

SLM80N04T

40V N -Channel MOSFET

General Description

This Power MOSFET is produced using Maple semi's advanced TRENCH technology.

This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- N-Channel:40V 80A

$$R_{DS(on)Typ} = 5.0m\Omega @ V_{GS} = 10V$$

$$R_{DS(on)Typ} = 6.5m\Omega @ V_{GS} = 4.5V$$

- Very Low On-resistance RDS(ON)

- LowCrss

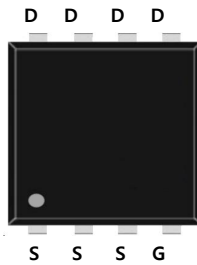
- Fast switching

- 100% avalanche tested

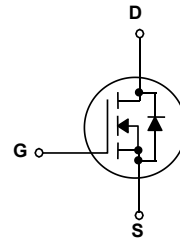
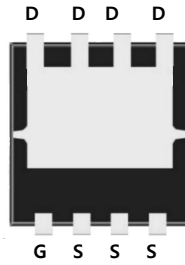
- Improved dv/dt capability

Application

- ✓ PWM Application
- ✓ Load Switch
- ✓ Power Management



DFN5*6



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter	SLM80N04T	Units
V _{DSS}	Drain-Source Voltage	40	V
I _D	Drain Current - Continuous (T _C = 25°C)	80	A
	- Continuous (T _C = 100°C)	52	A
I _{DM}	Drain Current - Pulsed (Note 1)	320	A
V _{GSS}	Gate-Source Voltage	±20	V
E _{AS}	Single Pulsed Avalanche Energy	104	mJ
P _D	Power Dissipation (T _C = 25°C)	77	W
R _{θJC}	Thermal Resistance, Junction to Case	1.95	W/°C
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T _L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C

* Drain current limited by maximum junction temperature.

Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLM80N04T	SLM80N04T	DFN5*6	Tape & Reel	5000	50000

Electrical Characteristics

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 32\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	--	5.0	6.5	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 25\text{ A}$	-	6.5	10	

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	4042	-	pF
C_{oss}	Output Capacitance		--	386	-	pF
C_{rss}	Reverse Transfer Capacitance		--	232	-	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DS} = 20\text{ V},$ $R_G = 3\Omega, I_D = 30\text{ A}$	--	8	--	ns
t_r	Turn-On Rise Time		--	18	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	24	--	ns
t_f	Turn-Off Fall Time		--	14	--	ns
Q_g	Total Gate Charge	$V_{DS} = 20\text{ V}, I_D = 30\text{ A},$ $V_{GS} = 10\text{ V}$	--	57	--	nC
Q_{gs}	Gate-Source Charge		--	9	--	nC
Q_{gd}	Gate-Drain Charge		--	11	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	80	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	320	A
V_{SD}	Drain to Source Diode Forward Voltage, $V_{GS} = 0\text{ V}, I_{SD} = 30\text{ A}, T_J = 25^\circ\text{C}$	--	--	1.2	V
t_{rr}	Reverse Recovery Time & $T_J = 25^\circ\text{C}, I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	--	22	-	nS
Q_{rr}	Reverse Recovery Charge & $T_J = 25^\circ\text{C}, I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	--	11	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^\circ\text{C}, V_{DD} = 20\text{ V}, V_G = 10\text{ V}, R_G = 25\Omega, L = 0.5\text{ mH}, I_{AS} = 20\text{ A}$
3. Pulse Test: Pulse Widths $\leq 300\mu\text{s}$, Duty Cycles $\leq 0.5\%$

