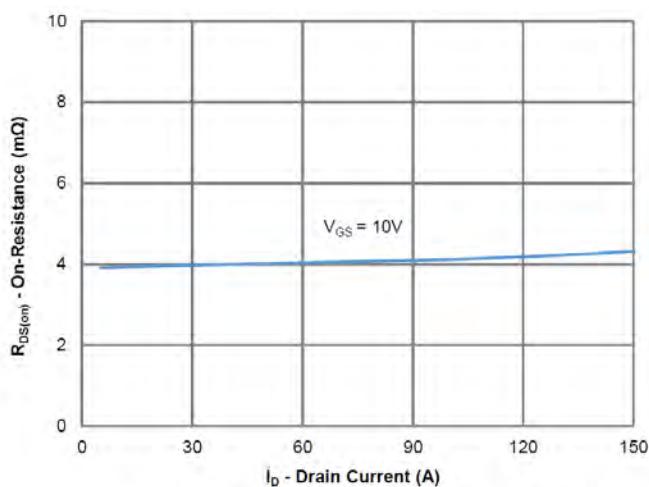Figure 3: On-Resistance vs. Gate-Source Voltage

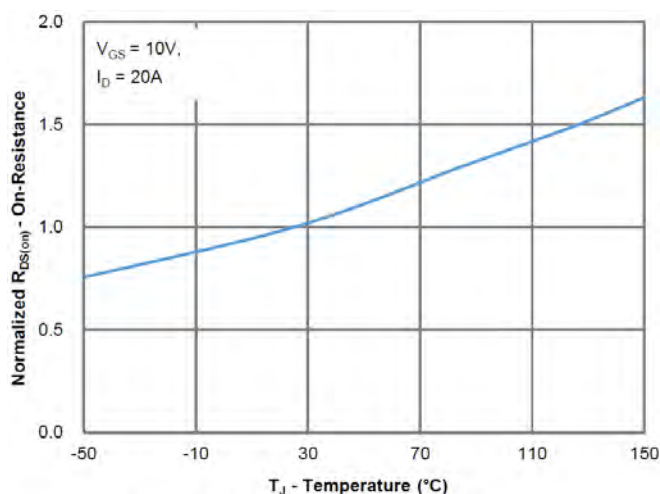Figure 4: On-Resistance vs. Gate-Source Voltage
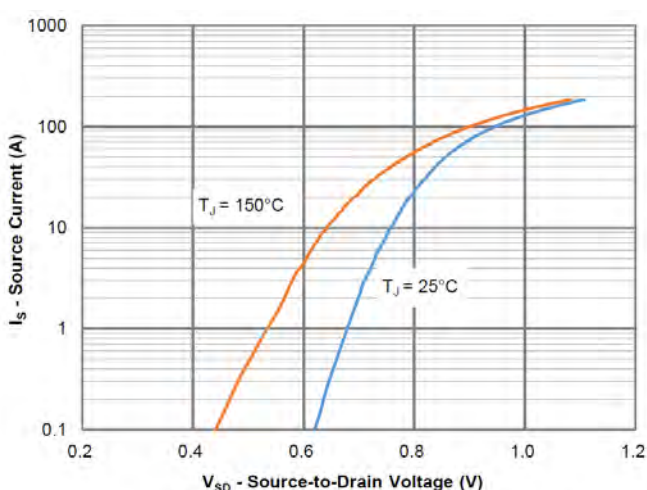

Figure 5: On-Resistance vs. Junction Temperature

Figure 6: Source-Drain Diode Forward Voltage
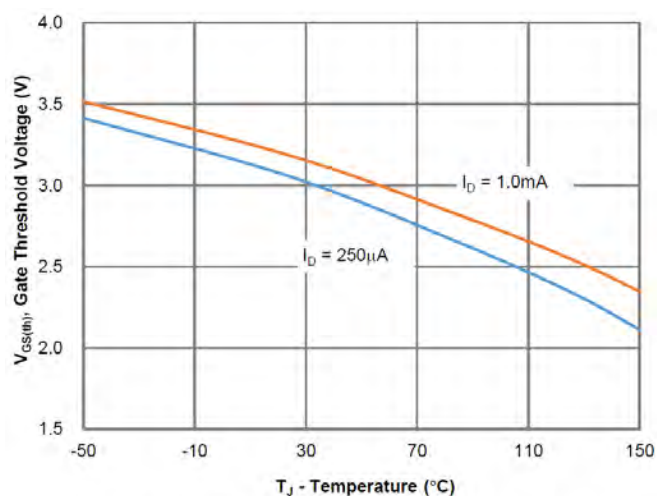
Typical Performance Characteristics

