120V N-Channel Enhancement Mode MOSFET

1.Product Information

1.1 Features

- ◇ Advanced SGT cell design
- ◇ Low Gate Charge
- ◇ Low On-Resistance
- ◇ RoHS and Halogen-Free Compliant
- ◇ 100% ΔVDS & UIS & Rg Tested

1.2 Applications

- ◇ DC-DC Converter
- ◇ Drones
- ◇ Motor drivers
- ◇ Light electric vehicles

1.3 Quick reference

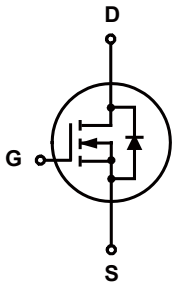
- ◇ BV ≧ 120 V
- ◇ P_{tot} ≦ 555 W
- ◇ I_D ≦ 386 A
- ◇ $R_{DS(ON)}$ ≦ 2.3 mΩ @ V_{GS} = 10V
- ◇ $R_{DS(ON)}$ ≦ 2.8 mΩ @ V_{GS} = 6.0V

Green Product

RoHS

2.Pin Description

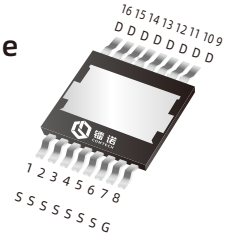
Symbol



Simplified Outline

Top View

TOLT



3.Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit	Note
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	120	V	-
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	±20	V	-
I_D*	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 10 V	-	386	A	Fig.2
		T_C = 100 ℃, V_{GS} = 10 V	-	273	A	
I_{DM}**,***	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 10 V	-	461	A	-
P_{tot}	Drain power dissipation	T_C = 25 ℃	-	555	W	Fig.1
		T_C = 100 ℃	-	277	W	
	Linear reduction	T_A > 25 ℃	-	3.70	W/℃	
T_{stg}	Storage Temperature		-55	175	℃	-
T_J	Junction Temperature		-	175	℃	-
I_S	Continuous-Source Current	T_C = 25 ℃	-	386	A	-
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD}= 120V,L= 0.5mH	-	2956	mJ	Fig.19

4.Thermal Characteristics

$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient	-	20	℃/W	Fig.16
$R_{\theta JC}$*	Thermal Resistance- Junction to Case	-	0.27		

Notes：

* Surface Mounted on 1 in² pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

*** limited by bonding wire

5.Marking Information

Product Name	Package	Reel size	Tape width	Quantity	Note
LN013N120LT	TOLT	330mm	24mm	1800	

Note: COMTECH defines “ Green ” as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight;Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

6. Electrical Characteristics (T_A=25 ° Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	Note
Static Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 250 μA	120	-	-	V	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	2	-	4	V	
I_{DSS}	Drain Leakage Current	V_{DS} =120V, V_{GS} = 0 V	-	-	1	μA	
I_{GSS}	Gate Leakage Current	V_{GS} = ± 20 V, V_{DS} = 0 V	-	-	±100	nA	
$R_{DS(ON)}$ [a]	On-State Resistance	V_{GS} =10V , I_{DS} =20A	-	2.1	2.3	mΩ	Fig.8
		V_{GS} =6.0V, I_{DS} =10A	-	2.6	2.8		
Diode Characteristics							
V_{SD} [a]	Diode Forward Voltage	I_{SD} = 20A , V_{GS} = 0 V	-	-	1.3	V	Fig.7
t_{rr}	Reverse Recovery Time	I_{DS} = 20A, V_{GS} = 0 V	-	123	-	nS	Fig.20
Q_{rr}	Reverse Recovery Charge	$dI_{SD/dt}$ = 100 A/μs	-	583	-	nC	
Dynamic Characteristics[b]							
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} =60V Frequency = 1 MHz	-	14458	-	pF	Fig.10
C_{oss}	Output Capacitance		-	1784	-		
C_{rss}	Reverse Transfer Capacitance		-	62	-		
R_G	Gate Resistance	F= 1 MHz	-	2.2	-	Ω	
t_d(on)	Turn-on Delay Time	V_{DS} =60V , V_{GS} = 10 V, $RG_{(ext)}$=2.7Ω , R_L=20uH I_{DS} =20A	-	46	-	nS	Fig.18
t_r	Turn-on Rise Time		-	87	-		
t_d(off)	Turn-off Delay Time		-	123	-		
t_f	Turn-off Fall Time		-	58	-		
dv/dt(on)	Turn-on Peak Diode Recovery		-	0.555	-	KV/us	
dv/dt(off)	Turn-off Peak Diode Recovery		-	0.826	-		
di/dt(on)	Turn-on Peak Diode Recovery		-	449	-	A/us	
di/dt(off)	Turn-off Peak Diode Recovery		-	273	-		
Gate Charge Characteristics[b]							
Q_g	Total Gate Charge	V_{DS} =60V , V_{GS} = 10 V, I_{DS} = 20A	-	204	-	nC	Fig.9
Q_{gs}	Gate-Source Charge		-	48	-		
Qgd	Gate-Drain Charge		-	71	-		
Vplateau	Gate plateau voltage		-	4.2	-	V	

