SC045N65LTK-R

Silicon Carbide MOSFET 650V, 45mΩ, 55A

重庆平伟半导体股份有限公司

Features

- Low switching losses
- Extremely low on-resistance $R_{DS(on)}$
- Robust body diode operation under hard commutation events
- .XT interconnection technology for best-in-class thermal performance
- Qualified according to JEDEC criteria

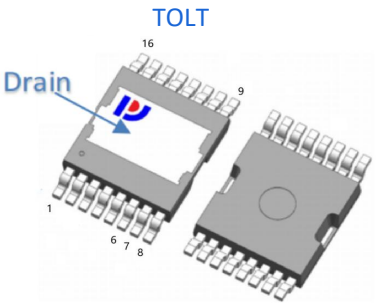
Applications

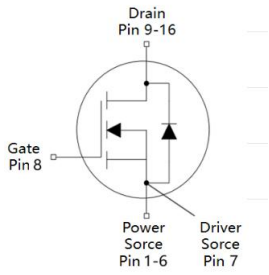
- SMPS
- Solar PV inverters
- UPS
- EV charging infrastructure
- Energy storage and battery formation

100% DVDS Tested
100% AvalancheTested

Product Summary

V_{DS}	650V
$R_{DS(on)\ typ.}$	45mΩ
I_D	55A





Package Marking and Ordering Information

Part #	Marking	Package	Packing	Reel Size	Tape Width	Qty
SC045N65LTK-R	SC045N65LTK	TOLT	Tape&Reel	13 inches	24mm	1200pcs

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	650	V
Continuous drain current T_C = 25°C T_C = 100°C	I_D	 55 39	A
Pulsed drain current (T_C = 25°C)	$I_{D\ pulse}$	221	A
Avalanche energy, single pulse (L=0.5mH)	E_{AS}	105	mJ
Gate-Source voltage,max.transient voltage	V_{GSmax}	-10/+22	V
Recommended operating values	V_{GSsop}	-5/+18	V
Power dissipation T_C = 25°C	P_{tot}	 127	W
Operating junction and storage temperature	T_j , T_{stg}	-55...+175	°C

Thermal Resistance

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Thermal resistance, junction – case.	R_{thJC}	-	0.8	1.2	°C/W	-
Thermal resistance, junction - ambient(min. footprint)	R_{thJA}	-	-	40.0	°C/W	-

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	650	-	-	V	V_{GS}=0V, I_D=1mA
Gate threshold voltage	$V_{GS(th)}$	2.2	3.2	4.2	V	V_{DS}=V_{GS}, I_D=5mA
Zero gate voltage drain current	I_{DSS}	- -	0.5 -	10 100	μA	V_{DS}=650V,V_{GS}=0V T_j=25°C T_j=175°C
Gate-source leakage current	I_{GSS}	-	-	200	nA	V_{GS}=22V,V_{DS}=0V
		-	-	-200	nA	V_{GS}=-10V,V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	45	55	mΩ	V_{GS}=18V,I_D=20A
Transconductance	g_{fs}	-	13	-	S	V_{DS}=20V,I_D=15A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	1611	-	pF	V_{GS}=0V, V_{DS}=400V, f=1MHz
Output Capacitance	C_{oss}	-	107	-		
Reverse Transfer Capacitance	C_{rss}	-	9	-		
Gate Total Charge	Q_G	-	70	-	nC	V_{DS}=400V,I_D=20A ,V_{GS}=-5/18V
Gate-Source charge	Q_{gs}	-	29	-		
Gate-Drain charge	Q_{gd}	-	16	-		
Turn-on delay time	$t_{d(on)}$	-	8	-	ns	V_{GS}=-5/18V, V_{DD}=400V, R_G=15Ω,I_D=20A
Rise time	t_r	-	20	-		
Turn-off delay time	$t_{d(off)}$	-	35	-		
Fall time	t_f	-	15	-		
Gate resistance	R_G	-	4.1	-	Ω	V_{GS}=0V, f=1MHz

