MS80N10KG

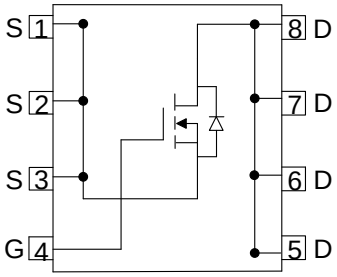
100V 7.7mohm N-channel SGT MOSFET

Description:

The N channel SGT MOSFET has designed to very low on-state resistance (R_{DSON}) and yet maintain superior switching performance, especially for high efficiency power-management applications.

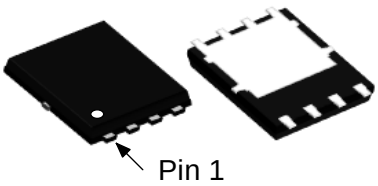
Applications:

- DC-DC Converter
- Power Management
- Motor Drivers
- Load Switching



Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	100	V
$R_{DSON,\ max}$ @V_{GS}=10V	7.7	mΩ
I_D	80	A



MS80N10KG
XXXXXX

Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
MS80N10KG	PDFN5X6-8L	MS80N10KG XXXXXX	13 inches Reel	5000

Maximum Ratings (T_A = 25 °C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	100	V
I_D	Drain Current - Continuous (T_C = 25°C) (Note 1)	80	A
	Drain Current - Continuous (T_C = 100°C)	50	A
	Drain Current - Continuous (package limited)	60	A
I_{DM}	Drain Current - Pulsed (Note 2)	240	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	27.5	mJ
P_D	Power Dissipation (T_C = 25°C)	52	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Steady-State	1.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient Steady State (Note 4)	48	°C/W

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.3 mH, V_{DD} =20 V, I_{AS}=10.5 A, R_G = 25 Ω, Starting T_J = 25 °C
4. Mount on minimum PCB layout

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	100			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80 V, V_{GS} = 0 V, T_J = 25℃			1	μA
I_{GSS}	Gate Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 250 μA	1.3	2	2.5	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS} = 10 V, I_D = 20 A		6.4	7.7	mΩ
		V_{GS} = 4.5 V, I_D = 15 A		9.2	11.4	
Dynamic Characteristics						
C_{ISS}	Input capacitance	V_{DS} = 50 V, V_{GS} = 0 V, F = 1 MHz		2945		pF
C_{OSS}	Output capacitance			737		pF
C_{RSS}	Reverse transfer capacitance			2.05		pF
R_G	Gate resistance	F = 1 MHz		3.2		Ω
Switching Characteristics						
$T_{D(ON)}$	Turn On Delay Time	V_{DS} = 50 V, I_D =13 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		14		ns
T_R	Rise Time			28.5		ns
$T_{D(OFF)}$	Turn Off Delay Time			46.5		ns
T_F	Fall Time			42.5		ns
Q_G	Total Gate Charge	V_{DS} = 50 V, I_D = 13 A, V_{GS} = 10 V		39.5		nC
Q_{GS}	Gate-Source Charge			6.6		nC
Q_{GD}	Gate-Drain Charge			8.6		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Body-Diode Forward Current				63	A
I_{SM}	Maximum Pulsed Body-Diode Forward Current (NOTE 1)				252	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V, I_S = 1 A		0.7	1	V
T_{RR}	Reverse recovery time	I_F = 13 A, di/dt = 100 A/μS		177		ns
Q_{RR}	Reverse recovery charge			1291		nC

Notes:

