40V 3.5mohm N-channel SGT MOSFET
SI035N04NG2

Description:

This N channel SGT MOSFET has been designed to low on-state resistance,low switching loss with good EAS performance, especially for DC-DC and Motor driving applications.

Features:

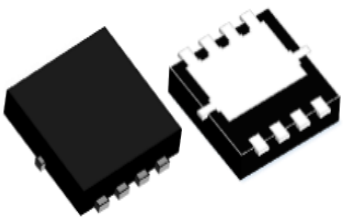
- Low FOM $R_{DS(ON)}$ X Q_G
- Ultra-low on-resistance
- RoHS compliant (Note 1)
- Halogen-free (Note 1)

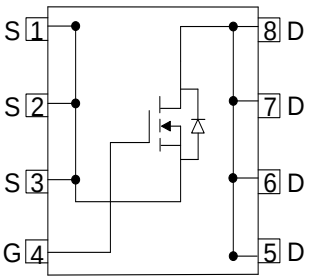
Applications:

- Battery management
- Solenoid and Motor Drivers
- DC-DC Converter

Key Performance Parameters:

Parameter	Value	Unit
V_{DS}	40	V
$R_{DSON,\ max}$ @V_{GS} = 10V	3.5	mΩ
I_D	100	A





Ordering Information:

Ordering Code	Package Type	Marking Code	Form	Packing
SI035N04NG2	DFN5X6	SI035N04NG2	Tape Reel	5000PCS

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

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	40	V
I_D	Drain Current - Continuous (T_C = 25°C) (Note 1)	100	A
	Drain Current - Continuous (T_C = 100°C)	68	A
I_{DM}	Drain Current - Pulsed (Note 2)	400	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	110	mJ
P_D	Power Dissipation (T_C = 25°C)	67	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	1.85	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Steady State (Note 4)	52	°C/W

Notes:

1. The max drain current rating is package limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.5 mH, V_{DD} = 50V, I_{AS} = 21 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	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 40 V, V_{GS} = 0 V,			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	1.7	2.5	V
$R_{DS(ON)}$	Drain-Source on-state resistance	V_{GS} = 10 V, I_D = 20 A		3	3.5	mΩ
		V_{GS} = 4.5 V, I_D = 20 A		3.5	5.0	mΩ
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{DS} = 20 V, V_{GS} = 0 V, F = 1 MHz		1850		pF
C_{OSS}	Output Capacitance			608		pF
C_{RSS}	Reverse Transfer Capacitance			29		pF
R_G	Gate Resistance	F = 1 MHz		7.2		Ω
Switching Characteristics						
$T_{D(ON)}$	Turn On Delay Time	V_{DD} = 20 V , R_L = 1 Ω, V_{GS} = 10 V, R_G = 6 Ω		9		nS
T_R	Rise Time			51		nS
$T_{D(OFF)}$	Turn Off Delay Time			45.5		nS
T_F	Fall Time			78		nS
Q_G	Total Gate Charge	V_{DD} = 20 V , I_D = 20 A, V_{GS} = 10 V		28.2		nC
Q_{GS}	Gate-Source Charge			4.6		nC
Q_{GD}	Gate-Drain Charge			5.9		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Body-Diode Forward Current				100	A
I_{SM}	Maximum Pulsed Body-Diode Forward Current (NOTE 1)				400	A
V_{SD}	Diode Forward Voltage	V_{GS} = 0 V, I_S = 1 A		0.7	1	V
T_{RR}	Reverse recovery time	V_{DD} = 20 V, I_D = 15 A, di/dt = 100 A/μS		40		ns
Q_{RR}	Reverse recovery charge			27		nC
I_{RRM}	Peak Reverse Recovery Current			1.1		A