Notes :
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

Fig.1 Power Capability

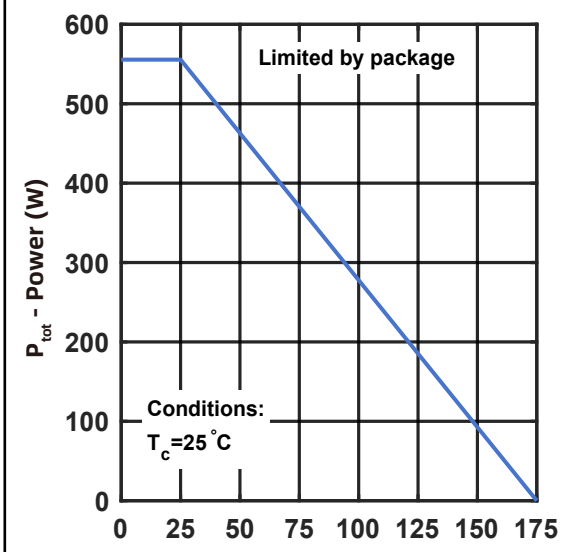


Fig.2 Current Capability

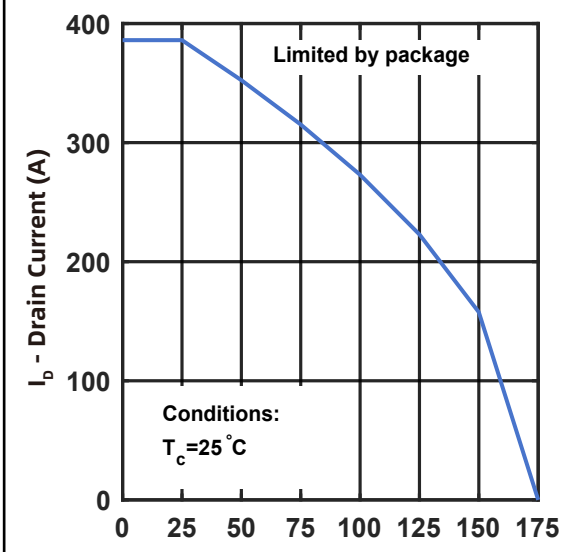


Fig.3 Output Characteristics@Tj -55°C

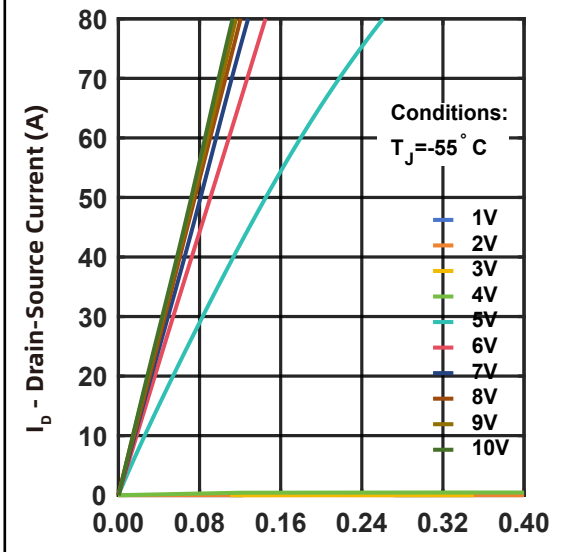
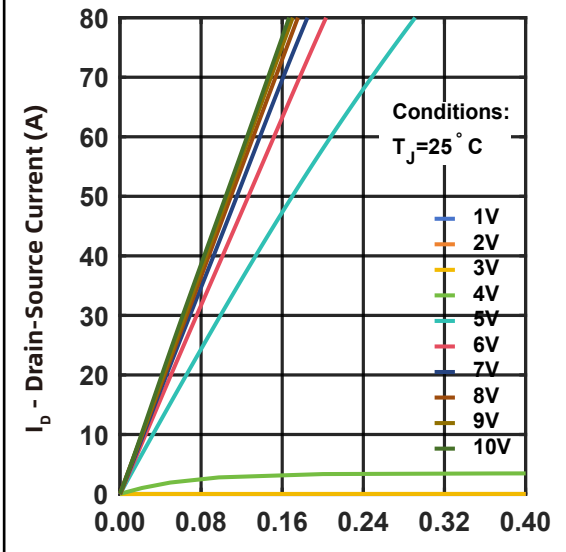


