

Features

- Uses advanced SGT technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)

Product Summary			
V_{DS}	$R_{DS(on)}$ (m Ω) Typ	I_D (A)	Q_g (Typ)
150V	53 @ 10V 10A	19	7nc

Mechanical Data

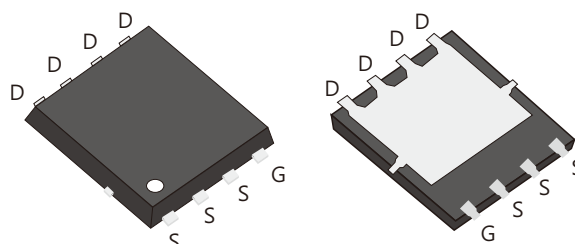
- Case:DFN5 $\times$ 6 Package

DFN5 $\times$ 6

DS53N15G3

Application

- Synchronous Rectification for AC/DC Quick Charger
- Battery management
- UPS (Uninterruptible Power Supplies)



Ordering Information

Part No.	Marking.	Package Type	Package	Quantity(box)
DS53N15G3	DS53N15G3	DFN5 $\times$ 6	Tape & Reel	5000

Block Diagram

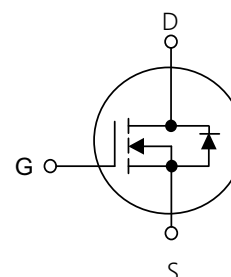


Table1 Absolute Maximum Ratings ($T_c=25^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current (Note 5)	$T_c=25^\circ\text{C}$	I_D	19	A
	$T_c=100^\circ\text{C}$		13	
Pulsed Drain Current (Note 1)		I_{DM}	76	A
Single Pulse Avalanche Energy(Note 2)		E_{AS}	25	mJ
Power Dissipation $T_c=25^\circ\text{C}$		P_D	50	W
Operating Junction and Storage Temperature		T_J/T_{STG}	-55~+175	$^\circ\text{C}$

Table 2. Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance Junction to Ambient,Max	$R_{\theta JA}$	60	$^{\circ}\text{C/W}$
Thermal resistance Junction to Case,Max	$R_{\theta JC}$	3.0	$^{\circ}\text{C/W}$

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =250μA	150	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =150V,V _{GS} =0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V,V _{DS} =0V	-	-	100	nA
	Reverse		V _{GS} =-20V,V _{DS} =0V	-	-	-100	nA
On Characteristics(Note 3)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =250μA	2.0	3.0	4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =10A	-	53	60	mΩ
Dynamic Characteristics(Note 4)							
Input Capacitance		C _{ISS}	V _{DS} =75V,V _{GS} =0V,f=1MHz	-	412	-	pF
Output Capacitance		C _{OSS}		-	74	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	5	-	pF
Transconductance		g _{fs}	V _{DS} =5V,I _D =10A	-	11	-	S
Switching Characteristics (Note 4)							
Turn-On Delay Time		t _{d(on)}	V _{DS} =75V,I _D =10A V _{GS} =10V,R _L =3Ω,	-	4.3	-	ns
Turn-On Rise Time		t _R		-	9	-	ns
Turn-Off Delay Time		t _{d(off)}		-	7	-	ns
Turn-Off Fall Time		t _f		-	4	-	ns
Total Gate Charge		Q _G	V _{DS} =75V,I _D =10A, V _{GS} =10V	-	7	-	nC
Gate-Source Charge		Q _{GS}		-	3	-	nC
Gate-Drain Charge		Q _{GD}		-	1.6	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _S =10A	-	-	1.2	V
Maximum Continuous Drain-Source Diode Forward Current		I _S		-	-	19	A
Reverse Recovery Time		t _{rr}	V _{GS} =0V, I _F =10A dI _F /dt=100A/μs	-	66	-	ns
Reverse Recovery Charge		Q _{RR}		-	87	-	nC

Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature

2 $L=0.5\text{mH}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

3 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

4 Guaranteed by design,not subject to production

5 The maximum current is limited by the package.

Typical Characteristics Diagrams

Figure 1. Output Characteristics

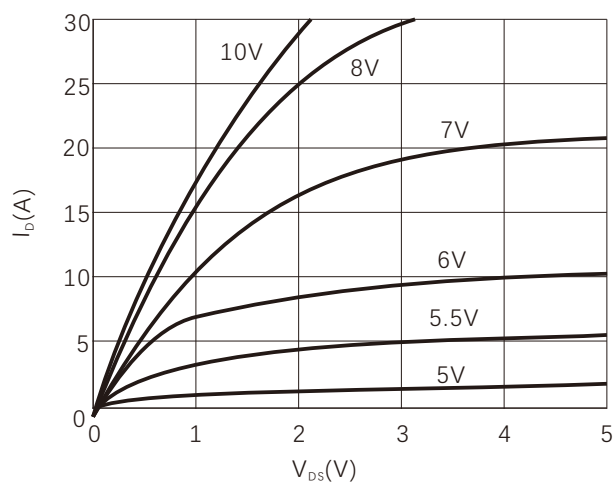


Figure 2. Normalized $R_{DS(ON)}$ vs Temperature

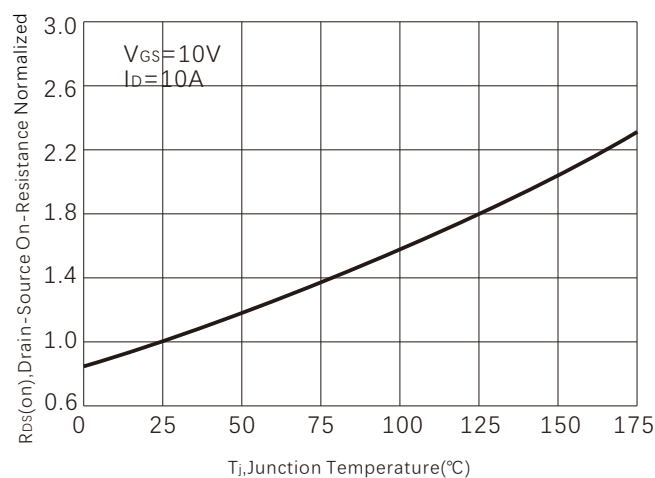


Figure 3. On-Resistance vs. Drain Current

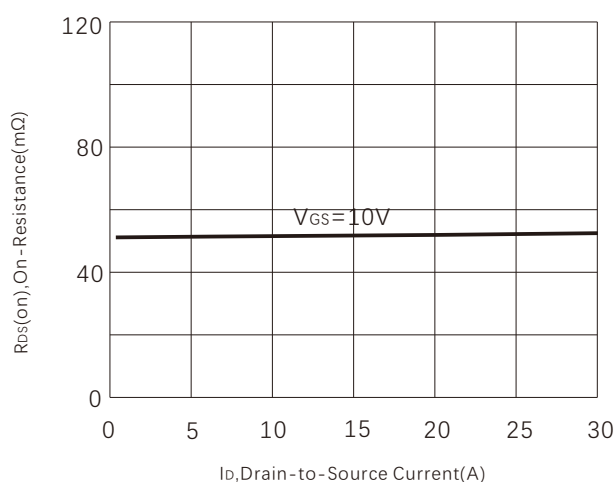


Figure 4. Capacitance

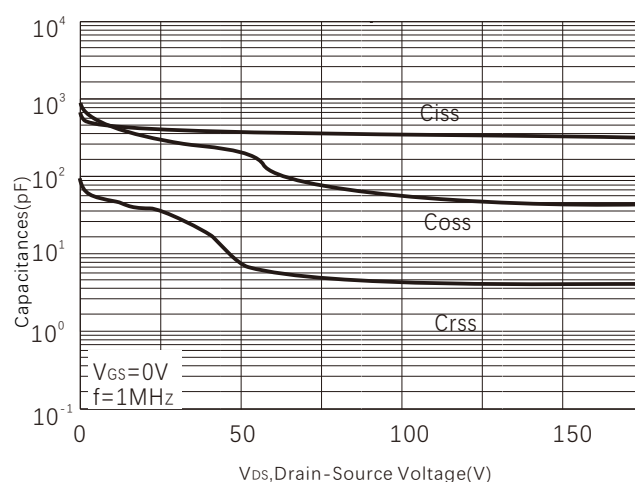


Figure 5. Gate charge

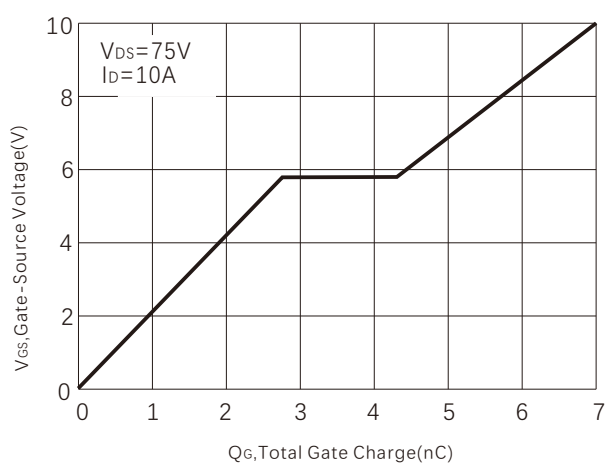