Electrical Characteristics Diagrams

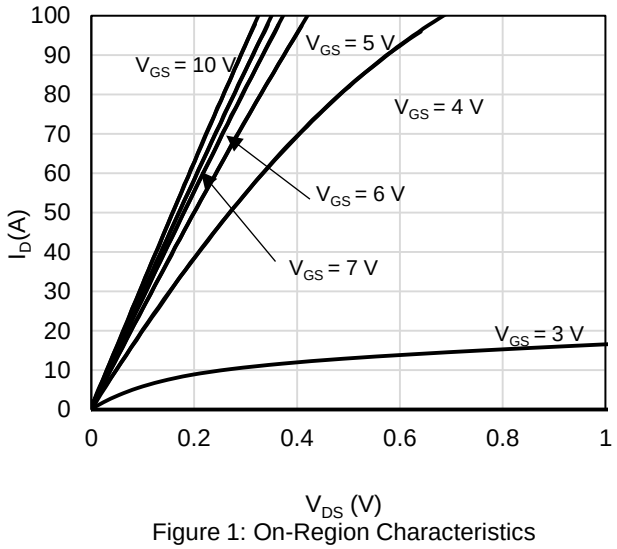


Figure 1: On-Region Characteristics

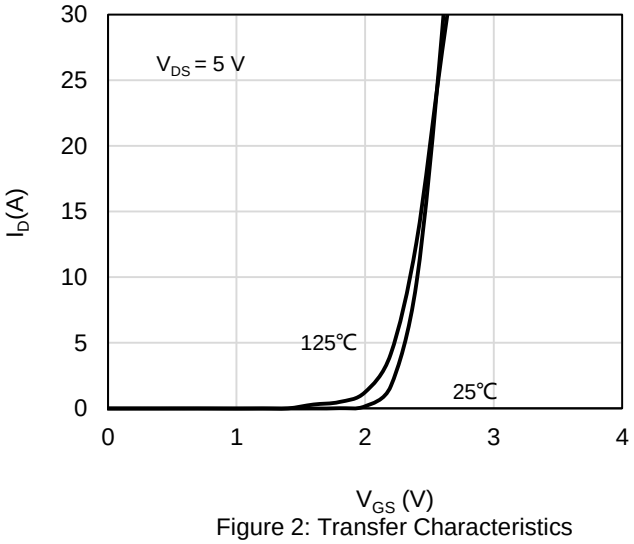


Figure 2: Transfer Characteristics

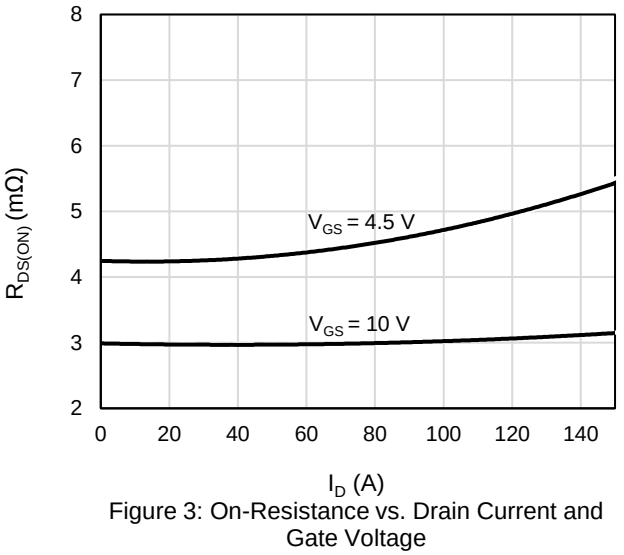


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