1. Pulse Test: Pulse width ≤ 300 us, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

Electrical Characteristics Diagrams

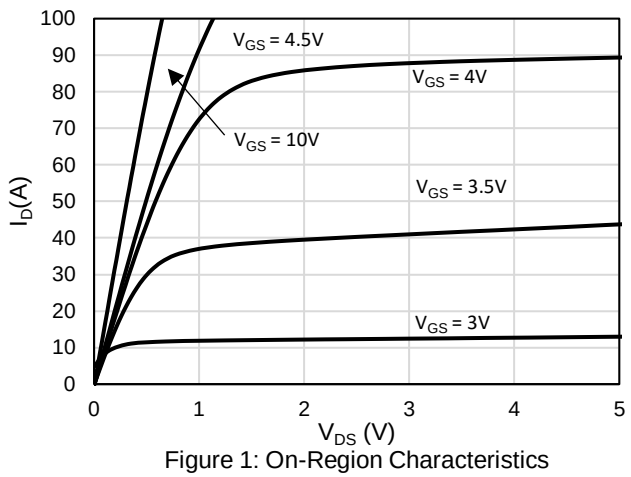


Figure 1: On-Region Characteristics

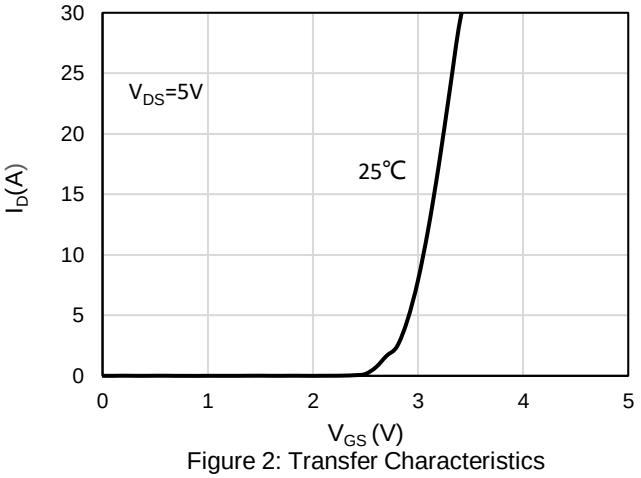


Figure 2: Transfer Characteristics

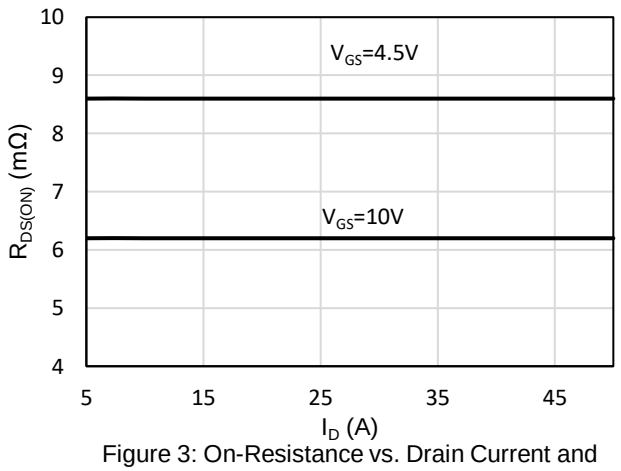


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