N- Channel Typical Characteristics

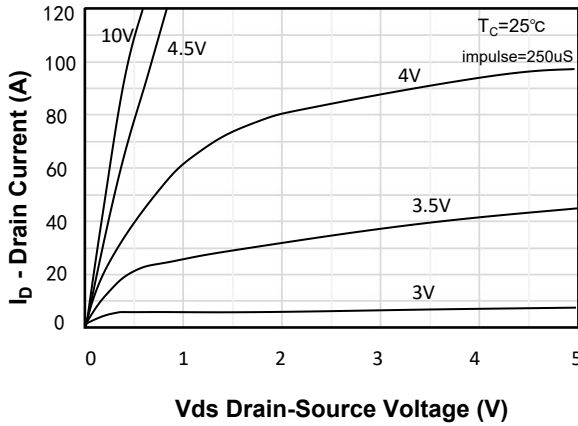


Figure 1. On-Region Characteristics

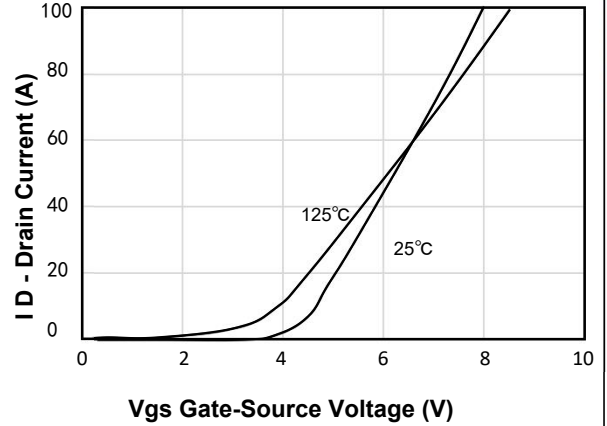


Figure 2. Transfer Characteristics

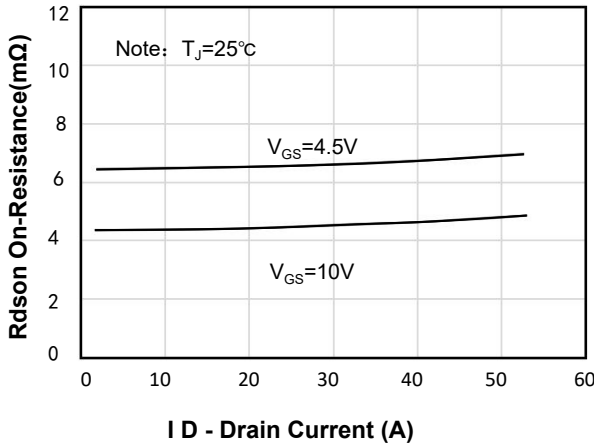


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

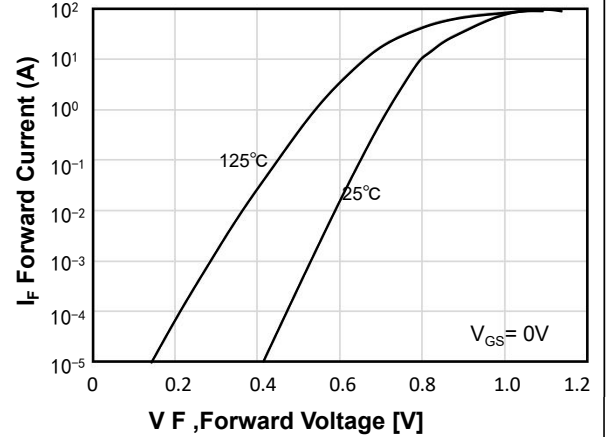


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

