

General Description:

The LW13N90SK uses advanced VDMOS technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-247, which accords with the ROHS standard.

Features:

- Fast Switching
- Low Gate Charge and R_{dson}
- Low Reverse transfer capacitances

Applications:

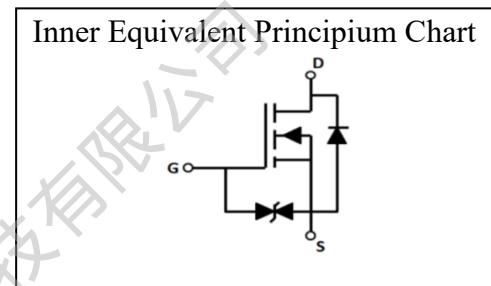
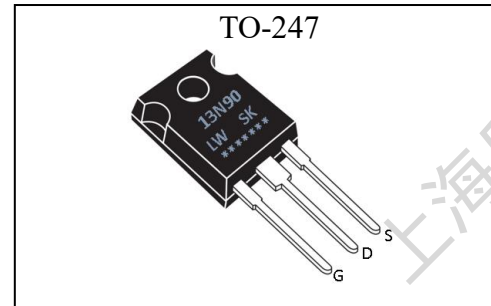
- Power switching application
- Hard switched and high frequency circuits

100% DVDS Tested

100% Avalanche Tested



V_{DSS}	900	V
I_D	13	A
$P_D (T_C=25^\circ C)$	297	W
$R_{DS(ON)}$ TYPE	0.6	Ω


Package Marking and Ordering Information:

Marking	Part #	Package	Packing	Qty.
13N90/LW SK/****	LW13N90SK	TO-247	Tube	25 units

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	900	V
I_D	Continuous Drain Current	13.0	A
	Continuous Drain Current $T_C = 100^\circ C$	7	A
I_{DM}^{a1}	Pulsed Drain Current	52	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	268	mJ
P_D	Power Dissipation	297	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ C$
T_L	Maximum Temperature for Soldering	260	$^\circ C$

Electrical Characteristics (Tc= 25°C unless otherwise specified) :

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	900	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 900V, V _{GS} = 0V, T _a = 25°C	--	--	25	μA
		V _{DS} =720V, V _{GS} = 0V, T _a = 125°C	--	--	250	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+30V	--	--	10	μA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-30V	--	--	-10	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =6.5A	--	0.6	0.8	Ω
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	3		5	V
Pulse width tp≤380μs, δ≤2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =40V, I _D =6.5A	--	11	--	S
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1.0MHz	--	3450	--	pF
C _{oss}	Output Capacitance		--	370	--	
C _{rss}	Reverse Transfer Capacitance		--	40	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(OFF)}	Turn-Off Delay Time	I _D =13.0A V _{DS} =450V V _{GS} = 10V R _G = 25Ω	--	140	--	ns
Q _g	Total Gate Charge	I _D =13A V _{DD} =720V V _{GS} = 10V	--	76	--	nC
Q _{gs}	Gate to Source Charge		--	20	--	
Q _{gd}	Gate to Drain ("Miller") Charge		--	27	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	13	A
V_{SD}	Diode Forward Voltage	$T_j = 25^\circ, I_S=13.0A, V_{GS}=0V$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$I_S=13.0A, T_j = 25^\circ$	--	1000	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/us, V_{GS}=0V$	--	20	--	μC
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Thermal Characteristics

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	0.42	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient	40	$^\circ C/W$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: $V_{DD}=50V, L=3.0mH, R_G=25 \Omega, Start T_j=25^\circ C$