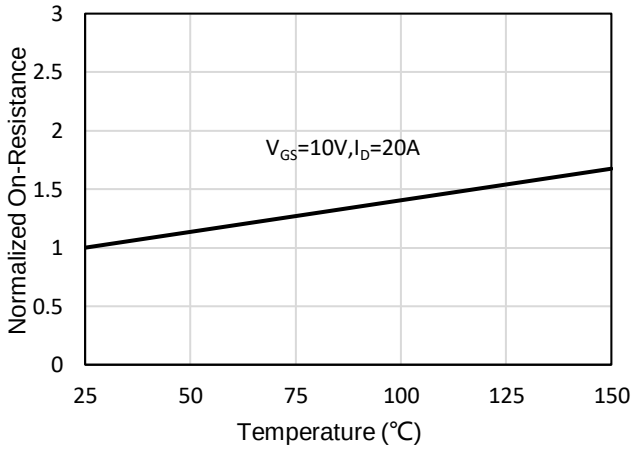


Figure 4: On-Resistance vs. Junction Temperature

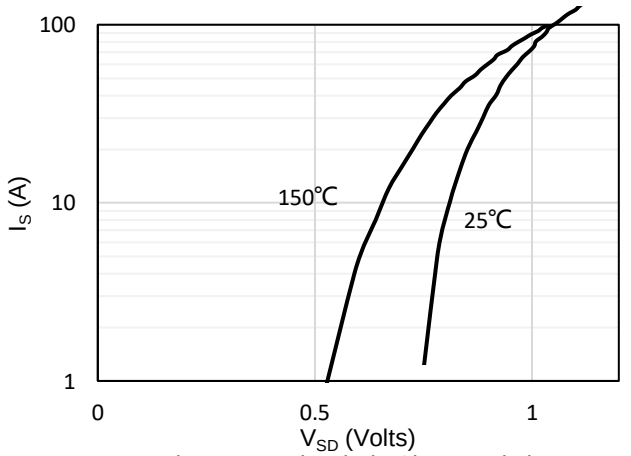


Figure 5: Body-Diode Characteristics

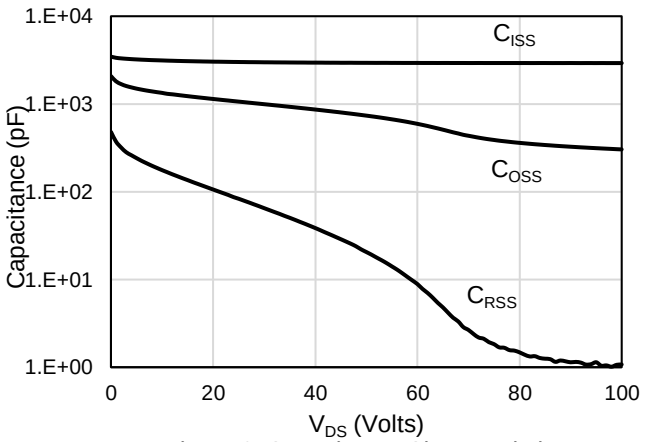


Figure 6: Capacitance Characteristics

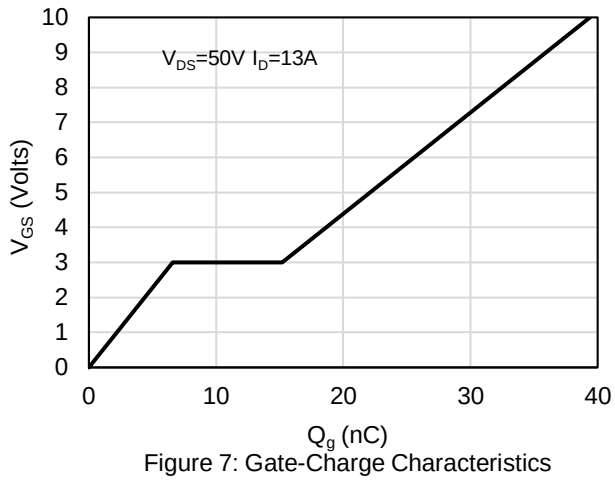


Figure 7: Gate-Charge Characteristics

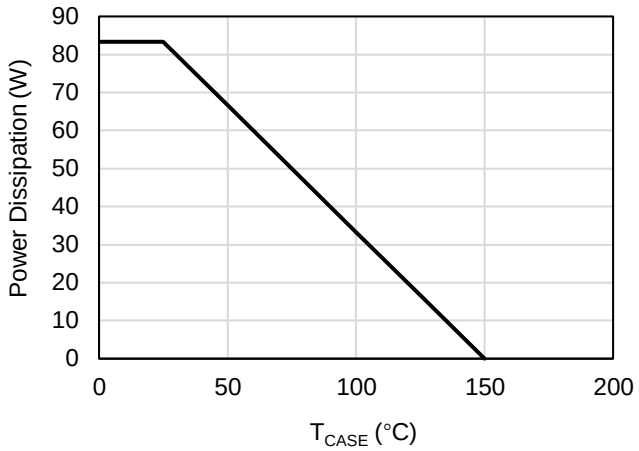


