CHIPLINK N-Channel Enhancement Mode Power MOSFET

Description

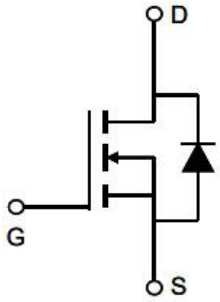
The LX3090KS combines advanced trench technology to provide excellent $R_{DS(ON)}$, it is tailored to minimize conduction loss, and provide superior switching performance. It can be used in a wide variety of applications.

Features

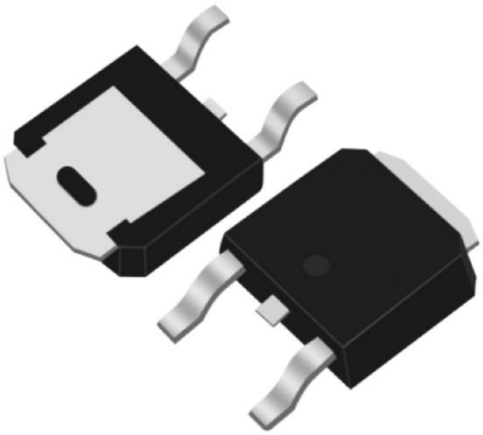
- V_{DS}=30V, I_D=90A
  $R_{DS(ON)typ.}$ =3.5mΩ@V_{GS}=10V
  $R_{DS(ON)typ.}$ =5mΩ@V_{GS}=4.5V
- 100% Avalanche Tested
- Fast Switching
- High Power and Current Handing Capability
- Termination is Lead-free and RoHS Compliant

Applications

- PWM Applications
- Load Switch
- Power Management



Schematic Diagram



TO252 Package

Maximum Ratings

(T_A= 25℃ unless otherwise noted)

PARAMETER	SYMBOL	MAX	UNIT
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D(T_C=25℃)	90	A
	I_D(T_C=100℃)	58	A
Pulsed Drain Current[BC]	I_{DM}	360	A
Maximum Power Dissipation[A]	P_D	90	W
Single Pulse Avalanche Energy[D]	E_{AS}	110	mJ
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃

Thermal Characteristic

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.7	℃/W

Electrical Characteristics

(T_A = 25℃ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	30			V
Gate-Threshold Voltage	$V_{th(GS)}$	V_{DS} = V_{GS}, I_D = 250μA	1	1.65	2	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30V, V_{GS} = 0V			1	μA
Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 30A		3.5	4.5	mΩ
		V_{GS} = 4.5V, I_D = 20A		5	6.6	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 20A	10			S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 15V, V_{GS} = 0V, F = 1MHz		2700		pF
Output Capacitance	C_{oss}			320		
Reverse Transfer Capacitance	C_{rss}			240		
Switching Capacitance						
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15V, R_L = 3Ω, V_{GS} = 10V, R_{GEN} = 3Ω		13		ns
Turn-On Rise Time	t_r			36		ns
Turn-Off Delay Time	$t_{d(off)}$			43		ns
Turn-Off Fall Time	t_f			16		ns
Total Gate Charge	Q_g	V_{DS} = 15V, I_D = 10A, V_{GS} = 4.5V		42		nC
Gate-Source Charge	Q_{gs}			4		nC
Gate-Drain Charge	Q_{gd}			14		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_D = 10A			1.2	V
Diode Forward Current	I_S				90	A

Notes:

A. The Power dissipation P_D is based on $T_{J(MAX)}$=150℃, using≤10s junction-to-ambient thermal resistance.

B. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150℃. Ratings are based on low frequency and duty cycles to keep initial T_J=25℃.

