JMTQ040N03A

Description

JMT N-channel Enhancement Mode Power MOSFET

Features

- 30V, 60A

  $R_{DS(ON)} < 4.0m\Omega$ @ $V_{GS} = 10V$

  $R_{DS(ON)} < 6.2m\Omega$ @ $V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

Applications

- Load Switch
- PWM Application
- Power Management

100% UIS TESTED!
100% ΔVds TESTED!

RoHS

Top View **Bottom View**

← Pin 1

PDFN3x3-8L

Q040N03A
XXXXX XXX

D	D	D	D
8	7	6	5
1	2	3	4
S	S	S	G
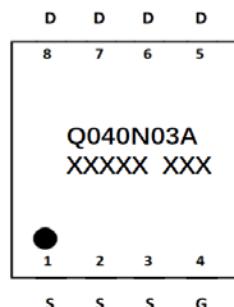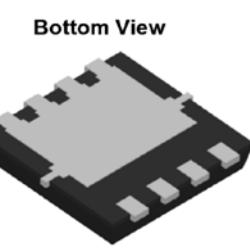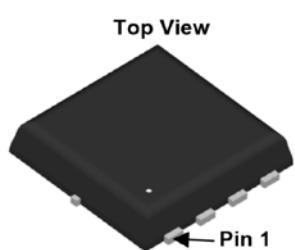
Marking and Pin Assignment
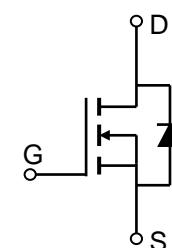
Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
Q040N03A	JMTQ040N03A	TAPING	PDFN3x3-8L	13"	5000	50000

Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter		Value	Units
V_{DS}	Drain-to-Source Voltage		30	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	$T_C = 25°C$	60	A
		$T_C = 100°C$	38	
I_{DM}	Pulsed Drain Current [1]		240	A
E_{AS}	Single Pulsed Avalanche Energy [2]		121	mJ
P_D	Power Dissipation	$T_C = 25°C$	39	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient [3]		41	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		3.2	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

JMTQ040N03A

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.3	1.9	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance[4]	V_{GS} = 10V, I_D = 30A	-	3.1	4.0	mΩ
		V_{GS} = 4.5V, I_D = 20A	-	4.8	6.2	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz	-	3089	-	pF
C_{oss}	Output Capacitance		-	372	-	pF
C_{rss}	Reverse Transfer Capacitance		-	302	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V, V_{DS} = 15V, I_D = 30A	-	58	-	nC
Q_{gs}	Gate Source Charge		-	12	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	13	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 15V, I_D= 30A, R_{GEN} = 3Ω	-	11	-	ns
t_r	Turn-On Rise Time		-	29	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	47	-	ns
t_f	Turn-Off Fall Time		-	18	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = 30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 30A, di/dt = 100A/us	-	16	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	7	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition: Starting T_J=25C, V_{DD}=15V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=22A