Figure 8: Power De-rating

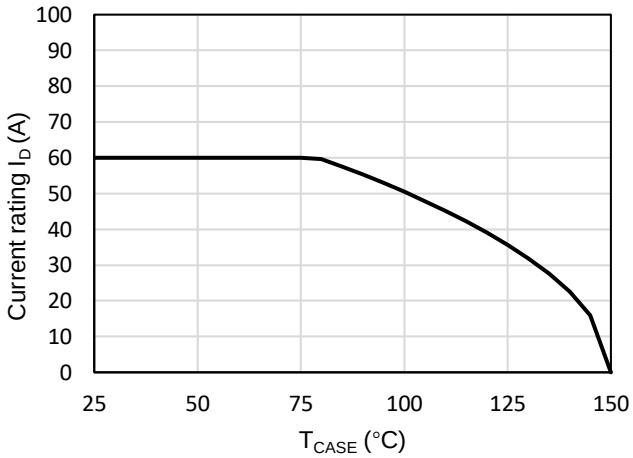


Figure 9: Current De-rating

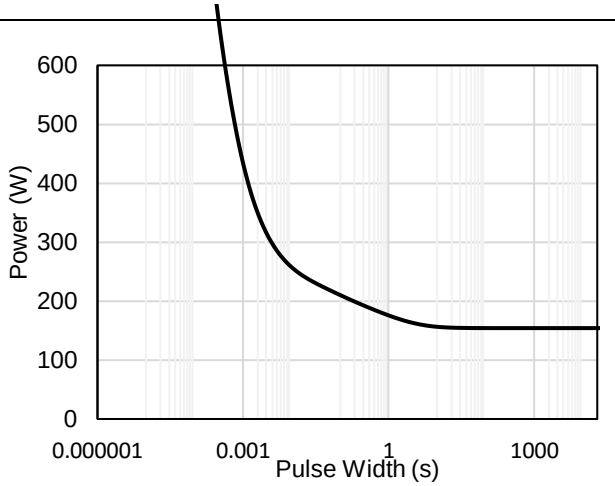


Figure 10: Single Pulse Power Rating Junction-to-Case

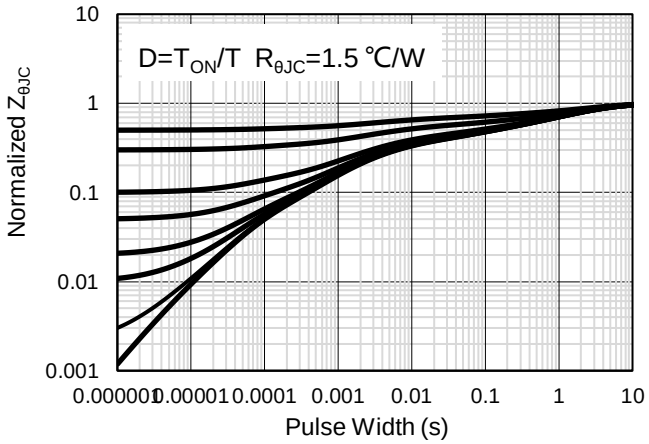


Figure 11: Normalized Maximum Transient Thermal Impedance

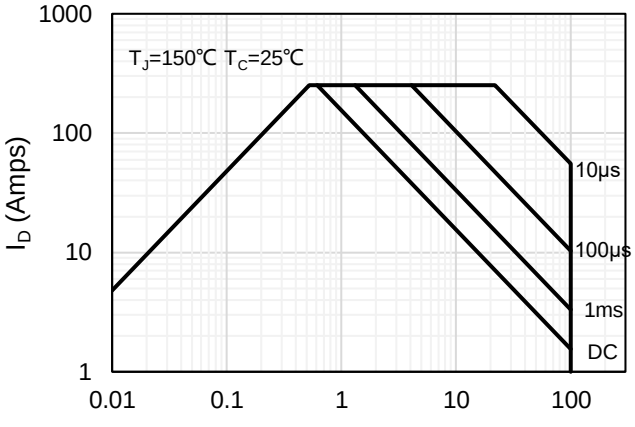
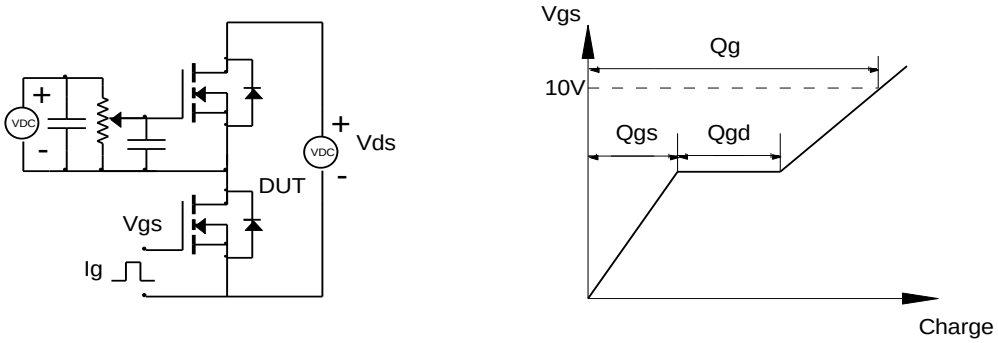