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	- -	3.4 3.1	- -	V	V_{GS}=-5V, I_{SD}=10A T_j=25°C T_j=175°C
Body Diode Continuous Forward Current	I_S	-	-	64	A	T_C = 25°C
		-	-	36	A	T_C = 100°C
Body Diode Reverse Recovery Time	t_{rr}	-	14	-	ns	V_{GS}=-5V,I_{SD}=20A, V_R=400V di/dt=1000A/μs
Body Diode Reverse Recovery Charge	Q_{rr}	-	73	-	nC	
Peak Reverse Recovery Current	I_{RRM}	-	8.6	-	A	

Typical Performance Characteristics

Fig 1: Output Characteristics Tj=25°C

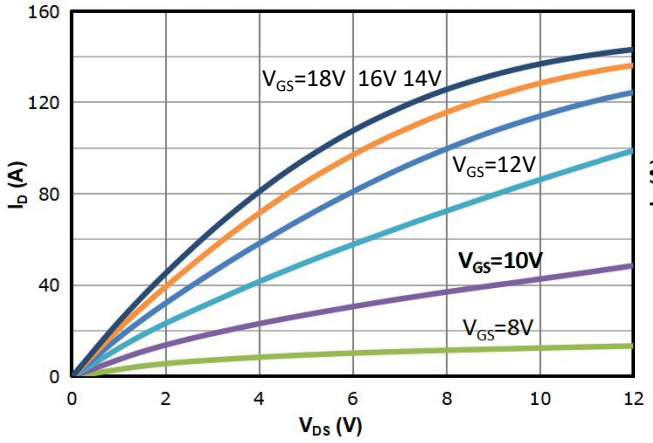


Fig 2: Output Characteristics Tj=175°C

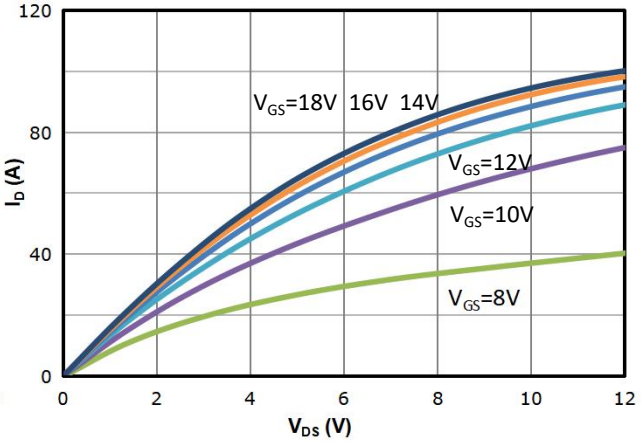


Fig 3: Transfer Characteristics

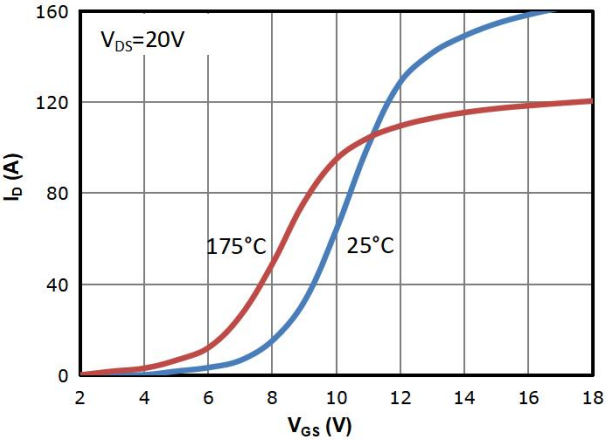


Fig 4: Rds(on) vs Drain Current and Gate Voltage

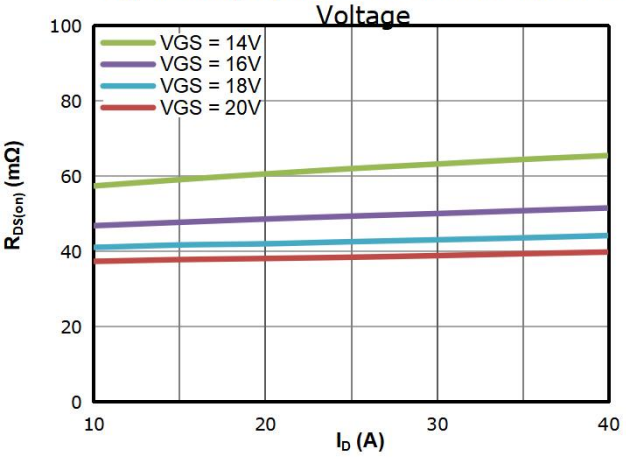