Figure 6. Source-Drain Diode Forward Voltage

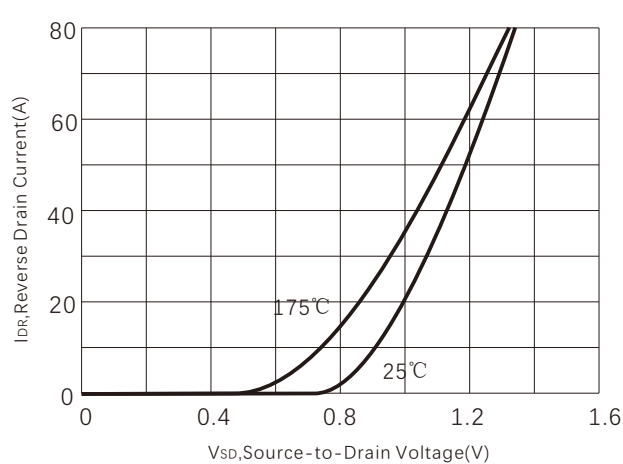


Figure7.Maximum Drain Current vs Temperature

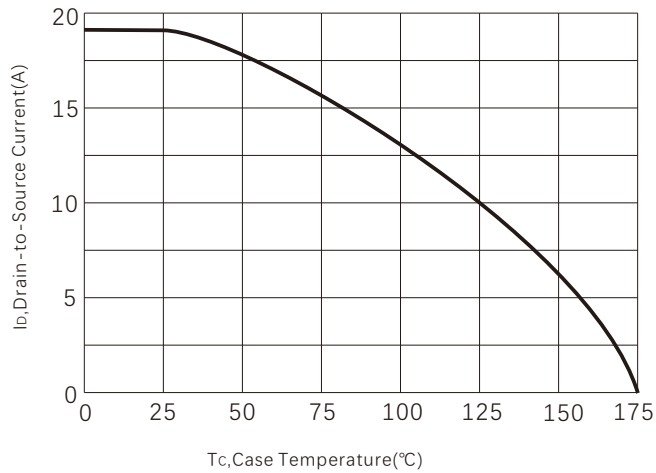


Figure 8. Power dissipation

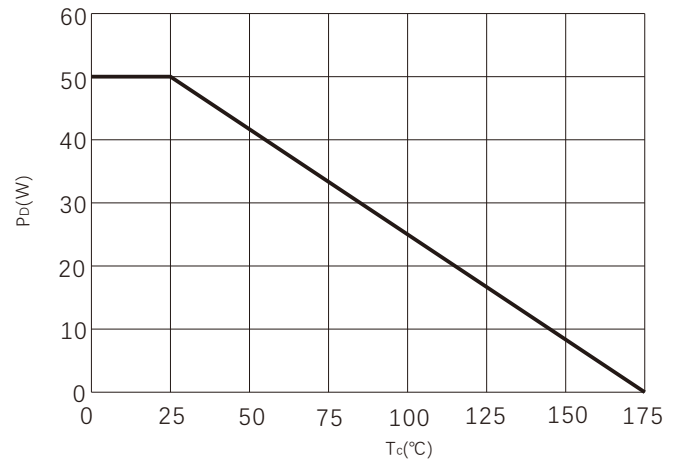


Figure 9.

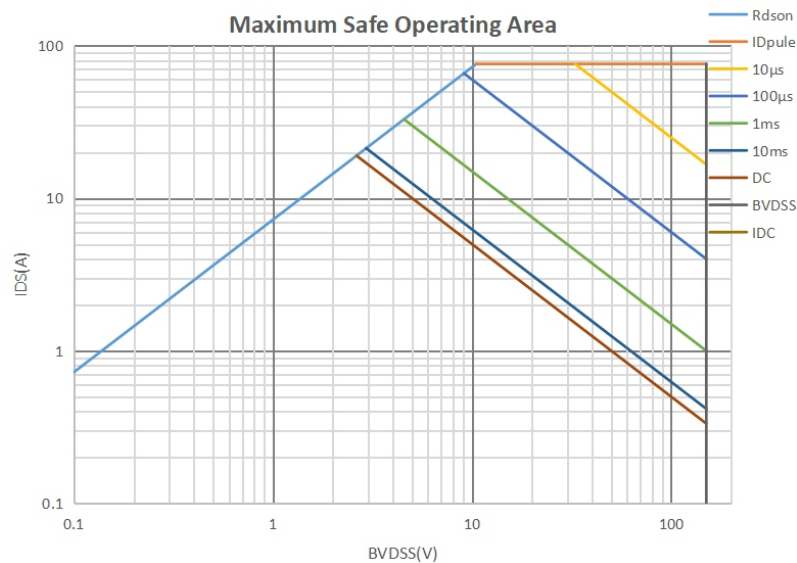
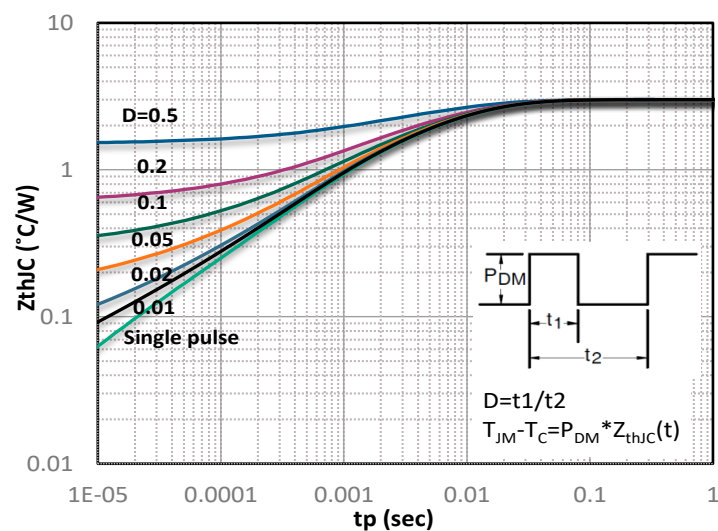
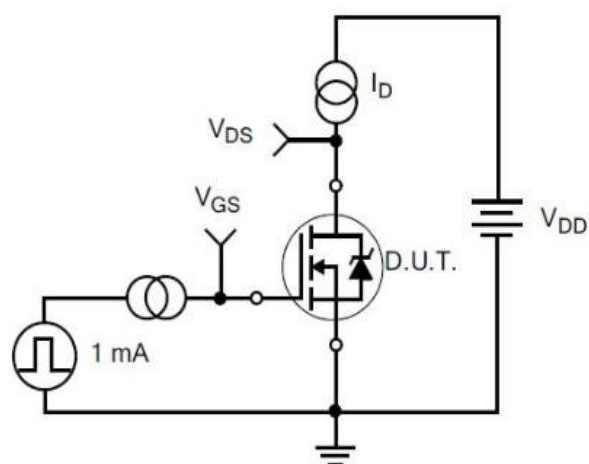