3. $R_{θJA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB

4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

**Figure 1: Output Characteristics**
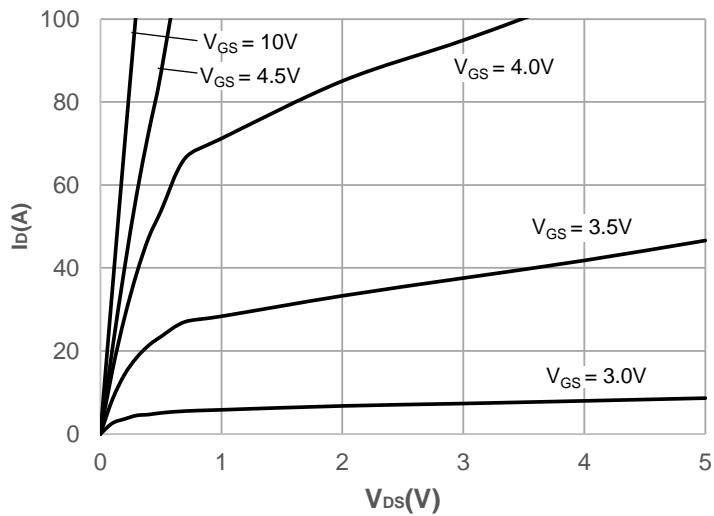

Figure 2: Typical Transfer Characteristics
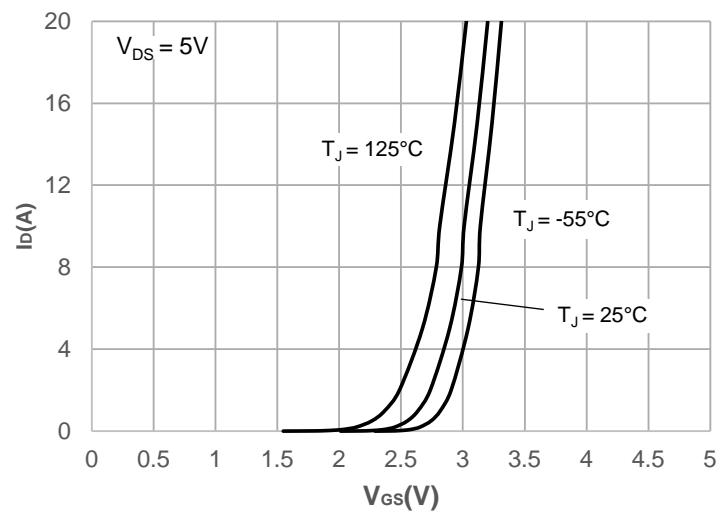

Figure 3: On-resistance vs. Drain Current
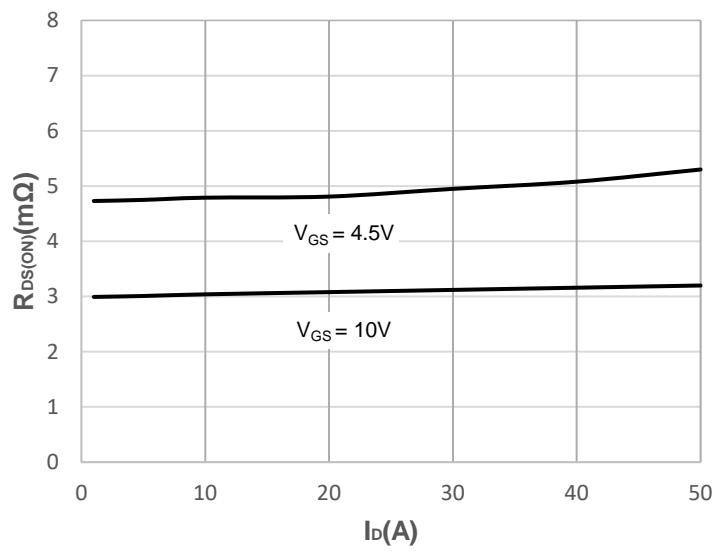
**Figure 4: Body Diode Characteristics**
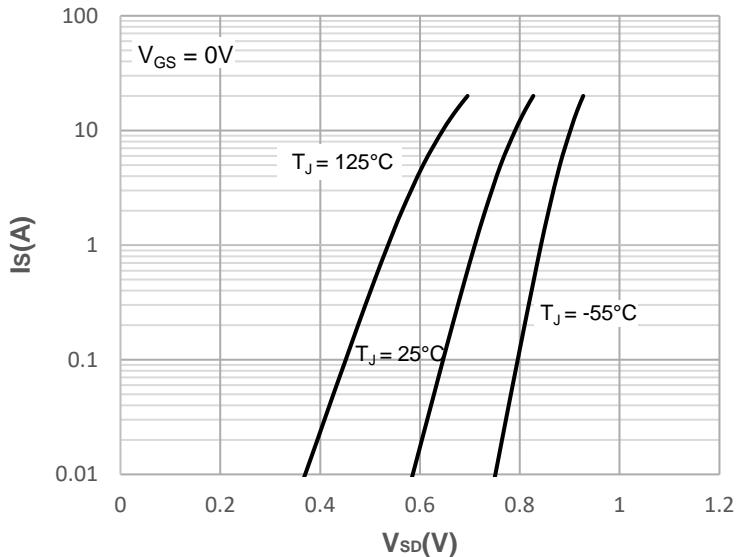