Fig 5: Rds(on) vs. Temperature

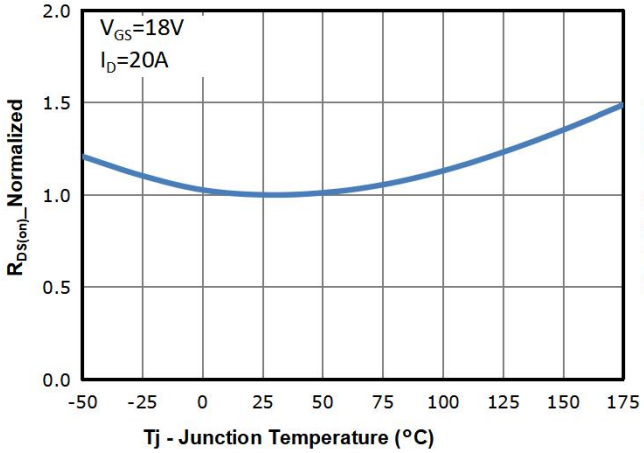


Fig 6: Vgs(th) vs. Temperature

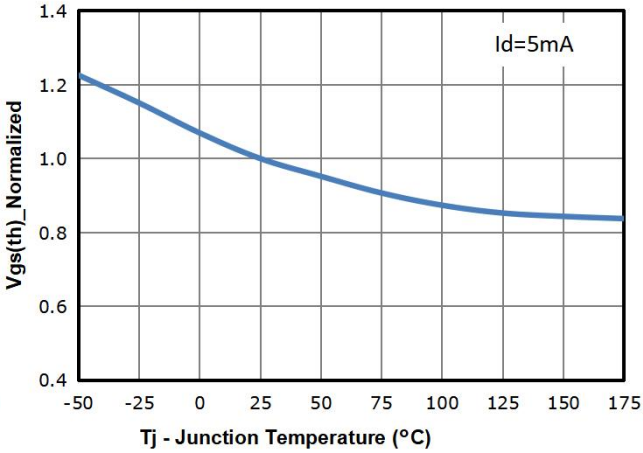


Fig 7: BVdss vs. Temperature

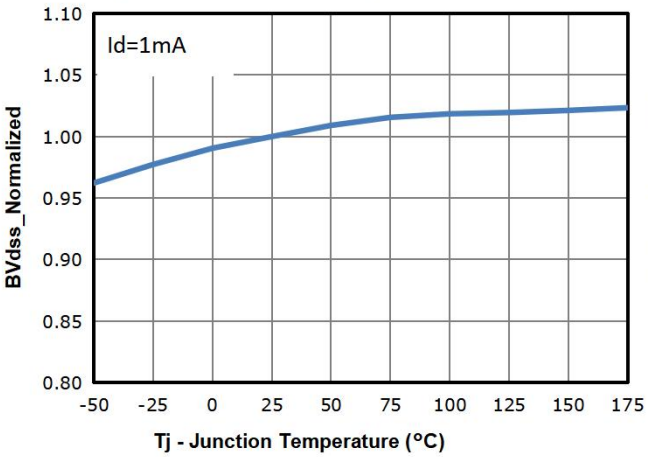


Fig 8: Capacitance Characteristics

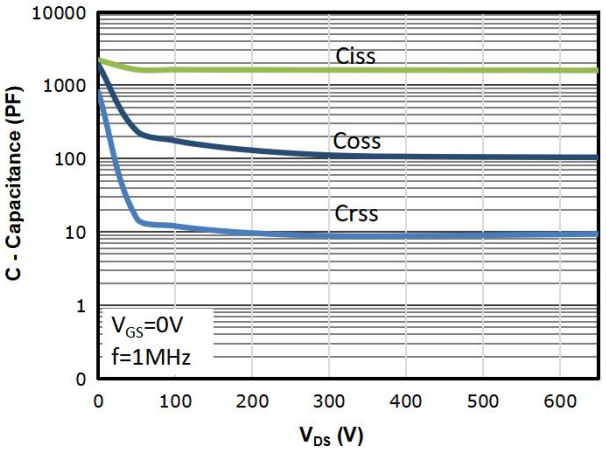


Fig 9: Gate ChargeCharacteristics

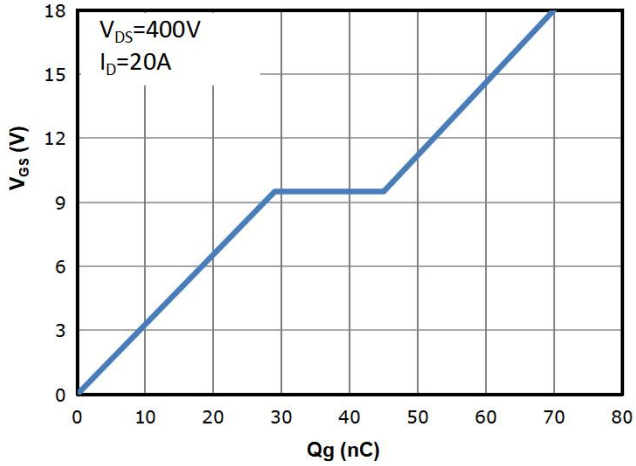