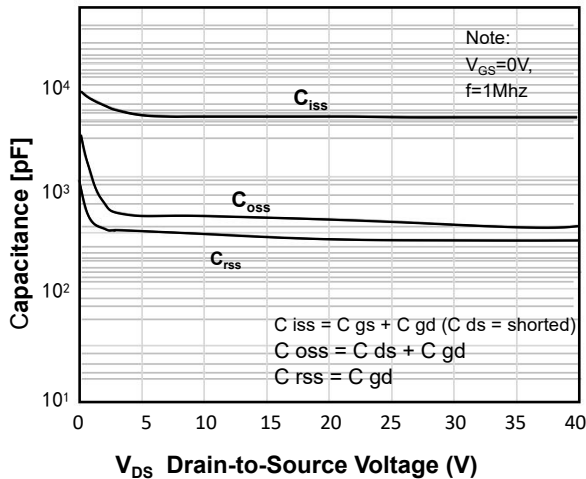


Figure 5. Capacitance Characteristics

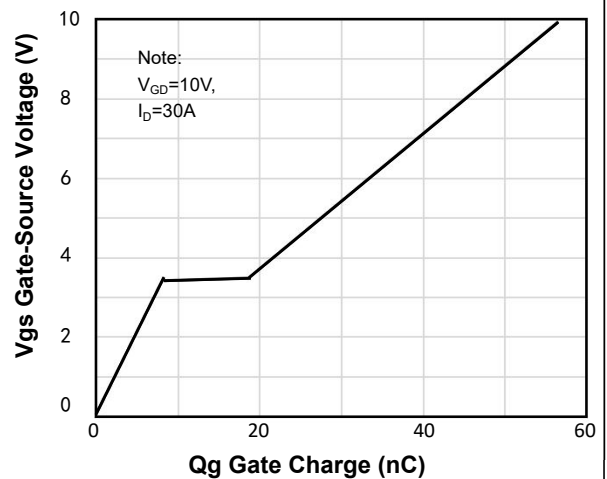


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

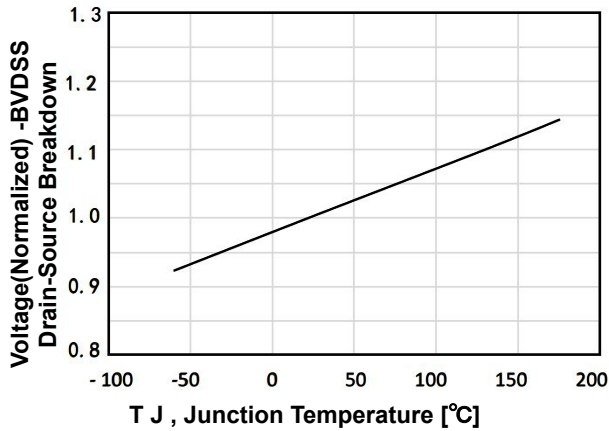


Figure 7. Breakdown Voltage Variation vs Temperature

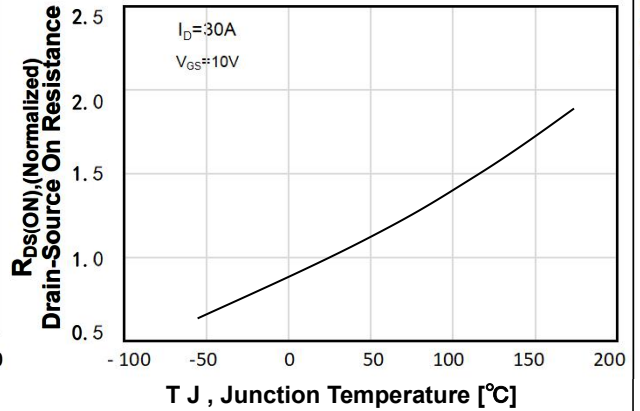


Figure 8. On-Resistance Variation vs Temperature