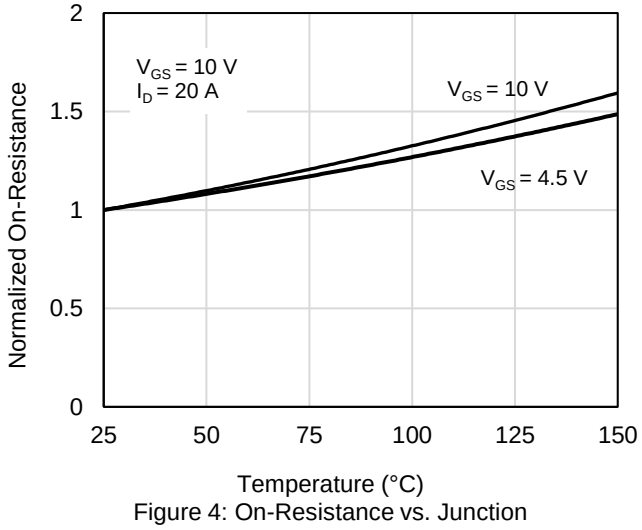


Figure 4: On-Resistance vs. Junction Temperature

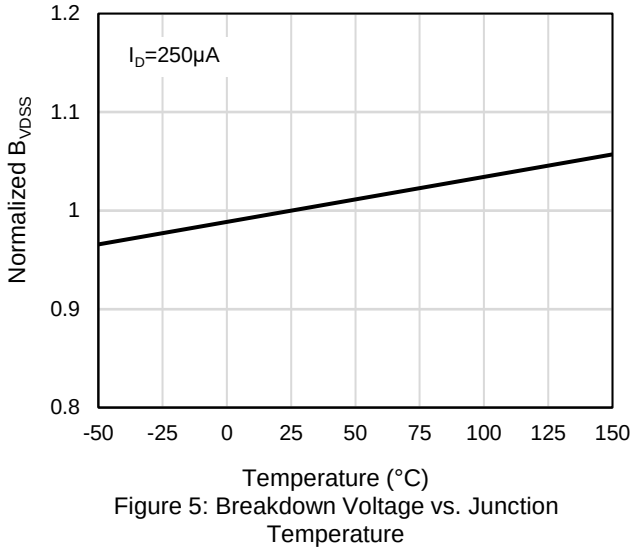


Figure 5: Breakdown Voltage vs. Junction Temperature

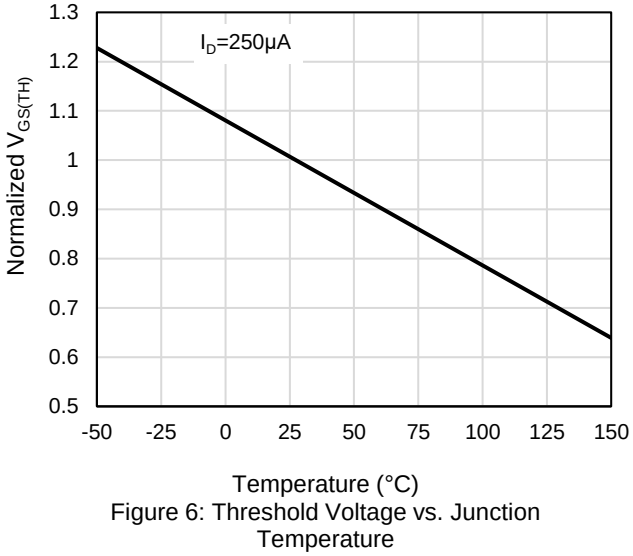


Figure 6: Threshold Voltage vs. Junction Temperature

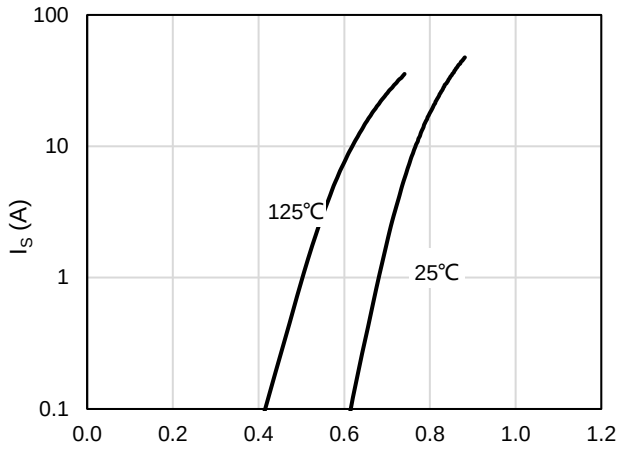