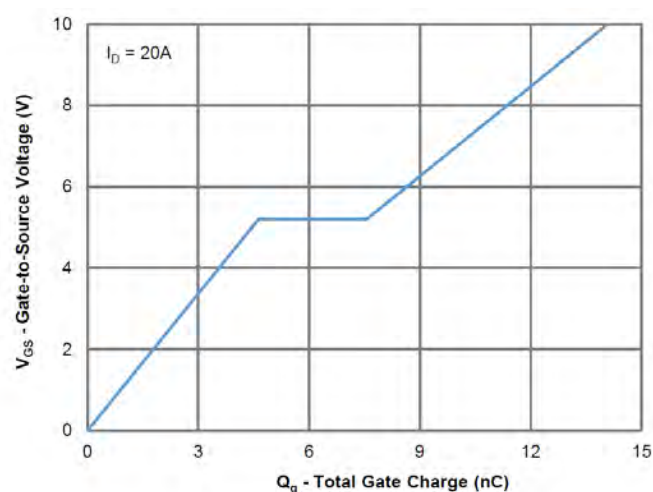Figure 7: Gate Threshold Variation vs. Junction Temperature
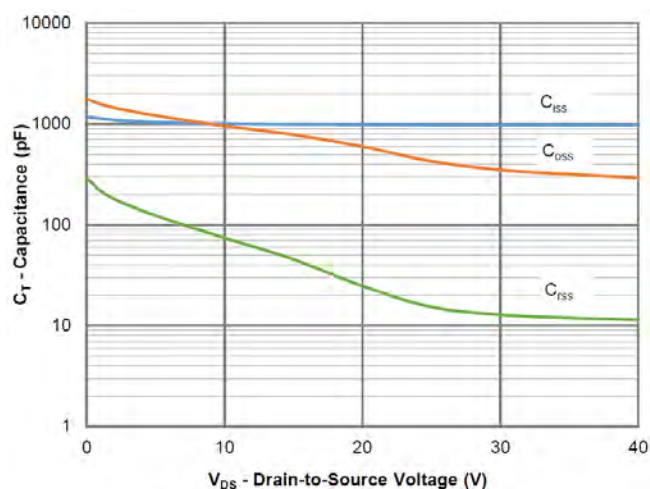
Figure 8: Gate Charge Characteristics
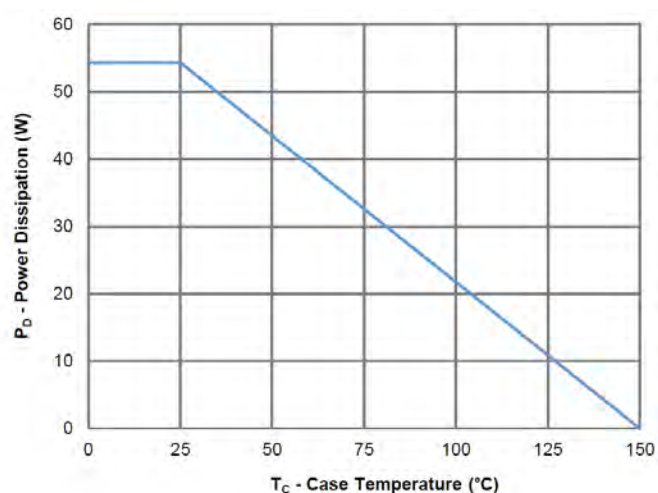
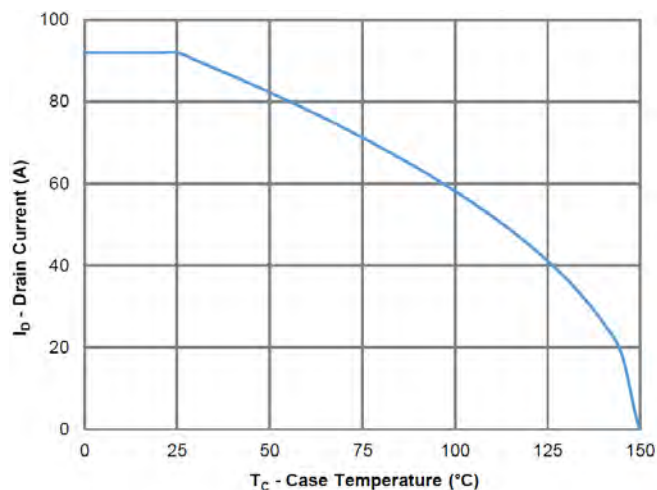Figure 9: Capacitance Characteristics
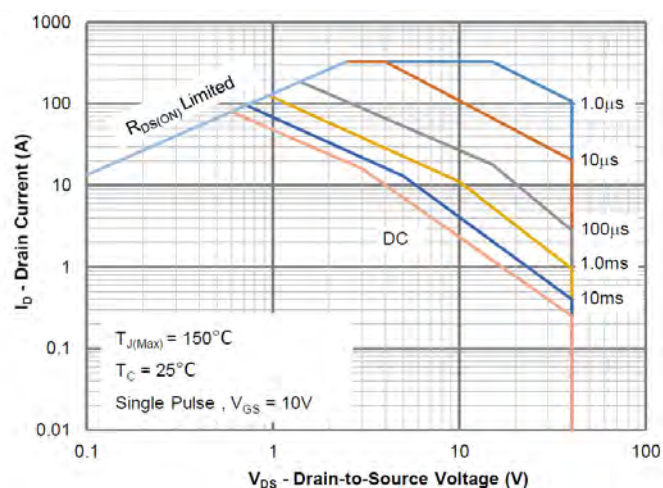
Figure 10: Power Derating