Fig 10: Body-diode Forward Characteristics

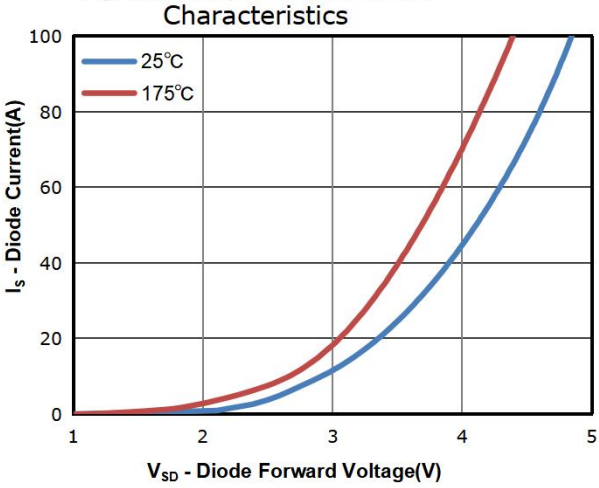


Fig 11: Power Dissipation

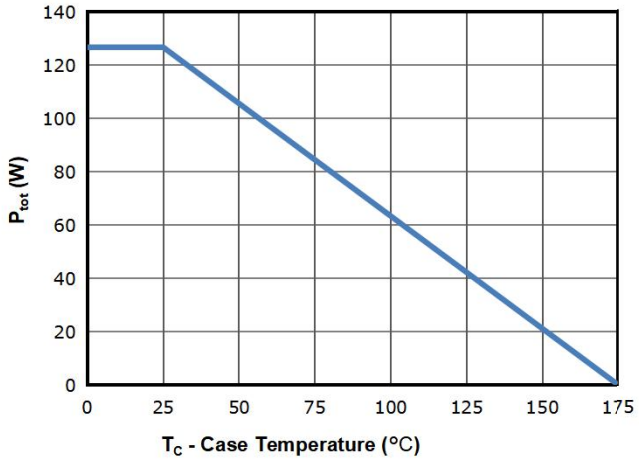


Fig 12: Drain Current Derating

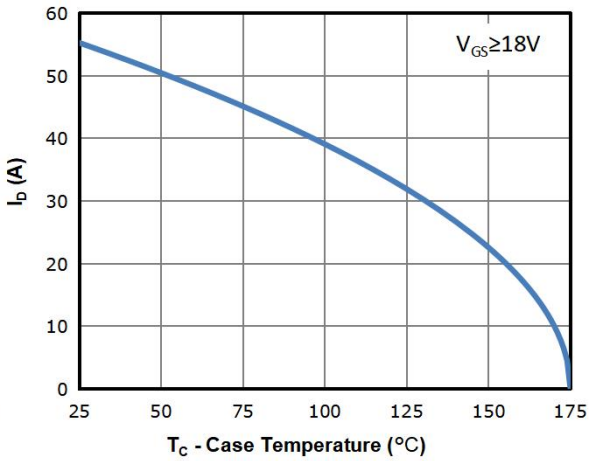


Fig 13: Safe Operating Area

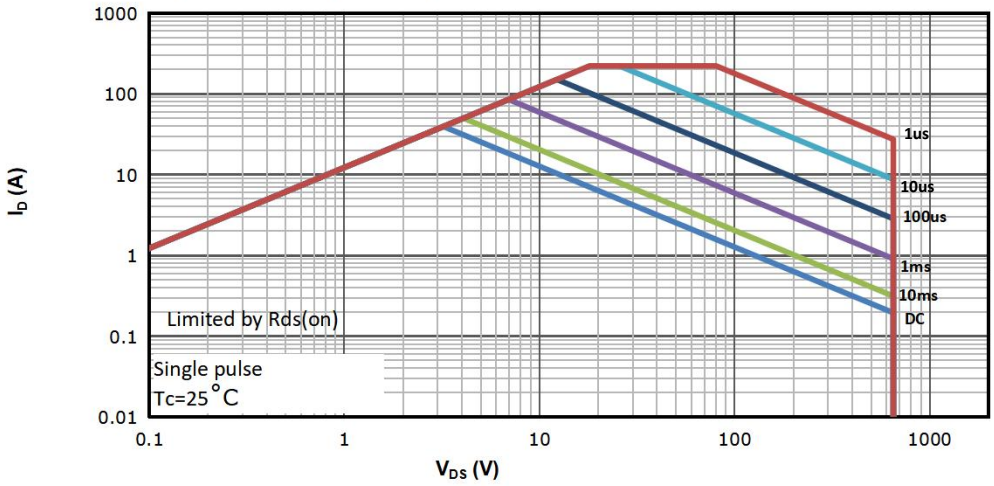
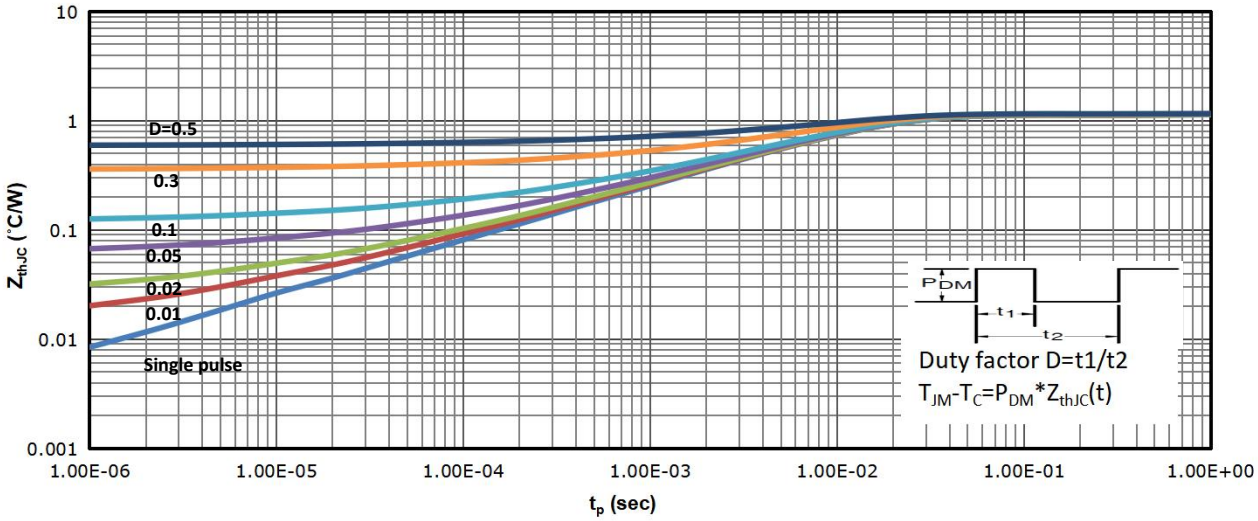
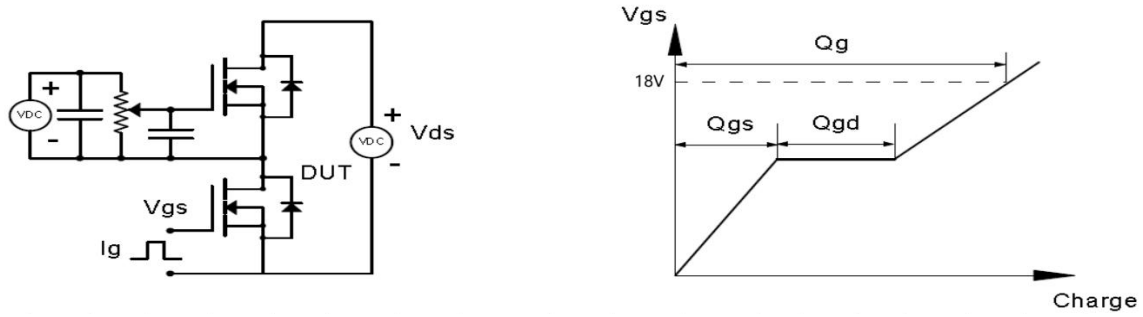