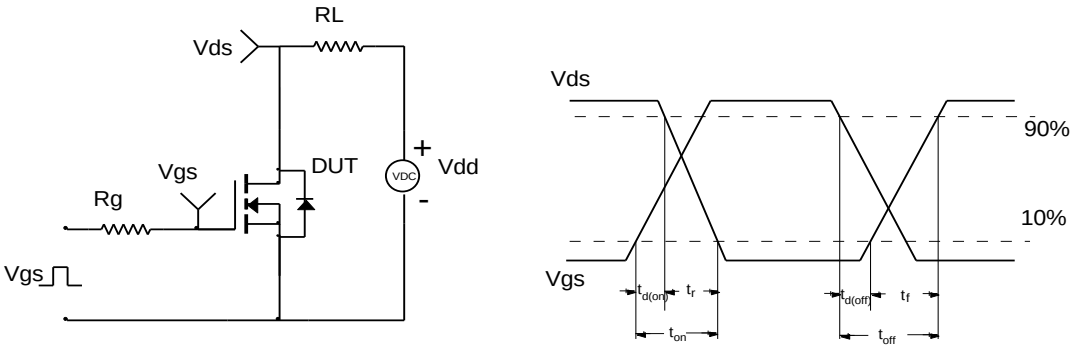
Figure 12: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