Figure 7: Body-Diode Characteristics

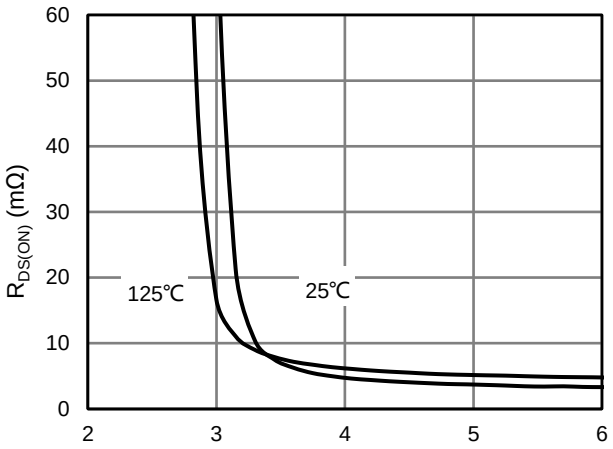


Figure 8: On-Resistance vs. Gate-Source Voltage

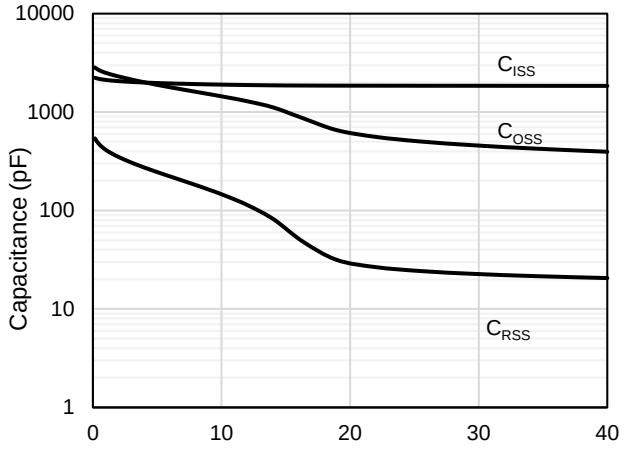


Figure 9: Capacitance Characteristics

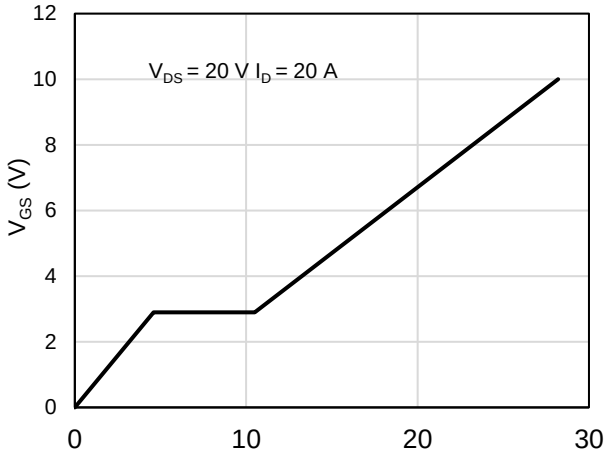


Figure 10: Gate-Charge Characteristics