Fig.4 Output Characteristics@Tj 25°C



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7. Typical Characteristics

Fig.5 Output Characteristics@Tj 175℃

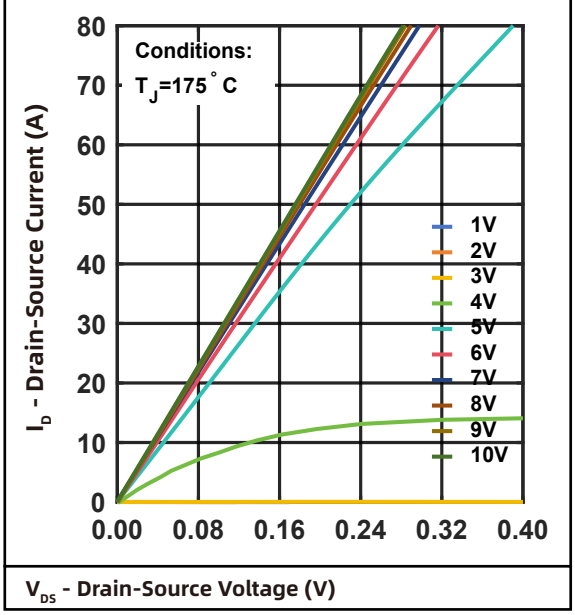


Fig.6 Transfer Characteristics vs Temp

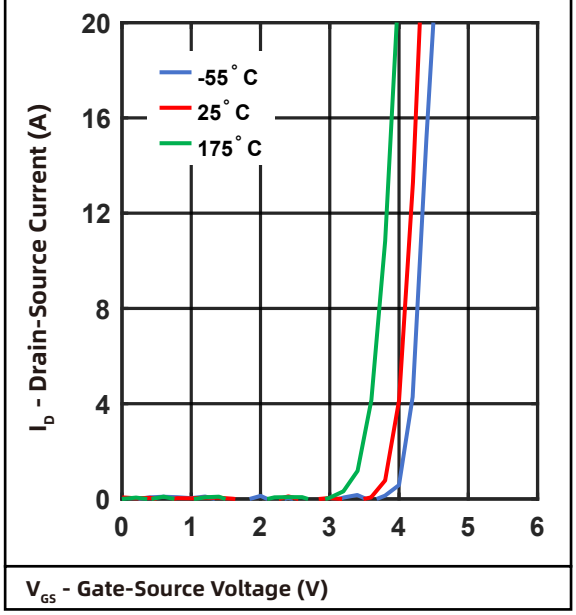


Fig.7 Body Diode Characteristics

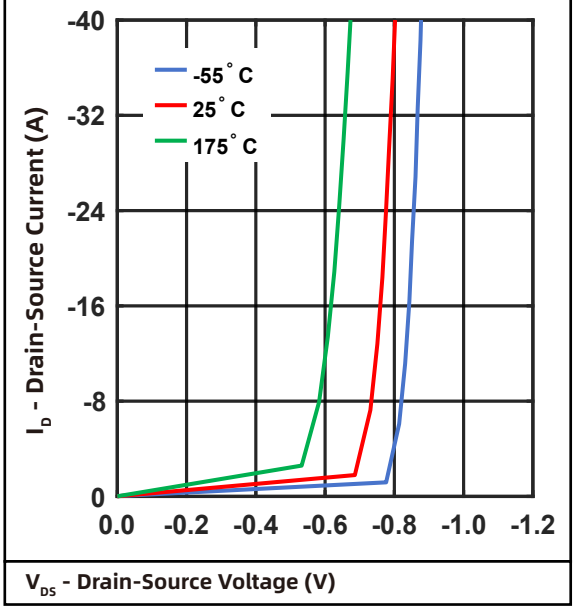
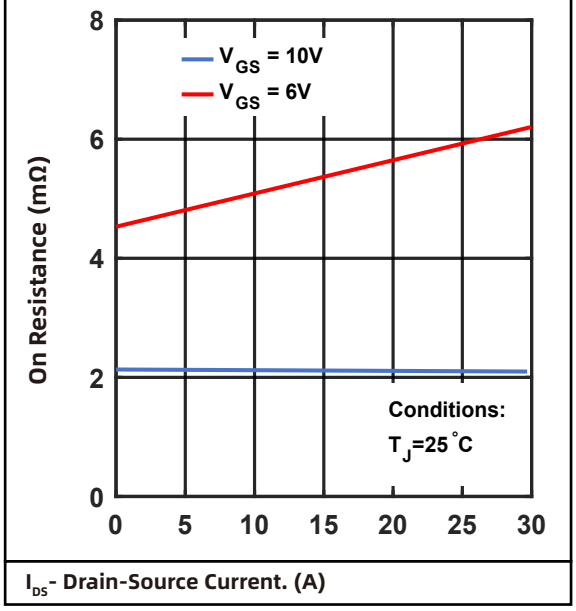