Figure 5: Gate Charge Characteristics
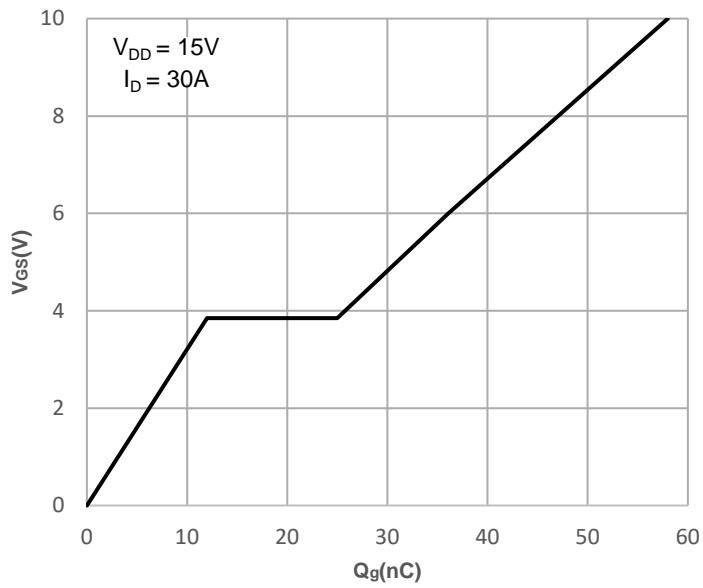
Figure 6: Capacitance Characteristics
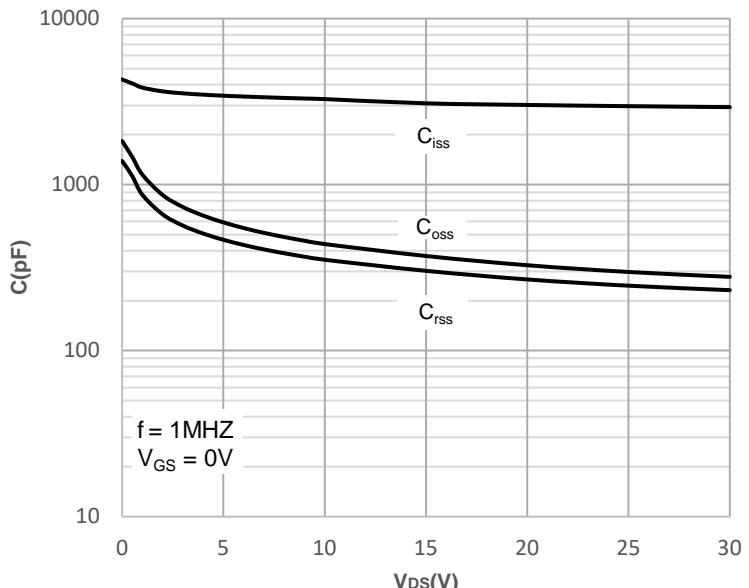
Typical Performance Characteristics

**Figure 7: Normalized Breakdown voltage vs. Junction Temperature**

$I_D = 1mA$

Normalized $V_{(BR)DSS}$ vs $T_J(°C)$ Junction Temperature
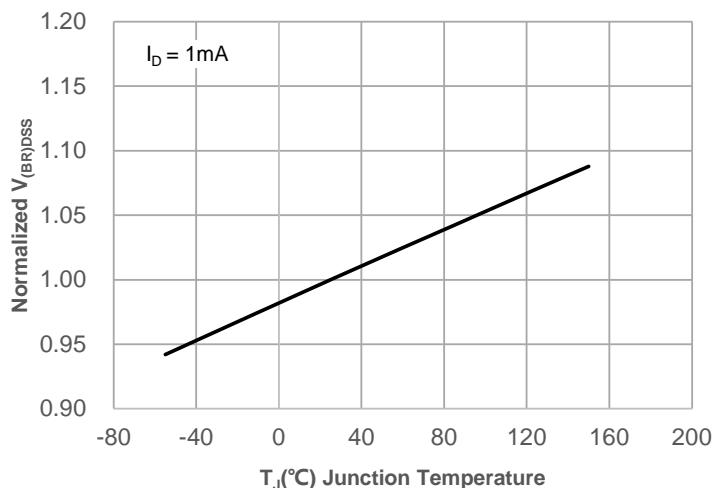
Figure 8: Normalized on Resistance vs. Junction Temperature