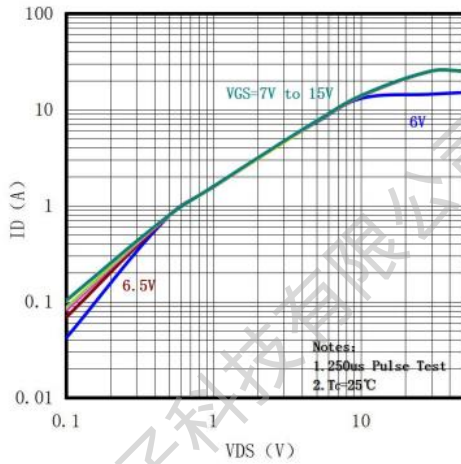
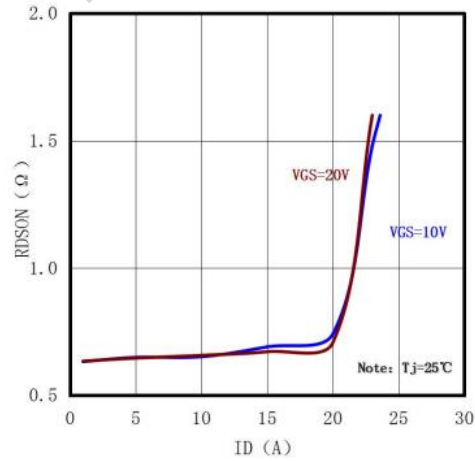
Typical Performance Characteristics

图 1 输出特性曲线, $T_c=25^\circ\text{C}$
Fig1 Typical Output Characteristics, $T_c=25^\circ\text{C}$

图 2 导通电阻与漏极电流和栅极电压曲线

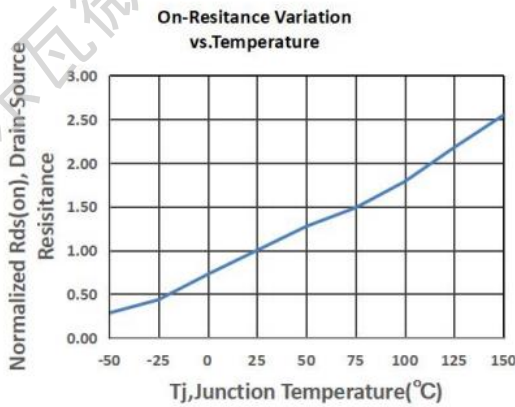
Fig2 On-Resistance Vs. Drain Current and Gate Voltage

图 3 导通电阻与温度曲线

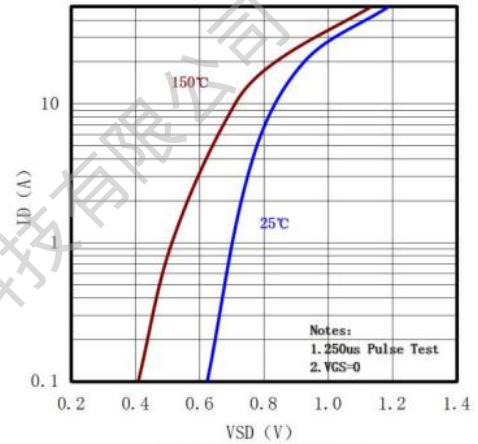
Fig3 Normalized On-Resistance Vs. Temperature

图 4 二极管正向电压曲线

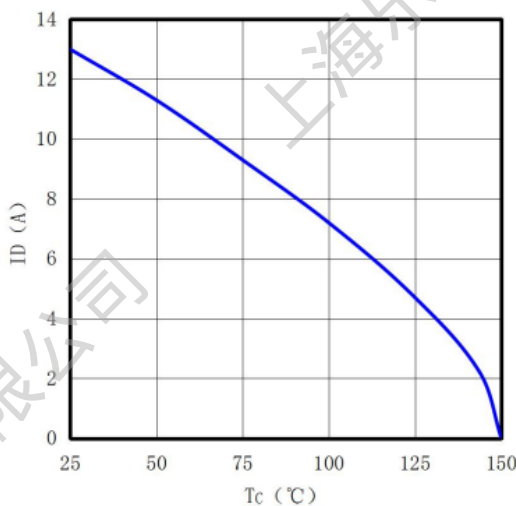
Fig4 Typical Source-Drain Diode Forward Voltage