Fig.8 Drain-Source On Resistance



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7. Typical Characteristics

Fig.9 Gate Charge

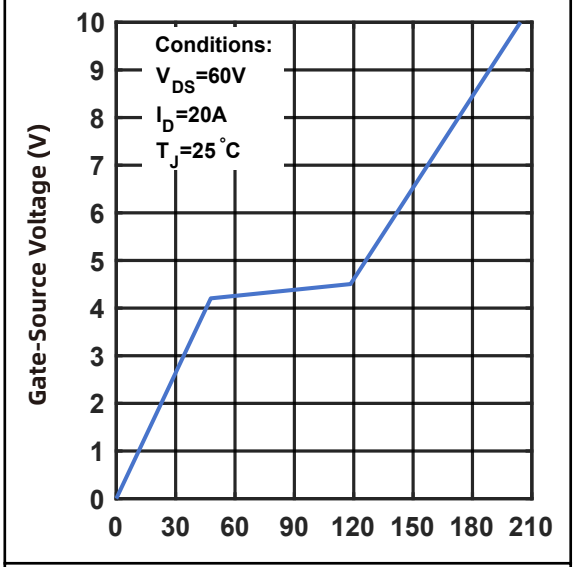


Fig.10 Capacitance

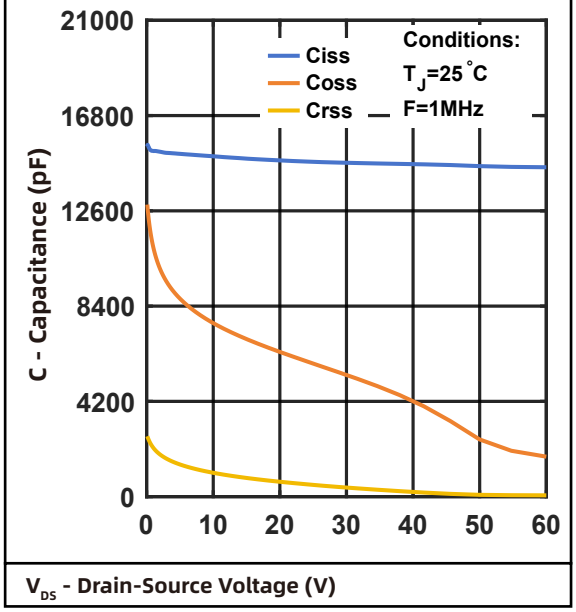


Fig.11 Normalized Threshold Voltage