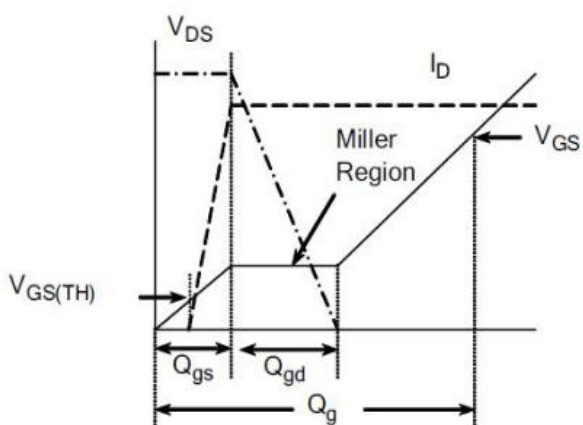
Figure 10. Maximum Transient Thermal Impedance



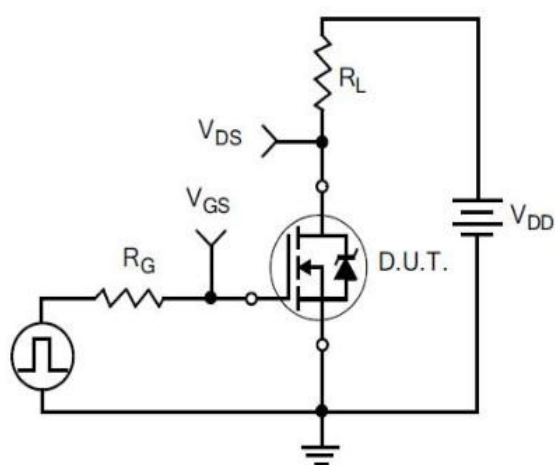
Typical Test Circuit



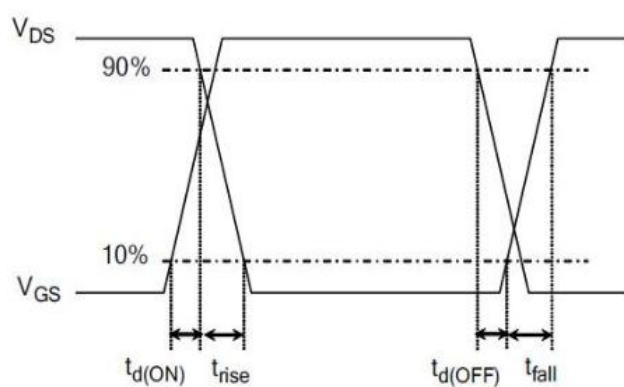
1) Gate Charge Test Circuit



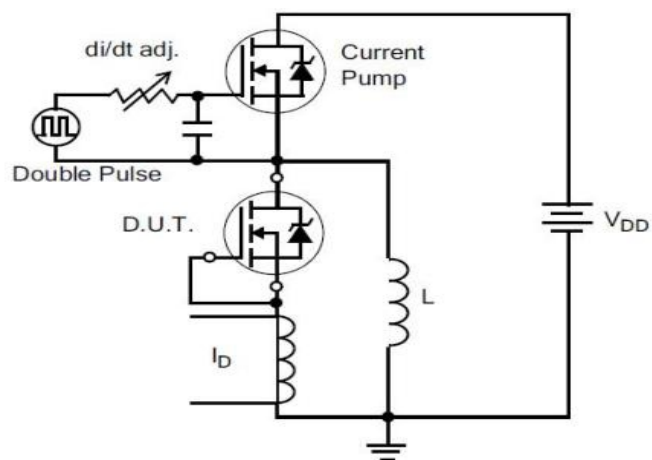