Figure 11: Current Derating

Figure 12: Safe Operating Area

Typical Performance Characteristics

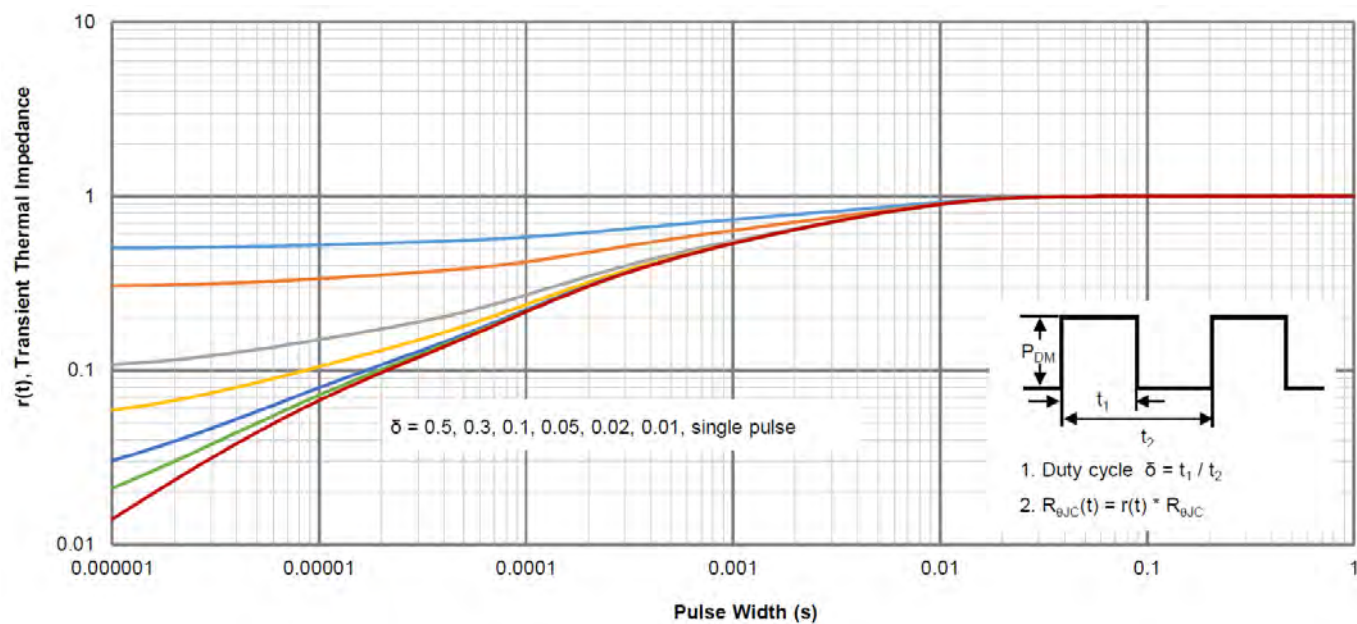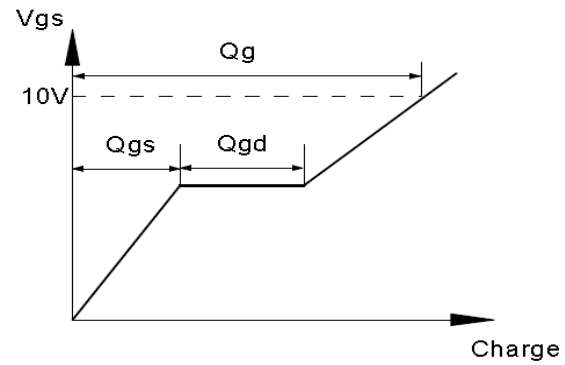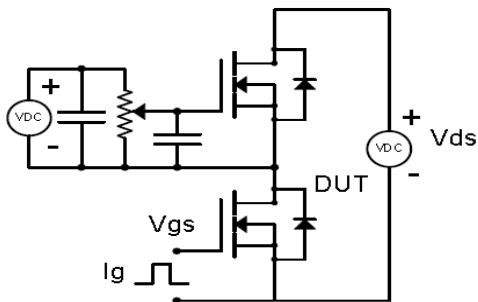