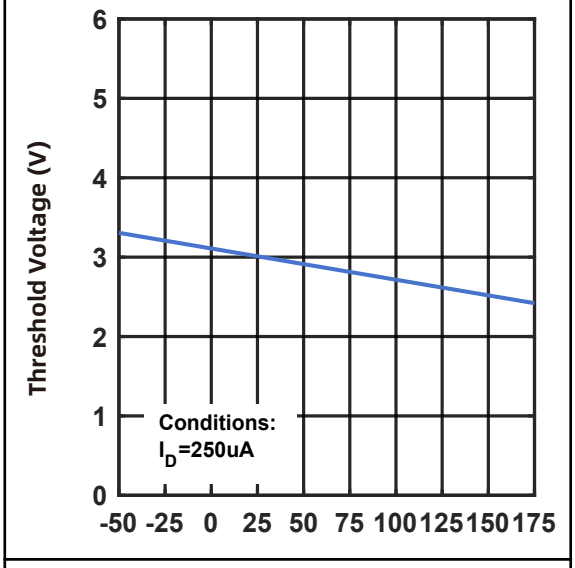
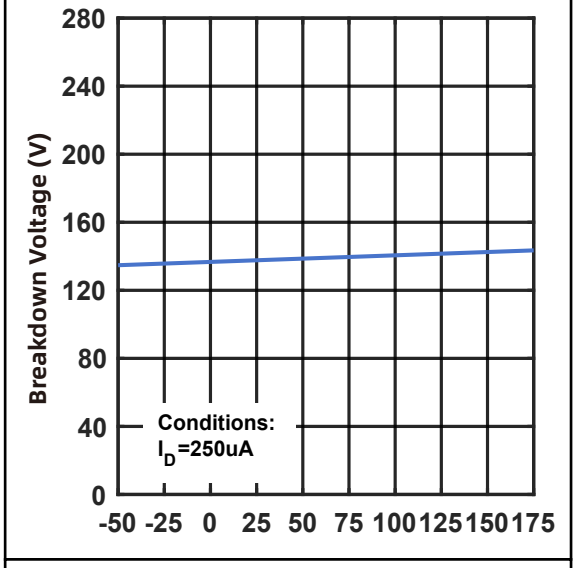


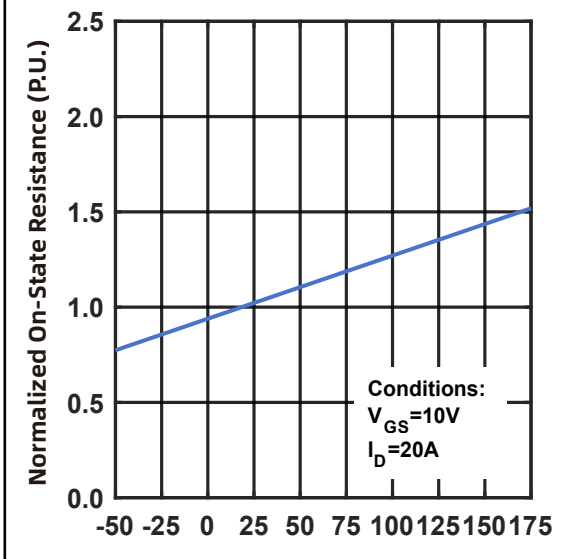
Fig.12 Normalized Breakdown Voltage



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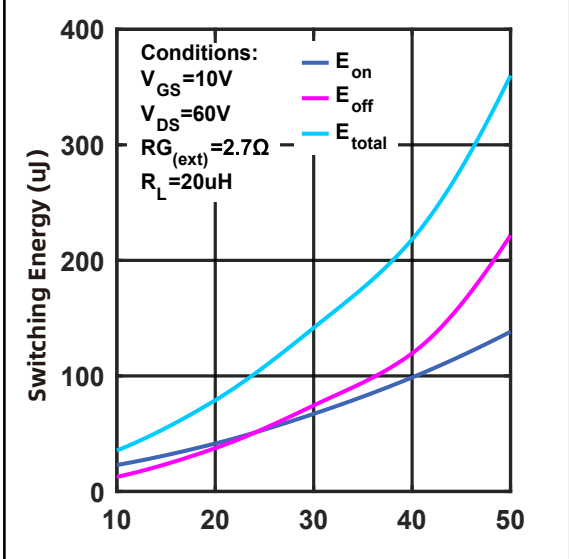
7. Typical Characteristics