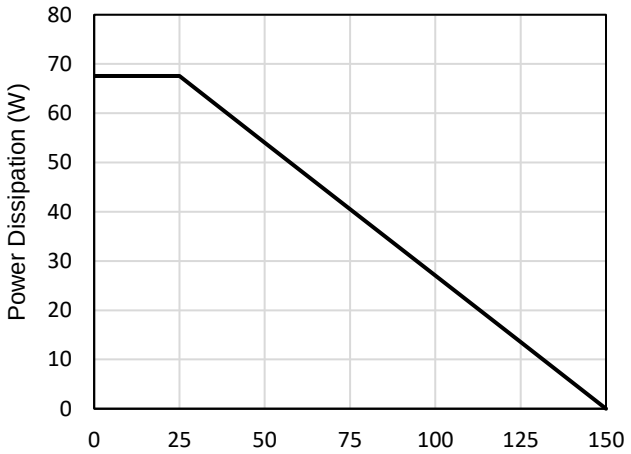


Figure 11: Power De-rating

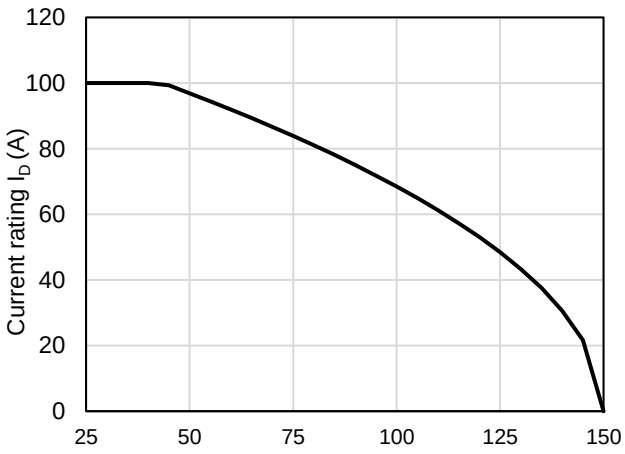


Figure 12: Current De-rating

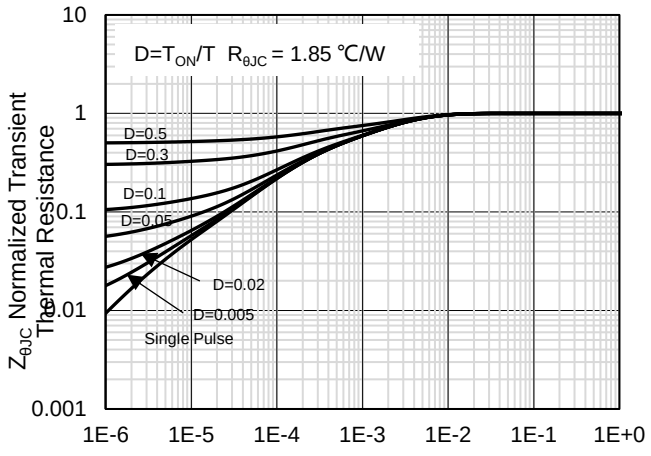


Figure 13: Normalized Maximum Transient Thermal Impedance

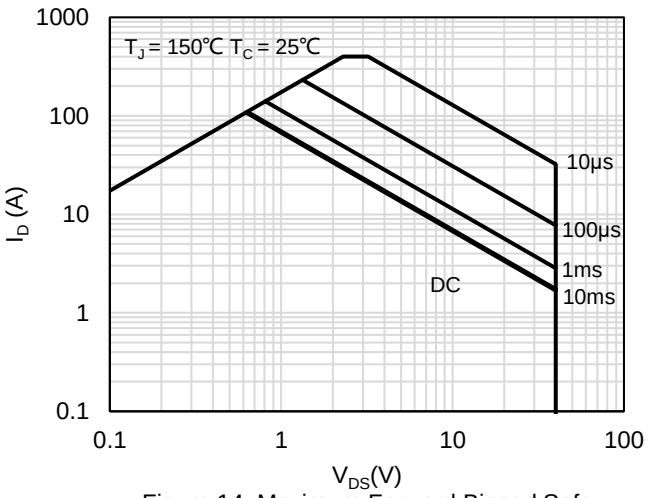
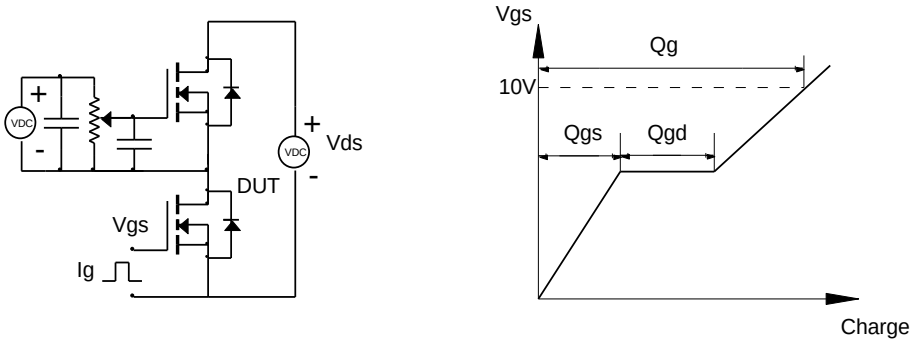