$V_{GS} = 10V$
$I_D = 30A$

Normalized $R_{DS(ON)}$ vs $T_J(°C)$ Junction Temperature
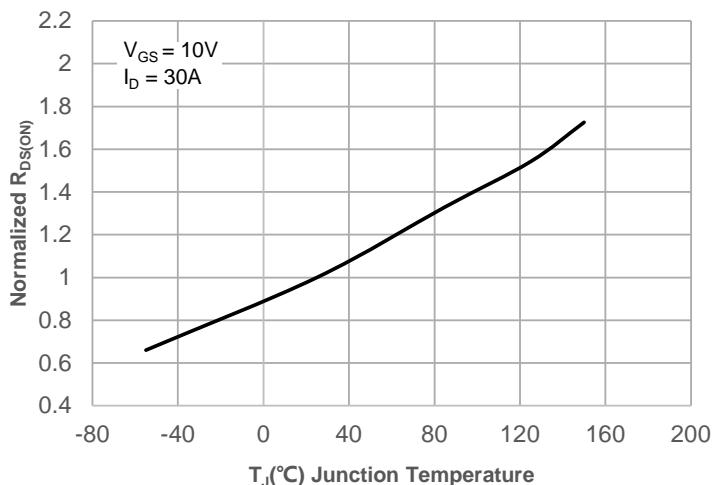
Figure 9: Maximum Safe Operating Area

Limited by $R_{DS(ON)}$

10us
100us
1ms
10ms
DC

$T_C = 25°C$
Single Puse

$I_D(A)$ vs $V_{DS}(V)$
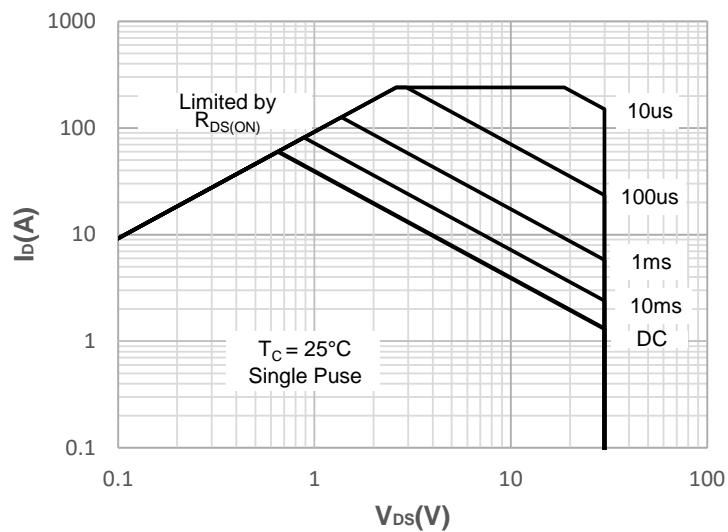
Figure 10: Maximum Continuous Drian Current vs. Case Temperature

$V_{GS}= 10V$

$I_D(A)$ vs $T_C(°C)$ Case Temperature
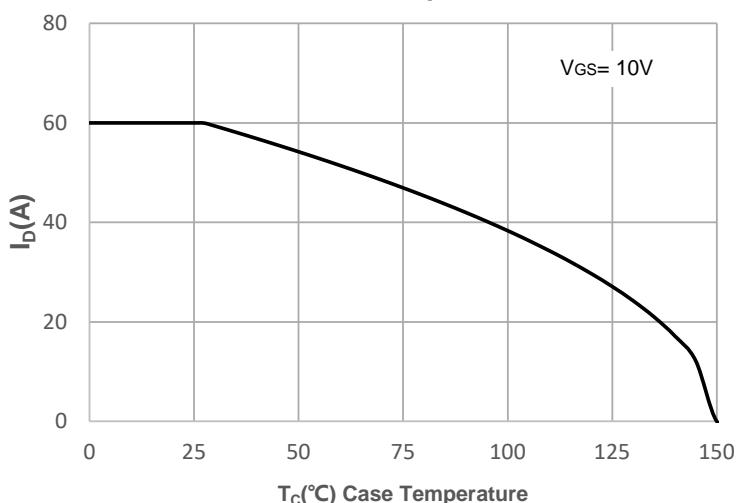
Figure 11: Normalized Maximum Transient Thermal Impedance