Fig.13 Normalized On Resistance



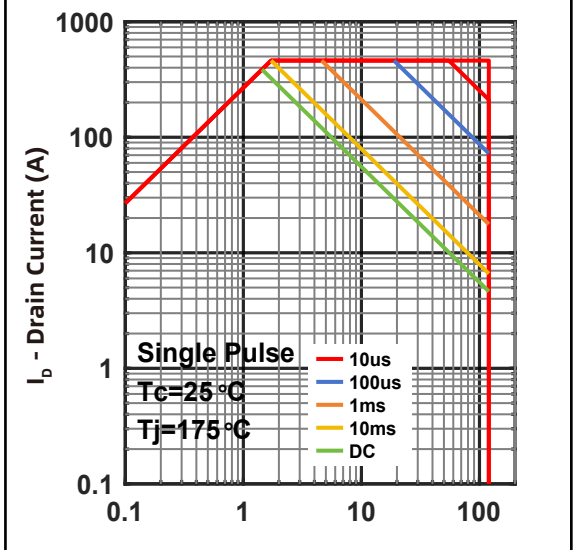
T_j - Junction Temperature (°C)

Fig.14 Switching Energy vs ID



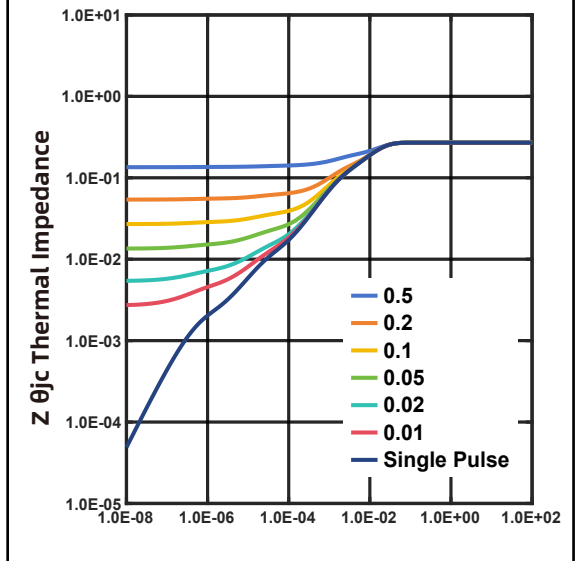
I_{DS}- Drain-Source Current. (A)

Fig.15 Safe Operating Area



V_{DS} - Drain-Source Voltage (V)

Fig.16 Transient Thermal Impedance



Square Wave Pulse Duration (sec)