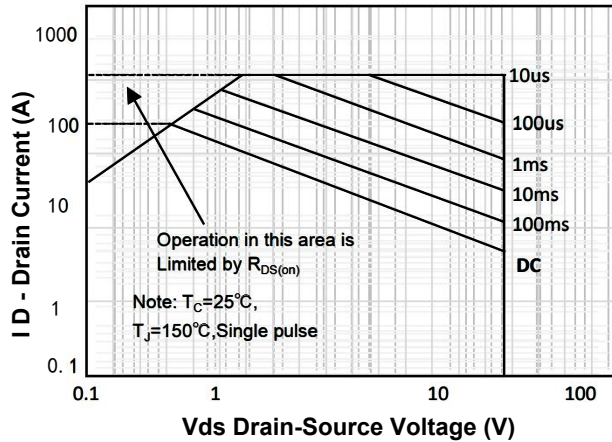


Figure 9. Maximum Safe Operating Area

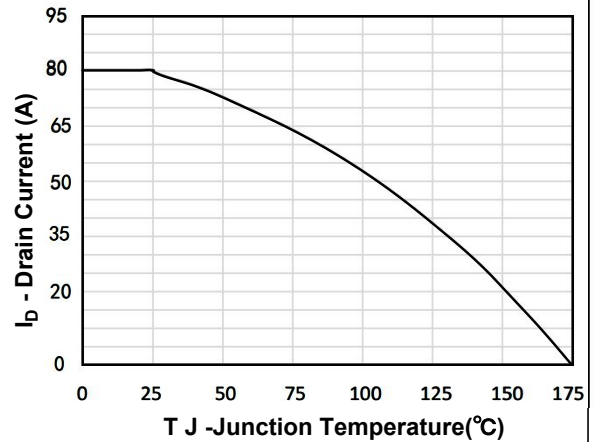


Figure 10. V_{DS} Drain VS Junction Temperature

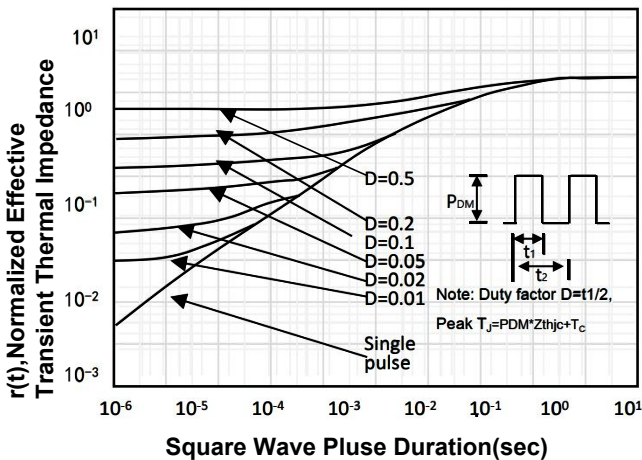
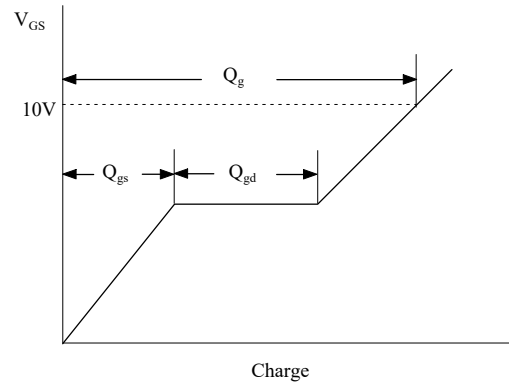
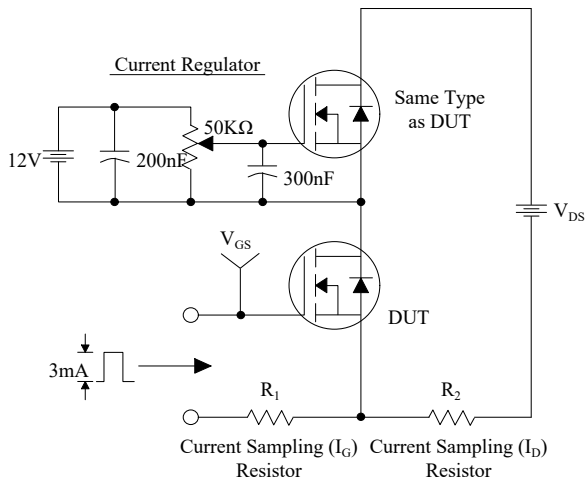
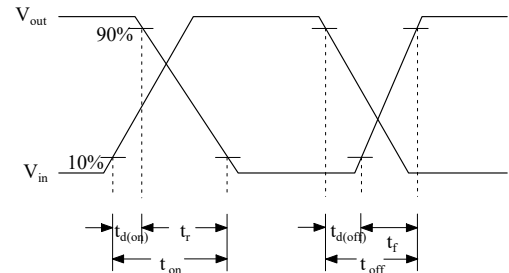
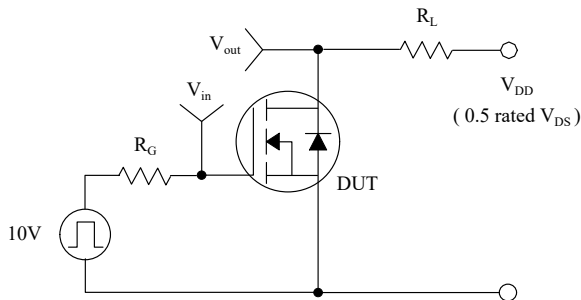