Fig 14: Max. Transient Thermal Impedance

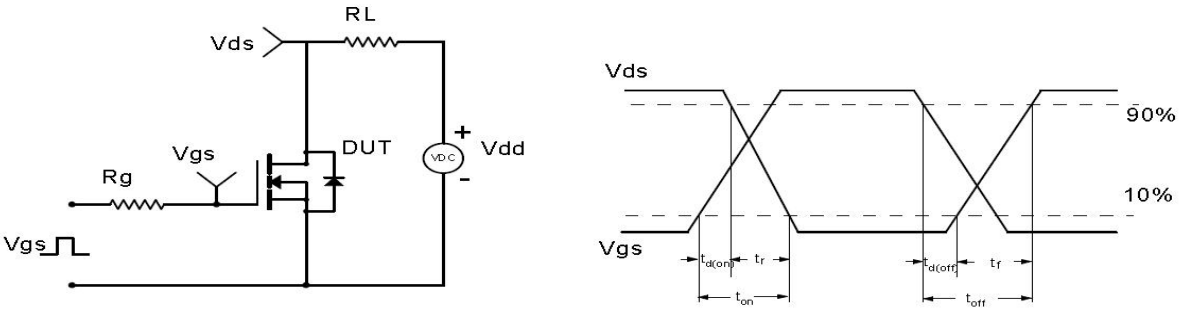


Test Circuit & Waveform

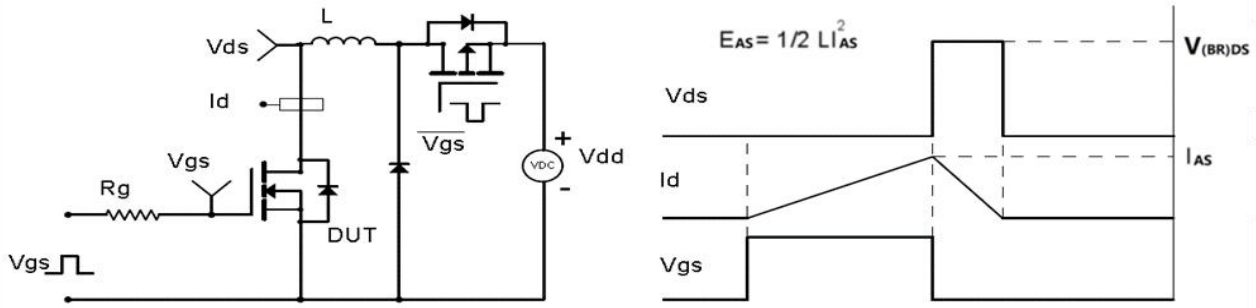
Gate Charge Test Circuit & Waveform



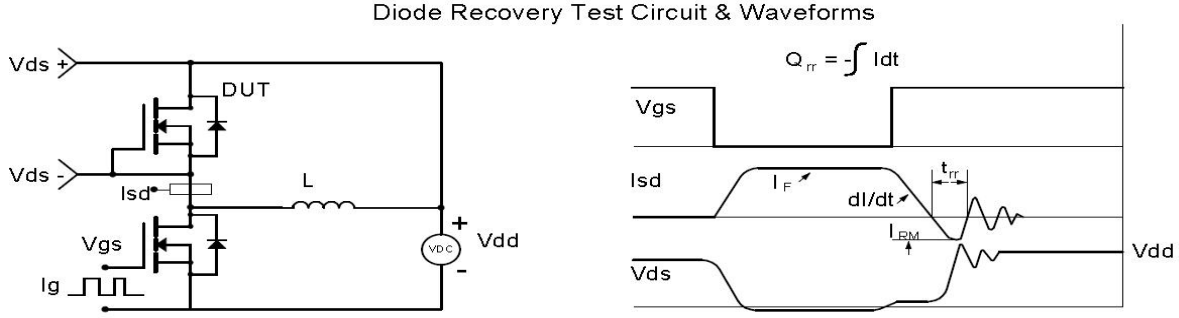
Resistive Switching Test Circuit & Waveforms