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7. Typical Characteristics

Fig.17 Gate Charge Test Circuit & Waveform

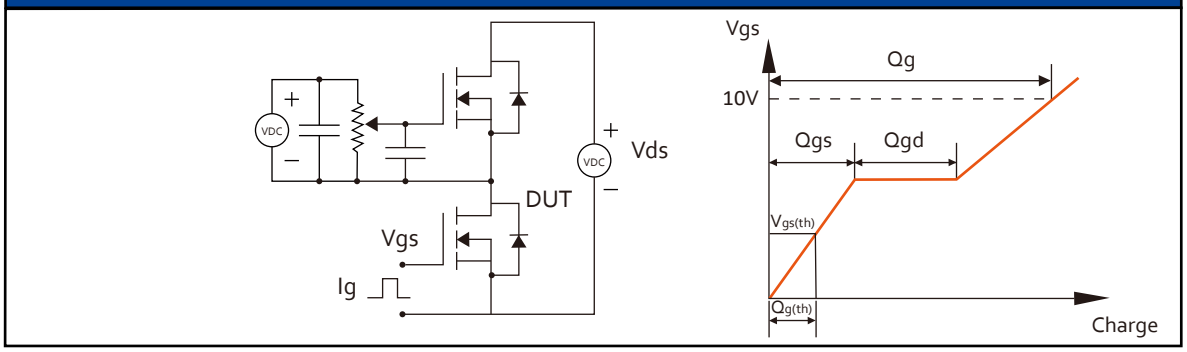


Fig.18 Resistive Switching Test Circuit & Waveforms

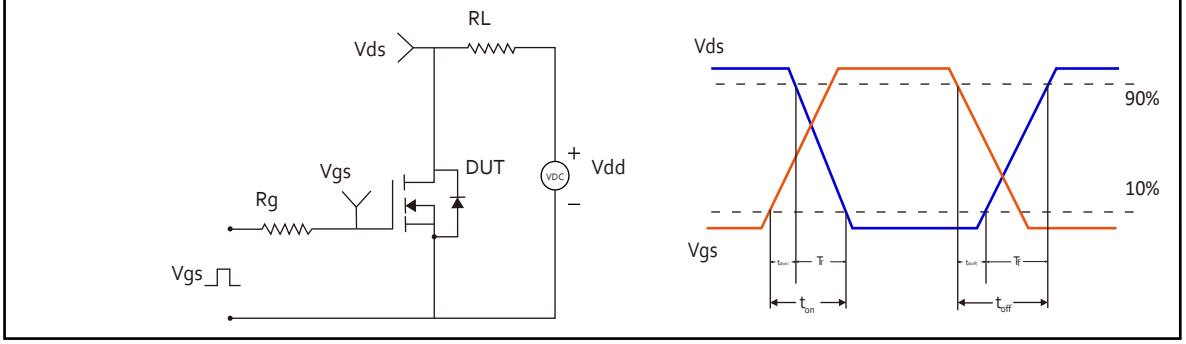


Fig.19 Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

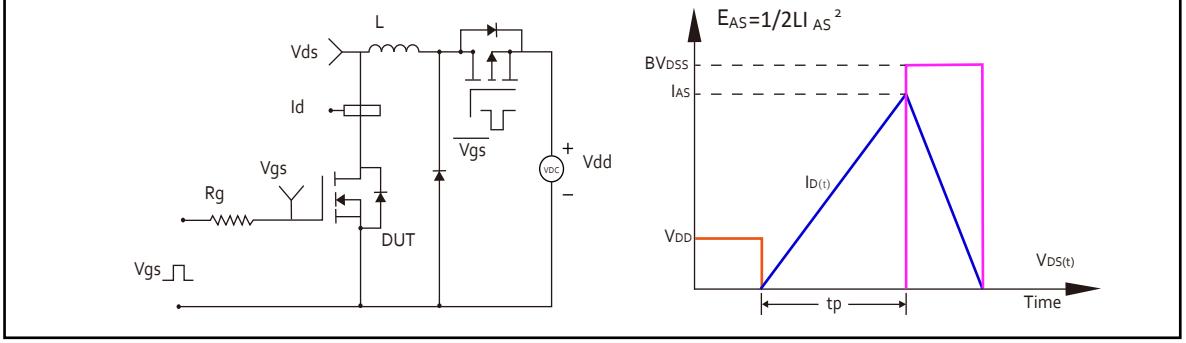
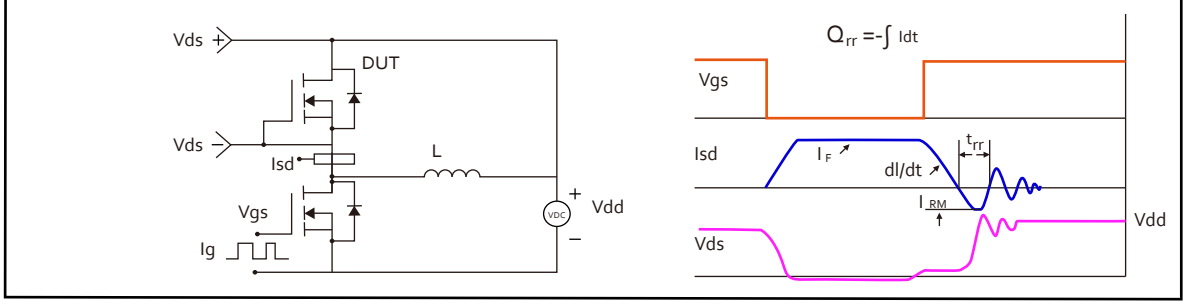