Figure 11. Transient Thermal Response Curve

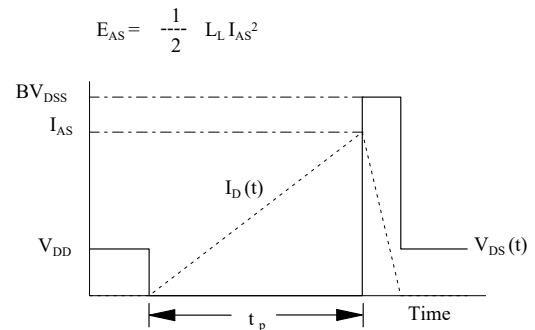
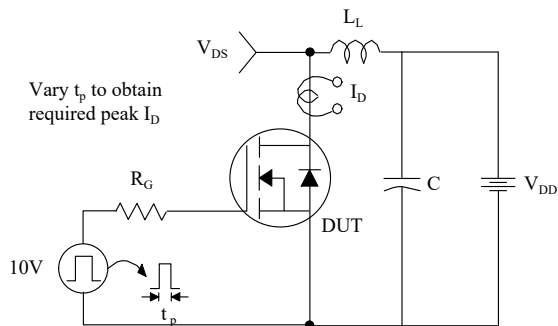
Gate Charge Test Circuit & Waveform



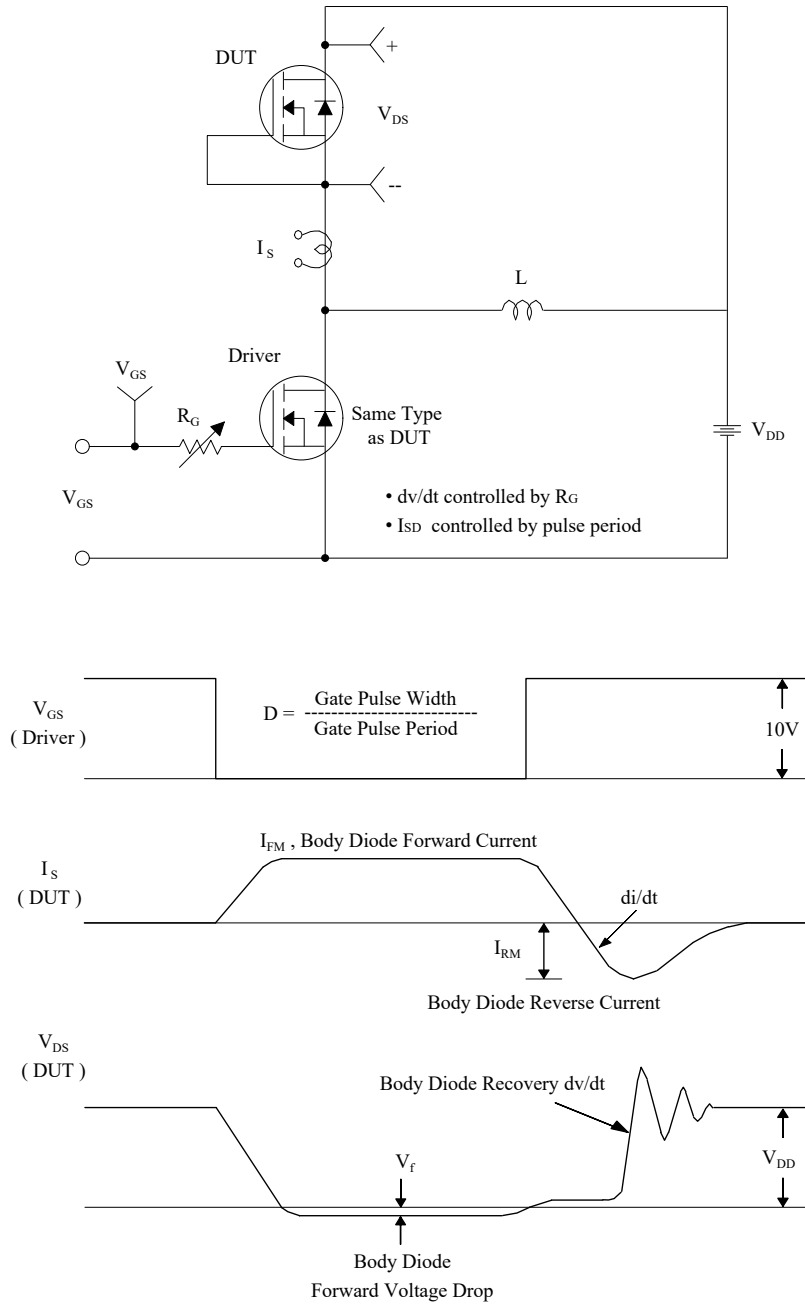
Resistive Switching Test Circuit & Waveforms