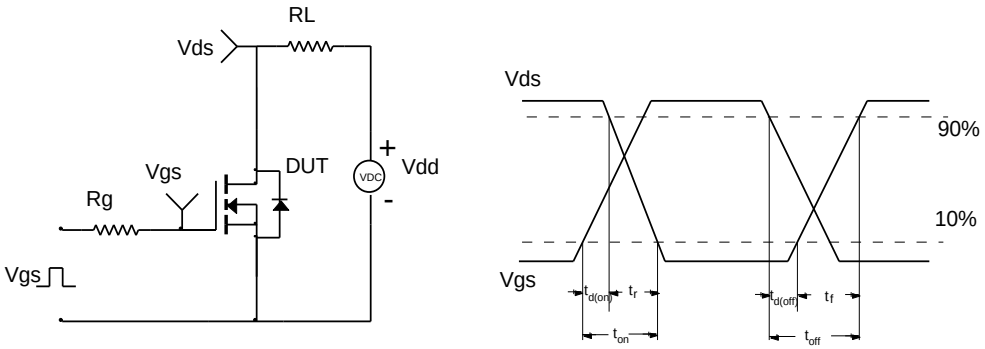
Figure 14: Maximum Forward Biased Safe Operating Area

Test Circuit and Waveform

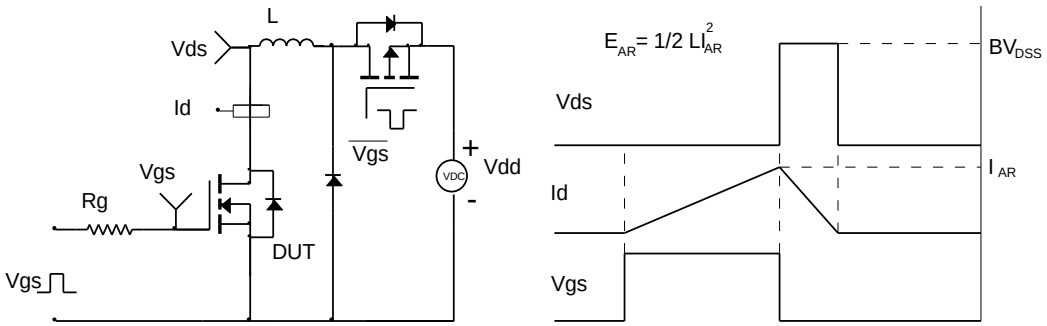
Gate Charge Test Circuit & Waveform



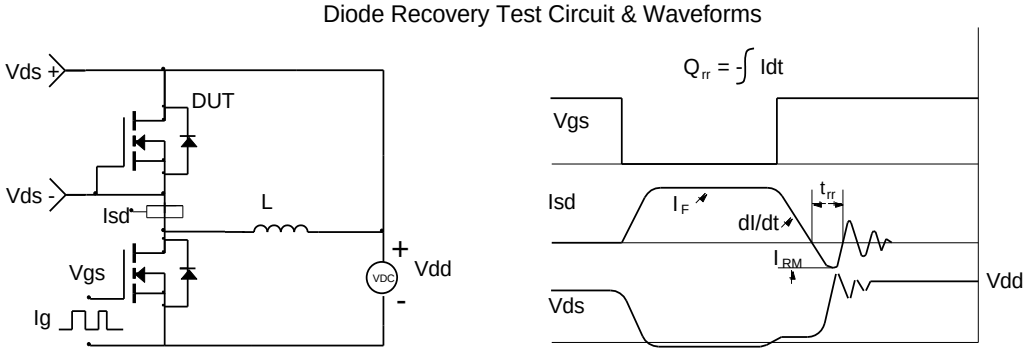
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