图 5 最大漏极电流与壳温曲线

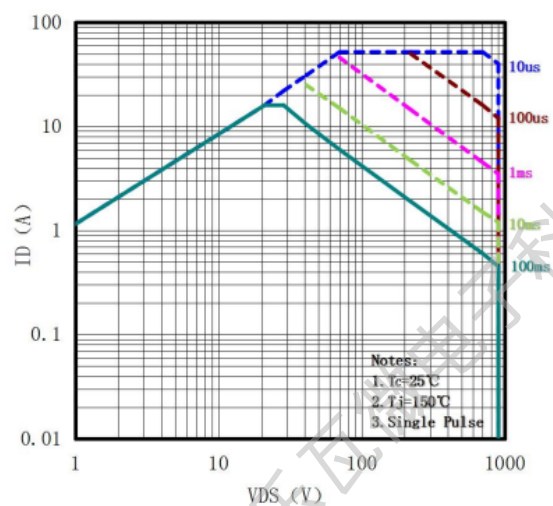
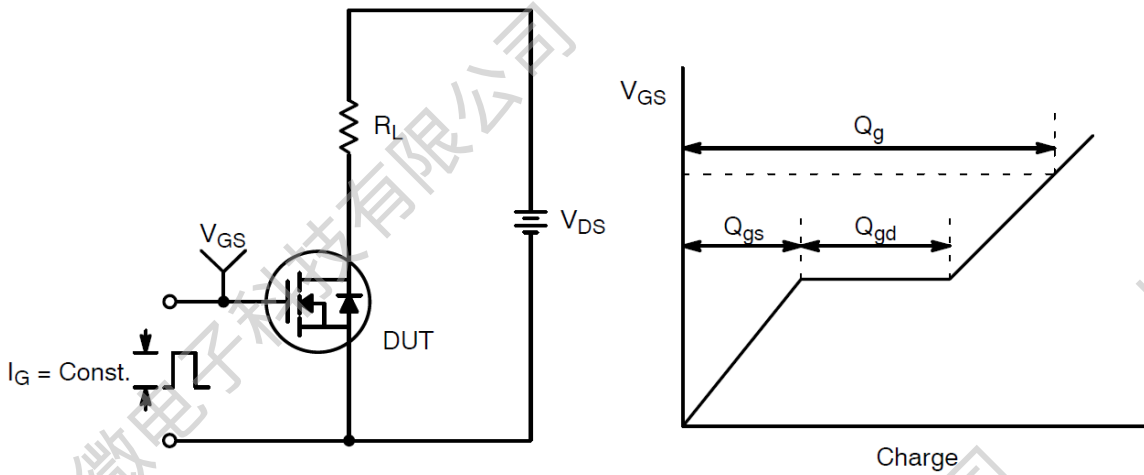
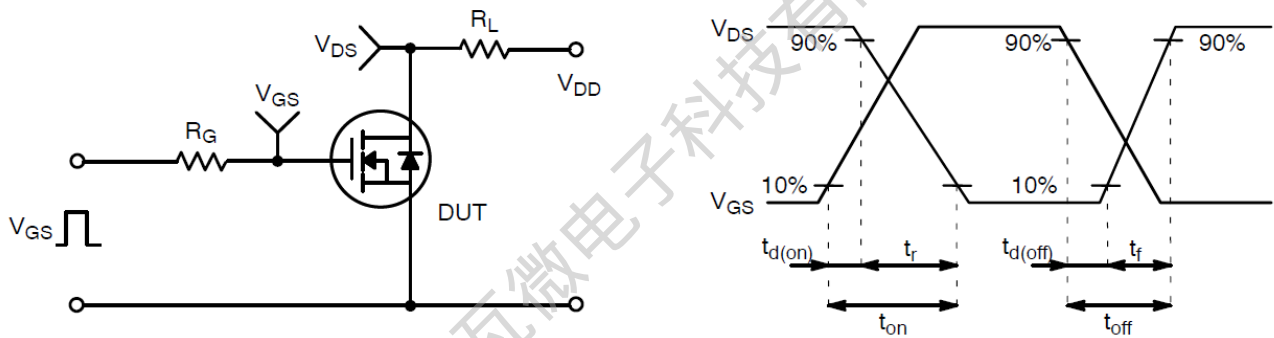
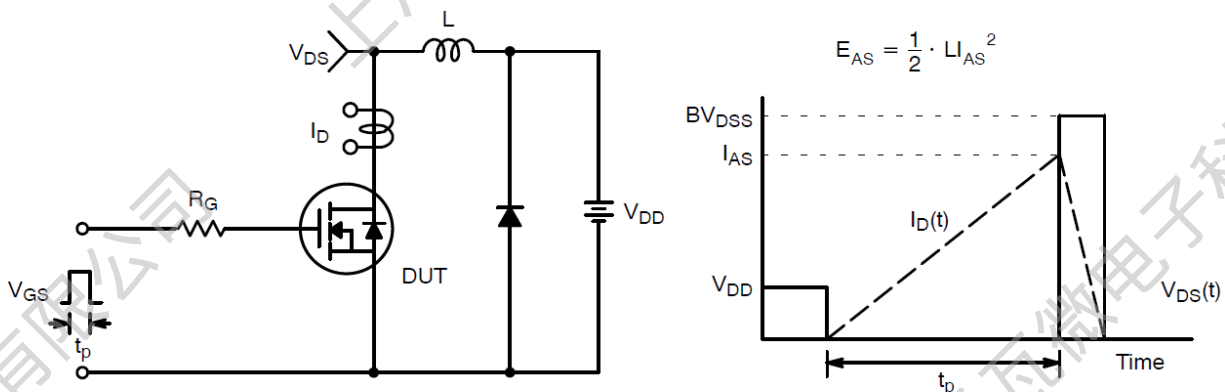
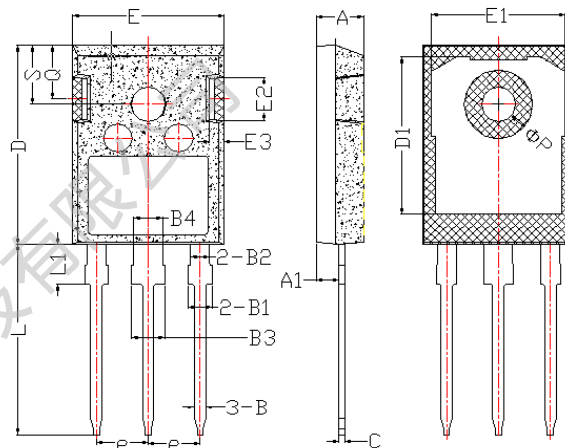
Fig5 Maximum Drain Current Vs. Case Temperature

图 6 最大安全工作区曲线

Fig6 Maximum Safe Operating Area

Test Circuit and Waveform:

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching Test Circuit & Waveforms

Package Information


Items	Values(mm)	
	MIN	MAX
A	4.83	5.21
A1	2.27	2.54
B	1.07	1.33
B1	1.90	2.41
B2	1.90	2.16
B3	2.87	3.38
B4	2.87	3.13
C	0.55	0.68
D	20.80	21.10
D1	16.25	17.65
E	15.70	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	2.60
e	5.44(BSC)	
L	19.80	20.32
L1	4.10	4.47
ΦP	3.50	3.70
Q	5.49	6.00
S	6.04	6.30

Revision History

Revision	Date	Descriptions
REV.1.1	Sep, 2019	“Add Marking Iformation and Package Information” Update
REV.1.0	Feb, 2019	Initial Version

DISCLAIMER:

The information in this document is believed to be accurate and reliable. However, no responsibility is assumed by LW-Micro for its use. All operating parameters must be designed, validated and tested to ensure they meet the requirements of your application. LW-Micro reserves the right to make any specification and/or circuitry changes without prior notification. Before starting a brand-new project, please contact LW-Micro Sales to get the most recent relevant information.

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