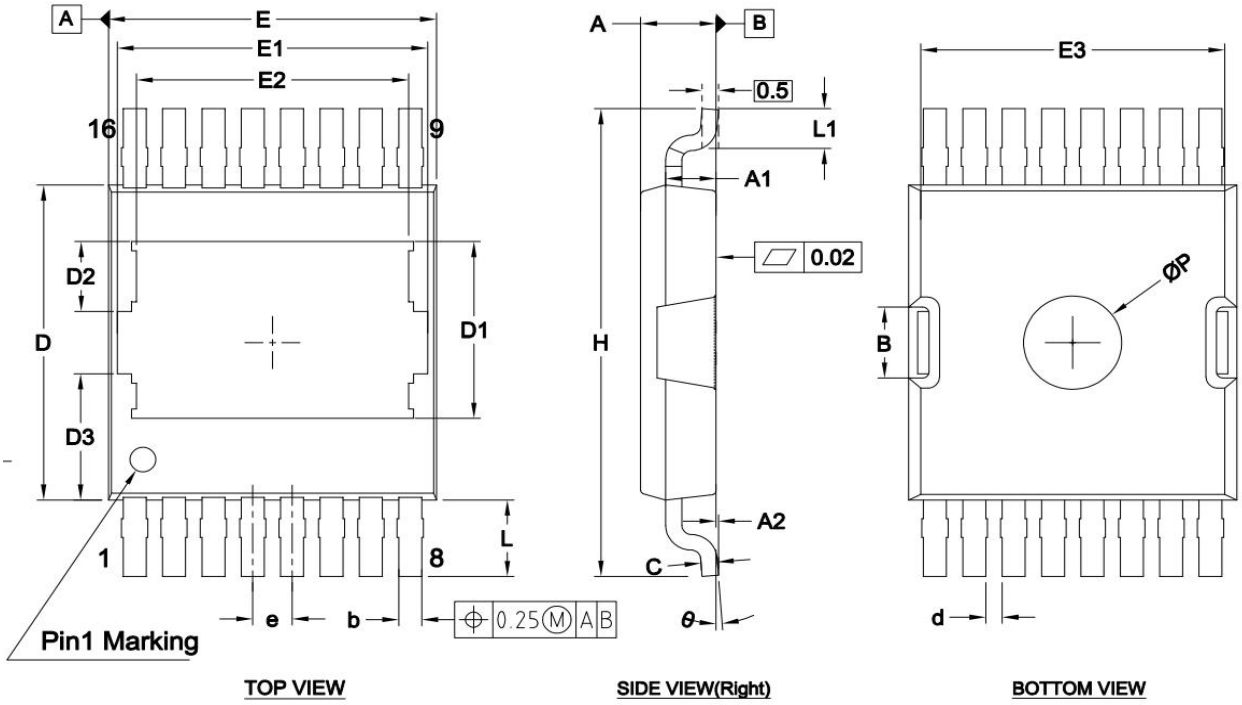
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TOLT



DIM / SYMBOL	MIN.	NOM.	MAX.
A	2.25	2.30	2.35
A1	1.44	1.54	1.64
A2	0.01	---	0.16
b	0.60	0.70	0.80
c	0.40	0.50	0.60
d	0.40	0.50	0.60
e		1.20 BSC	
D	10.00	10.10	10.30
D1	5.47	5.67	5.87
D2	2.04	2.24	2.44
D3		4.05 REF.	
E	9.70	10.00	10.30
E1		9.46 REF.	
E2	8.10	8.30	8.50
E3	9.07	9.27	9.47
H	14.80	15.00	15.20
L	2.25	2.45	2.65
L1	1.35	1.50	1.65
ØP	2.35	2.50	2.65
B	2.08	2.28	2.48
θ	1°	3°	5°

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