D = 0.5,
0.2,
0.1,
0.05,
0.02,
0.01,
single pulse

P_{DM}

t_1
t_2

Duty factor: D = t1/t2

Peak $T_J = T_C + P_{DM} \times Z_{\theta JC} \times R_{\theta JC}$

Normalized Thermal Impedance, ZθJC vs t, Pulse Width (s)
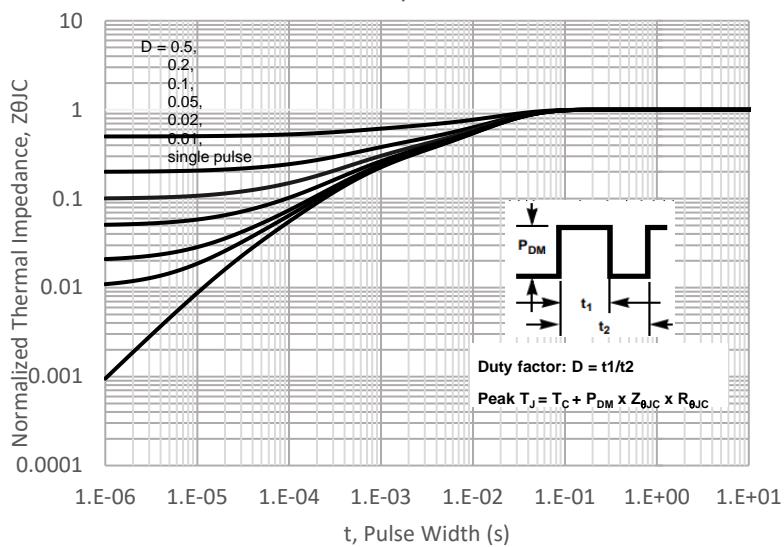
Figure 12: Peak Current Capacity

$V_{GS} = 10V$

Single Pulse

I_{DM} Peak Current(A) vs t, Pulse Width (s)
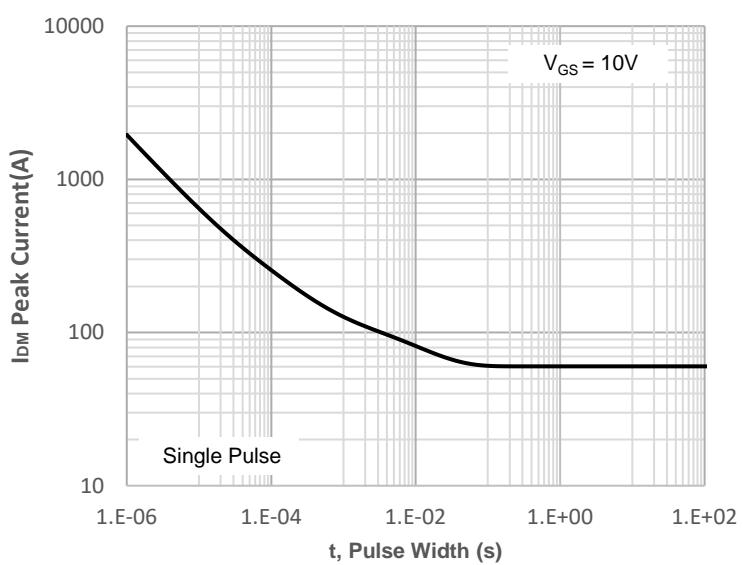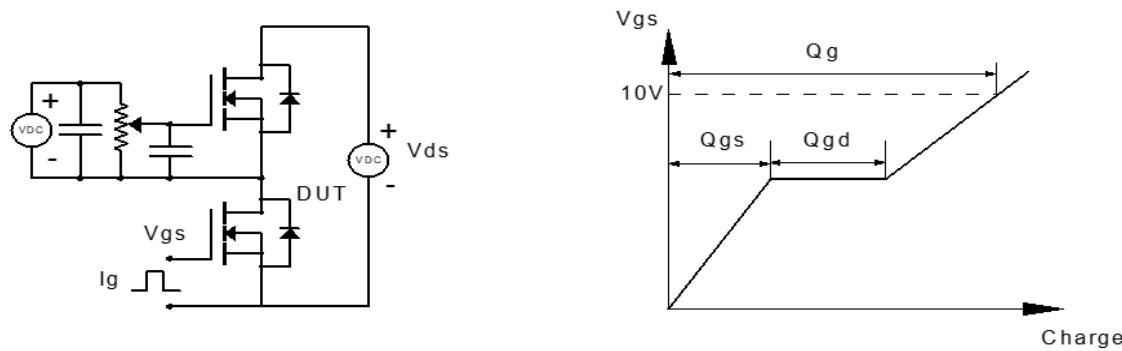
## Test Circuit