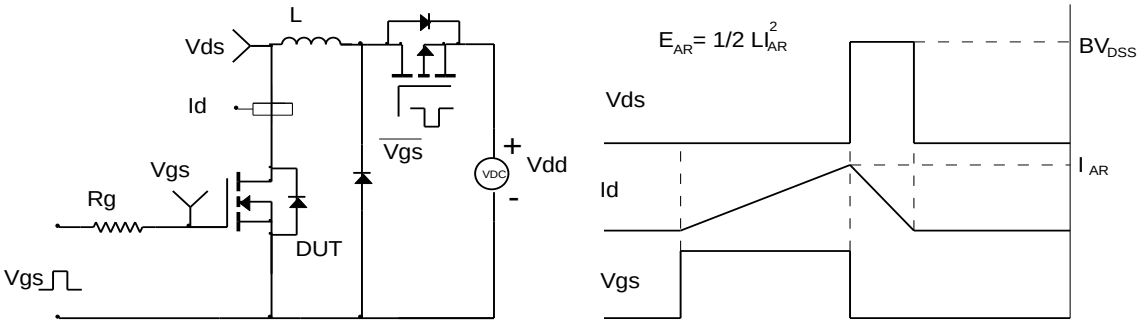
Gate Charge Test Circuit & Waveform



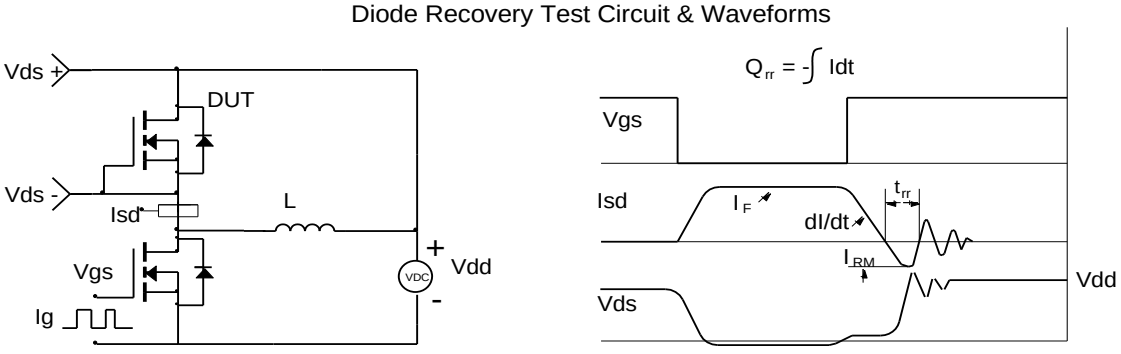
Resistive Switching Test Circuit & Waveforms



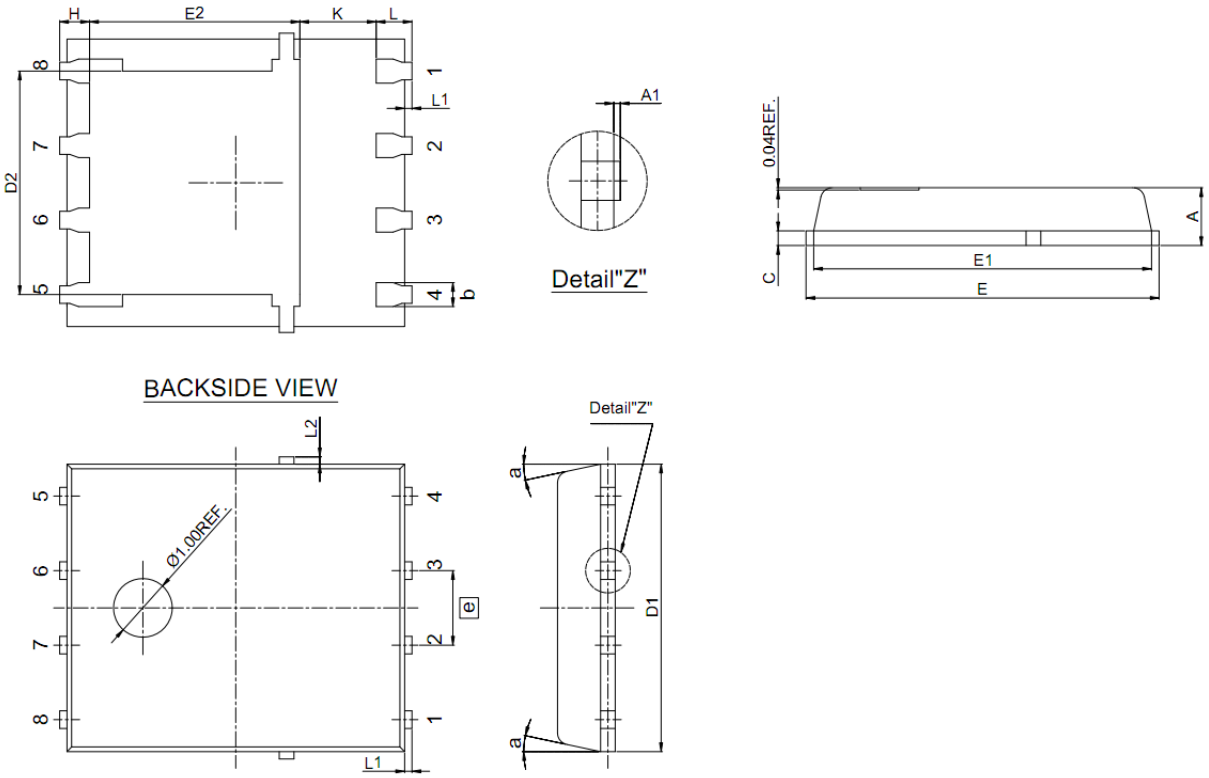
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outlines PDFN5*6-8L



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2	-	-	0.125
a	0°	-	12°

(Land Pattern
Only for Reference)