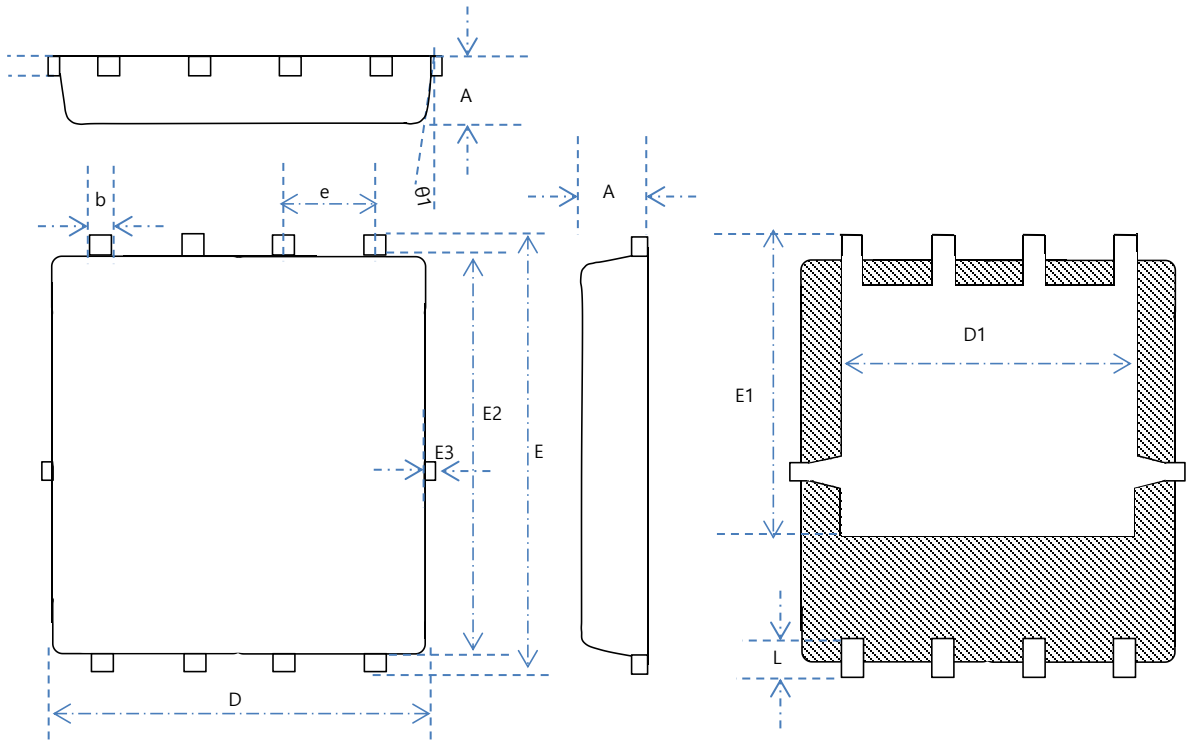
Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



DFN 5*6 OUTLINE



SYMBO L	Mechanical Dimensions/mm			SYMBOL	Mechanical Dimensions/mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.85	0.95	1.05	D	5.10	5.20	5.30
A1	0.254 REF			e	1.270 TYPE		
b	—	0.30	—	D1	3.90	4.0	4.10
E	5.85	6.05	6.25	L	0.54	0.64	0.74
E1	3.90	4.10	4.30				
E2	5.45	5.55	5.65	θ	8°	10°	12°
E3	—	—	0.15				