**Figure 1: Gate Charge Test Circuit & Waveform**
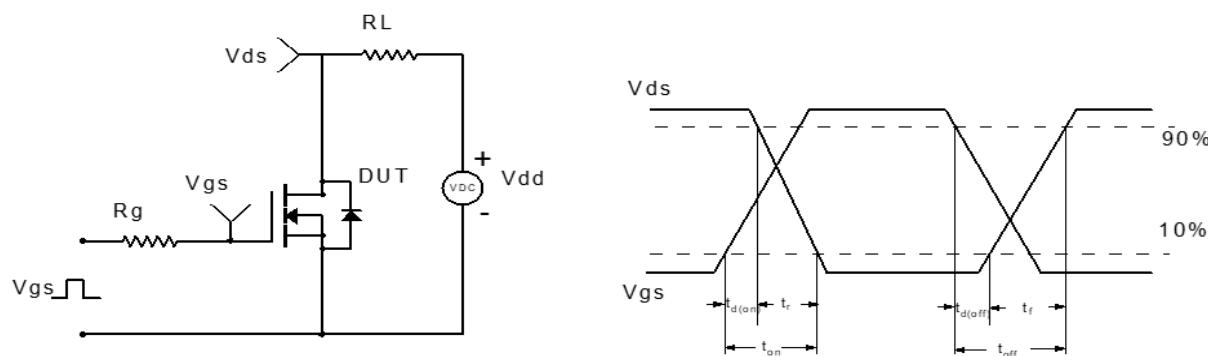
**Figure 2: Resistive Switching Test Circuit & Waveform**
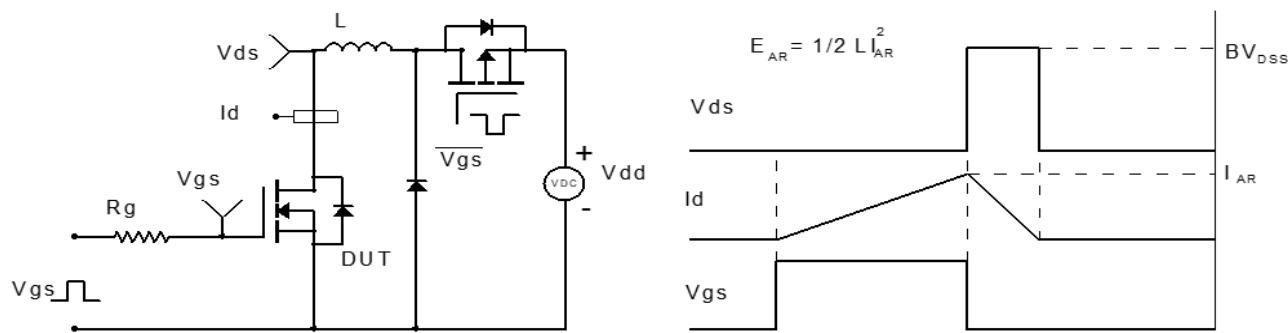
**Figure 3: Unclamped Inductive Switching Test Circuit& Waveform**
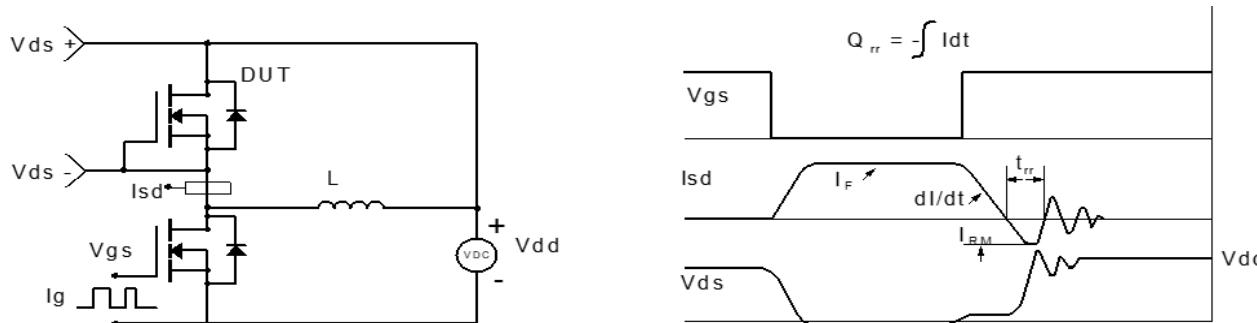
Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN3x3-8L)
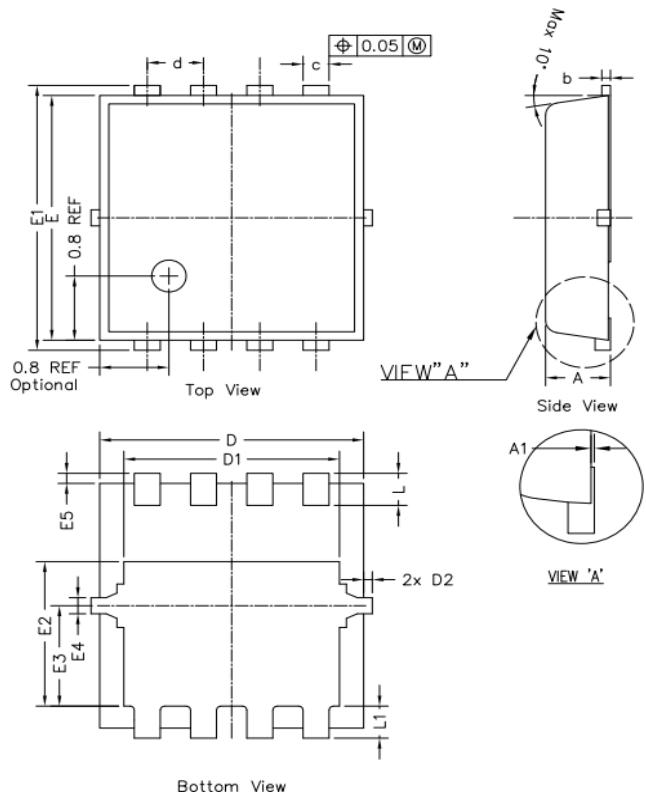
SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	---	---	0.050	----	----	0.002
b	0.144	0.152	0.202	0.006	0.006	0.008
c	0.250	0.300	0.350	0.010	0.012	0.014
d		0.65 BSC			0.026 BSC	
D	2.950	3.050	3.150	0.116	0.120	0.124
D1	2.390	2.490	2.590	0.094	0.098	0.102
D2	---	---	0.125	---	---	0.005
E	2.950	3.050	3.150	0.116	0.120	0.124
E1	3.200	3.300	3.400	0.126	0.130	0.134
E2	1.700	1.800	1.900	0.067	0.071	0.075
E3	1.150	1.250	1.350	0.045	0.049	0.053
E4	0.150	0.200	0.250	0.006	0.008	0.010
E5	0.075	0.125	0.175	0.003	0.005	0.007
L	0.300	0.400	0.500	0.01	0.02	0.02
L1	0.300	0.400	0.500	0.01	0.02	0.02

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