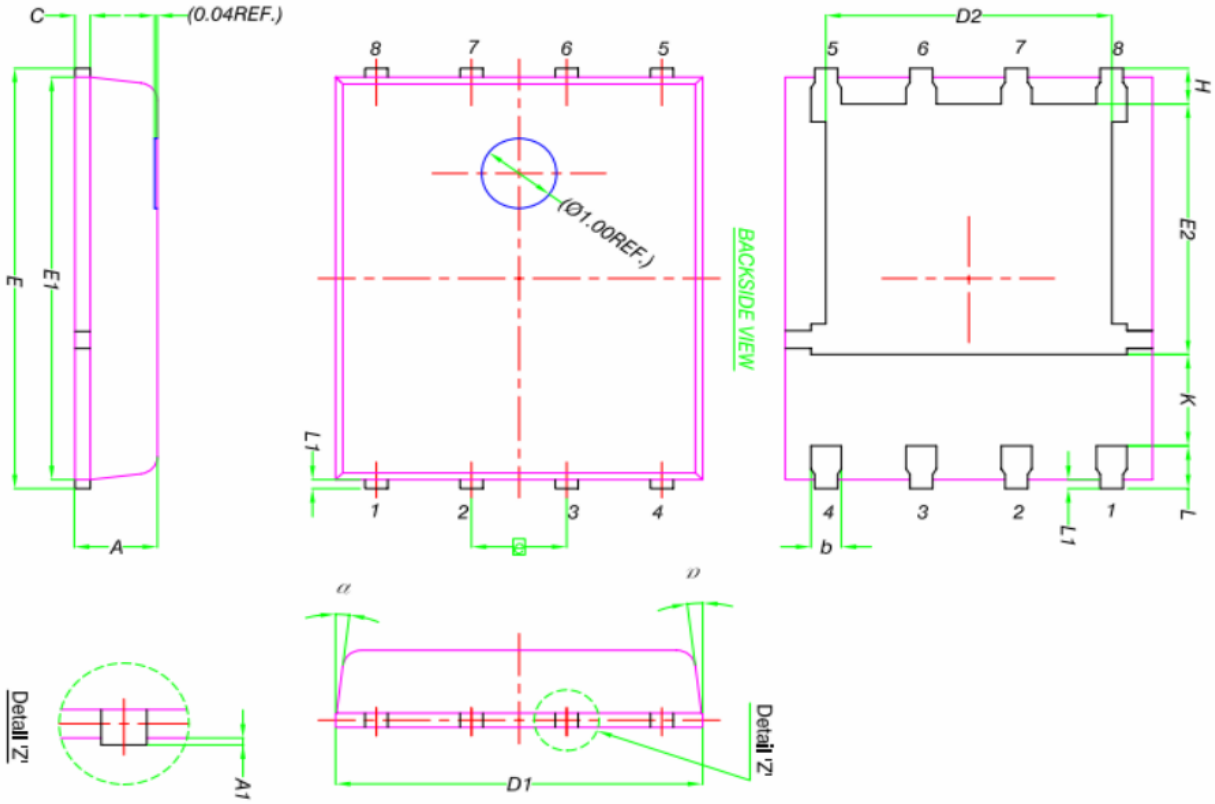


Diode Recovery Test Circuit & Waveforms



Package Outlines

Package Dimensions： PDFN 5*6 PACKAG



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
α	0°	-	12°