2) . Gate Charge Waveform



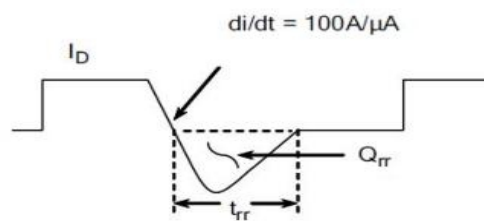
3) Resistive Switching Test Circuit



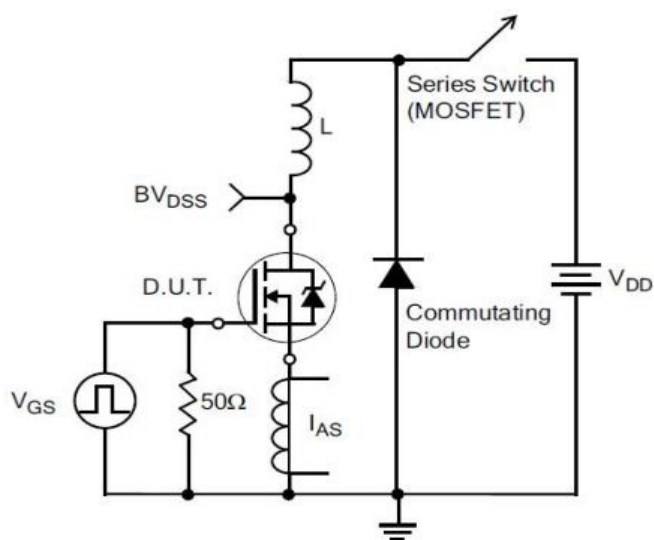
4) Resistive Switching Waveforms



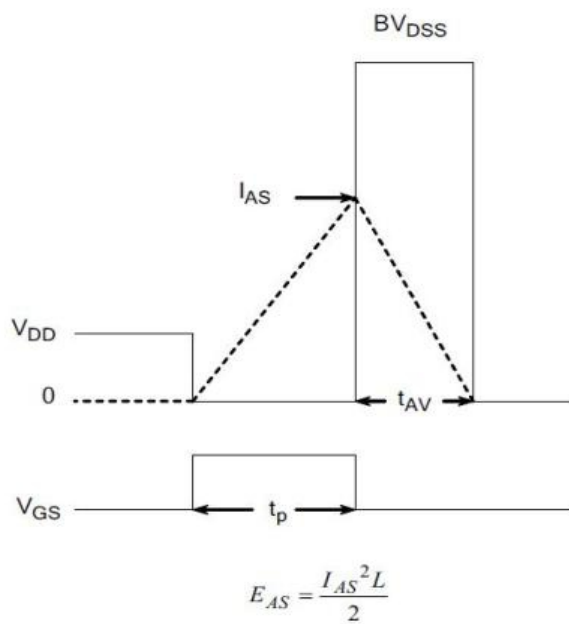
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