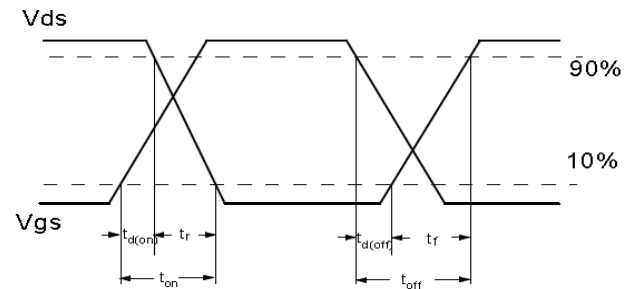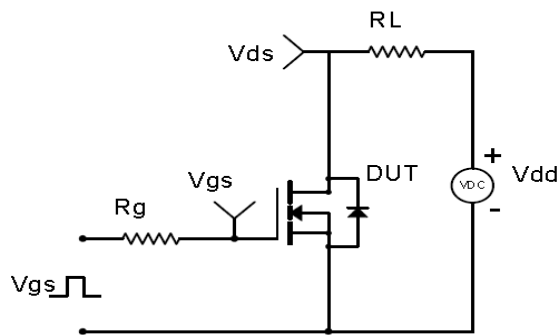Figure 13: Normalized Maximum Transient Thermal Impedance
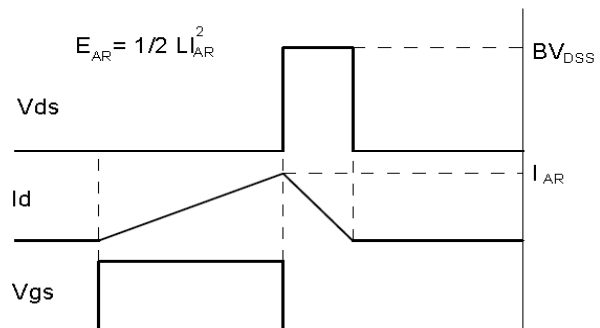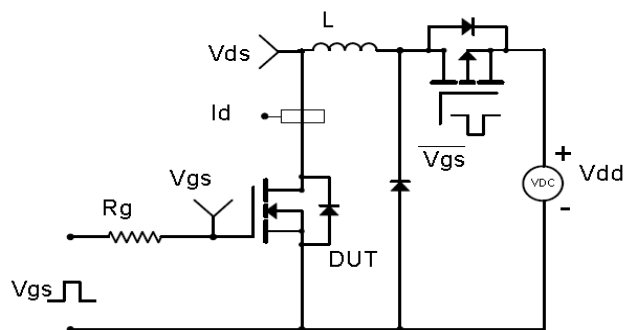
Test Circuit & Waveform