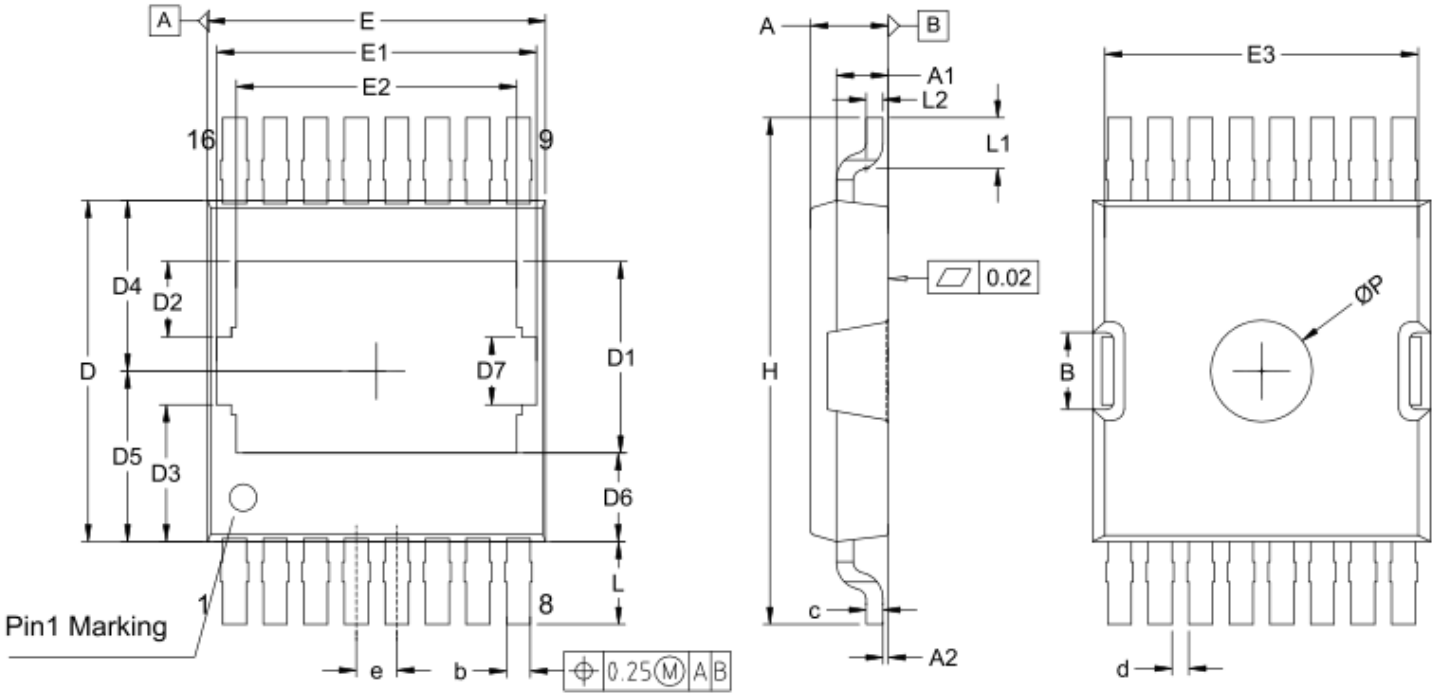
Fig.20 Diode Recovery Test Circuit & Waveforms



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8. Package Dimensions

TOLT Package



TOP VIEW　　SIDE VIEW(Right)　　BOTTOM VIEW

Symbol	Dimensions In Millimeters		
	MIN.	NOM.	MAX.
A	2.250	2.300	2.350
A1	1.440	1.540	1.640
A2	0.010	-	0.160
b	0.600	0.700	0.800
c	0.400	0.500	0.600
d	0.400	0.500	0.600
e			
D	10.000	10.100	10.300
D1	5.470	5.670	5.870
D2	2.040	2.240	2.440
D3		4.050 REF.	
D4		5.050 REF.	
D5		5.050 REF.	
D6		2.620 REF.	
D7		2.000 REF.	
E	9.700	10.000	10.100
E1		9.460 REF.	
E2	8.100	8.300	8.500
E3	9.070	9.270	9.470
H	14.800	15.000	15.200
L	2.250	2.450	2.650
L1	1.350	1.500	1.650
L2		0.500 BSC.	
ΦP	2.90	3.000	3.100
B	2.180	2.280	2.380

9. Record of Document amendment

产品名称：LN013N120LT
版权说明：镭诺电子（宁波）有限公司
联系电话：4008887385

文档类型：产品手册
公司主页：www.leinuosemi.com

版本：01
修改记录：
1.初版发行