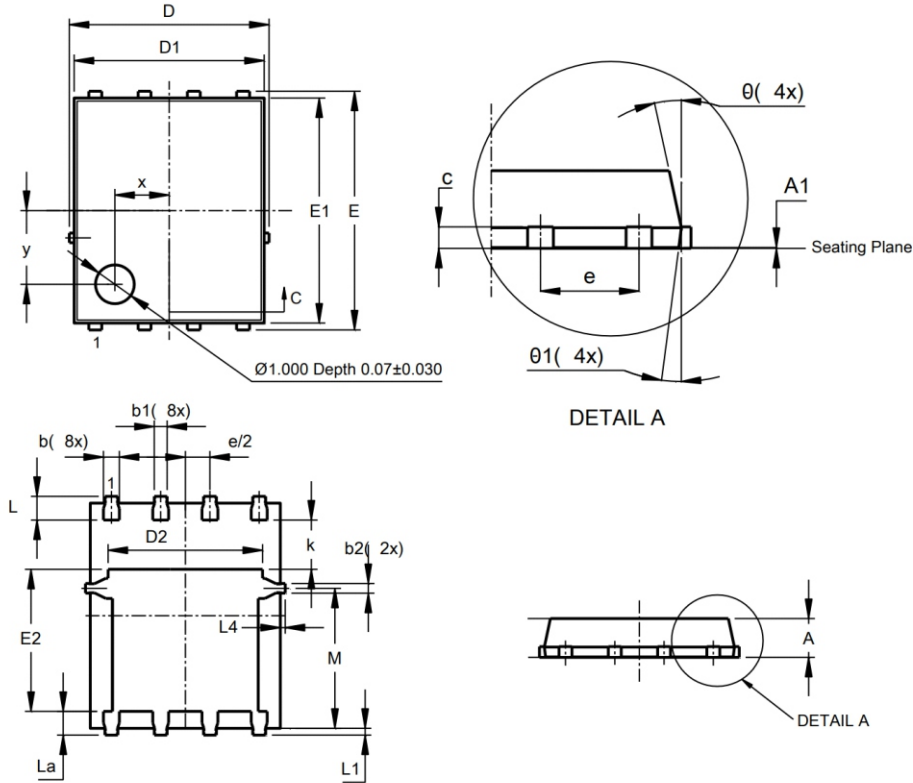
7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

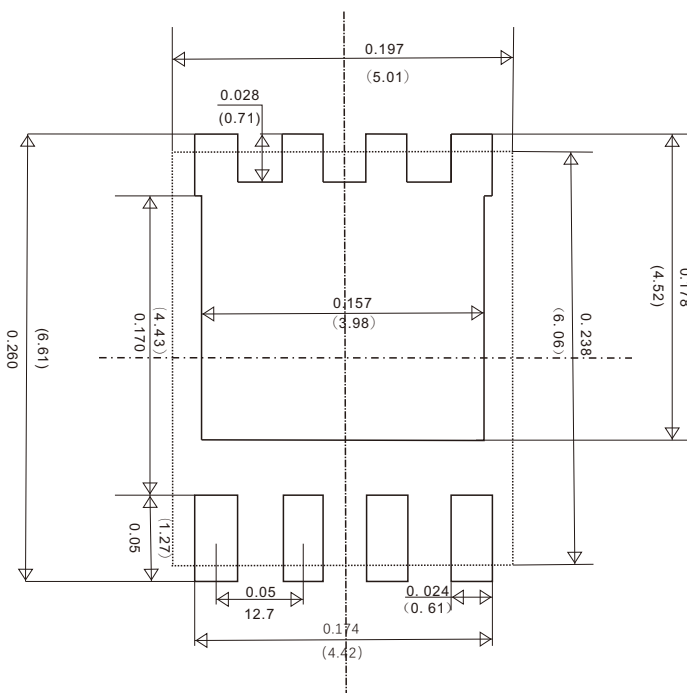
Dimensions

DFN5×6 PACKAGE OUTLINE DIMENSIONS



Dim	Min	Max	Type
A	0.90	1.10	1.00
b	0.23	0.41	0.32
b1	0.24	0.30	0.27
b2	0.16	0.32	0.23
c	0.17	0.27	0.22
D	-	-	5.01
D1	4.80	4.95	4.88
D2	-	-	3.98
E	-	-	6.06
E1	5.72	5.82	5.77
E2	3.42	3.52	3.47
k	-	-	1.33
L	0.56	0.66	0.61
La	0.57	0.67	0.63
L1	0.06	0.15	0.11
L4	-	-	0.06
M	3.00	3.20	3.08
Φ	10	11	10.39

Suggested Pad Layout



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