Gate Charge Test Circuit & Waveforms

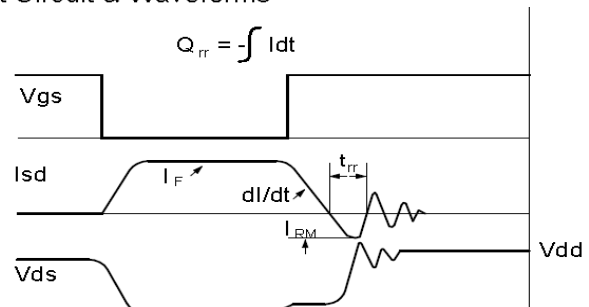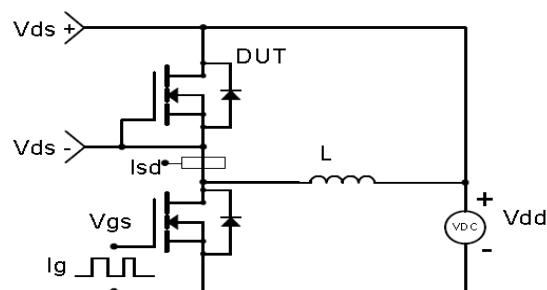### Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

$$E_{AR} = 1/2 \, LI_{AR}^2$$

Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int I dt$$

Outline Drawing PDFN5060
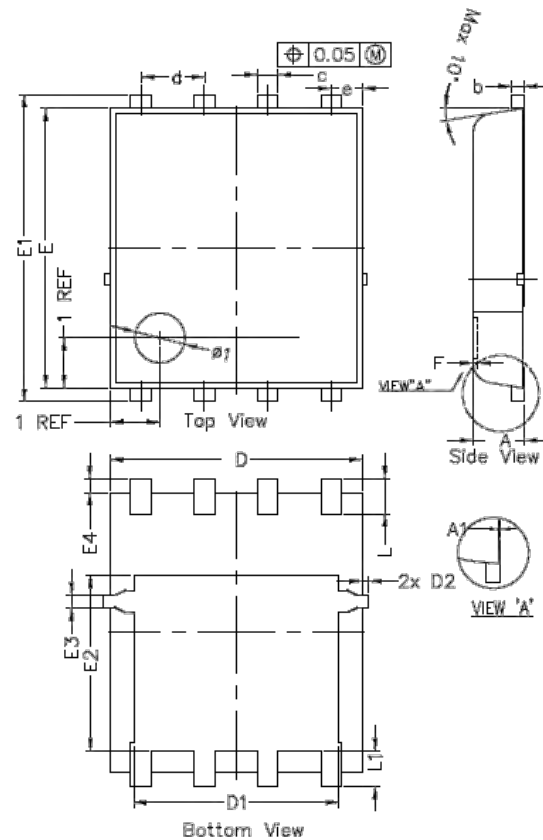
Dim	Millimeters		
	Min	Nom	Max
A	0.900	1.000	1.100
A1	0.000	---	0.050
b	0.246	0.254	0.312
c	0.310	0.410	0.510
d	1.27BSC		
D	4.950	5.050	5.150
D1	4.000	4.100	4.200
D2	---	---	0.125
e	0.62BSC		
E	5.500	5.600	5.700
E1	6.050	6.150	6.250
E2	3.425	3.525	3.625
E3	0.150	0.250	0.350
E4	0.175	0.275	0.375
F	---	---	0.100
L	0.500	0.600	0.700
L1	0.600	0.700	0.800

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