C. The Static characteristics in Figures are obtained using <300μs pulses, duty cycle 2% max.

D. EAS condition: TJ=25℃, V_{DD}=15V, V_{GS}=10V, R_G=25Ω, L=0.5Mh, I_{AS}=19A.

Typical Electrical and Thermal Characteristics

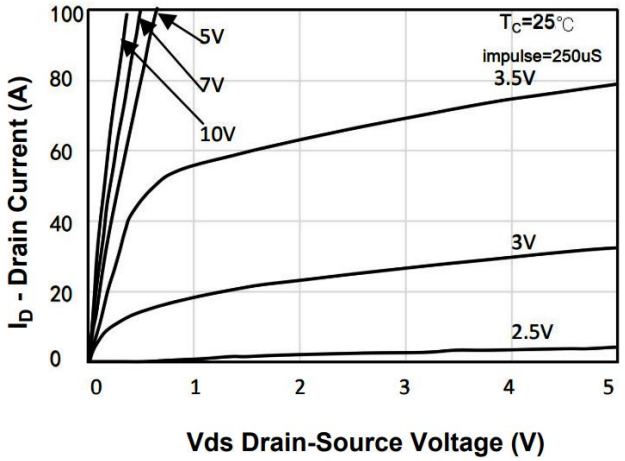


Figure 1. On-Region Characteristics

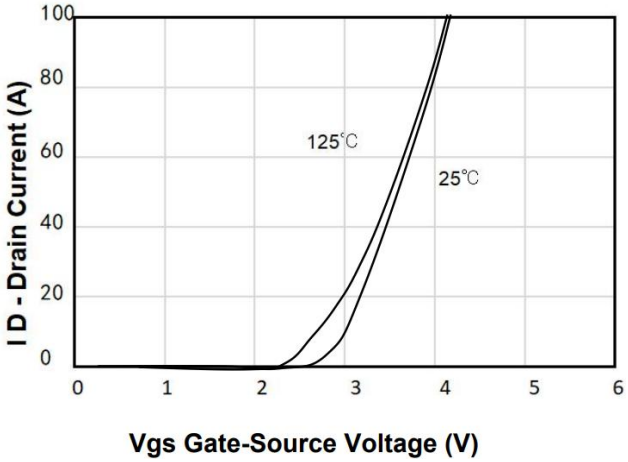


Figure 2. Transfer Characteristics

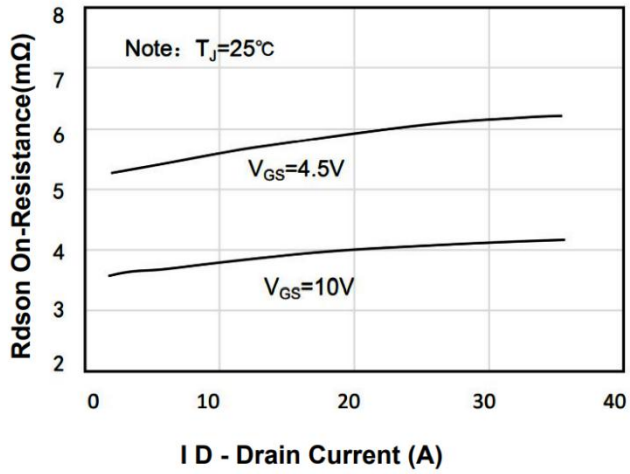


Figure 3. On-Resistance Variation vs. Drain Current and Gate Charge

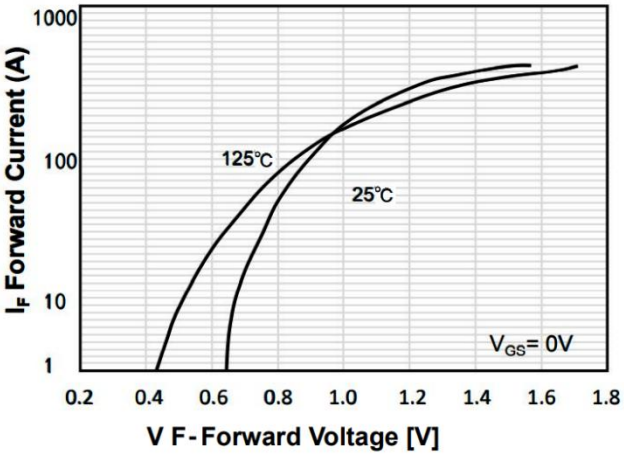


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

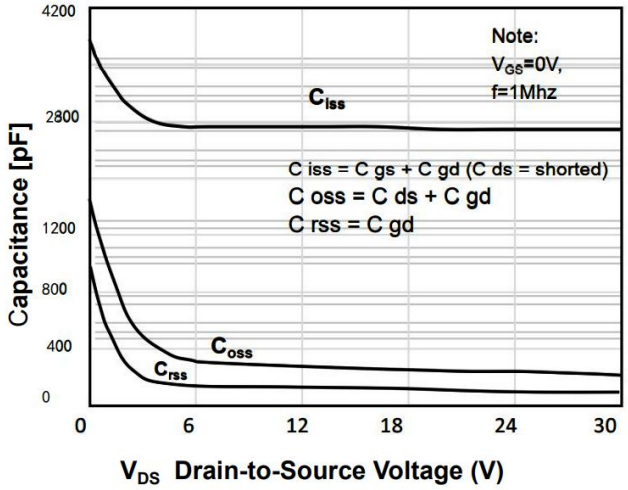


Figure 5. Capacitance vs. Vds

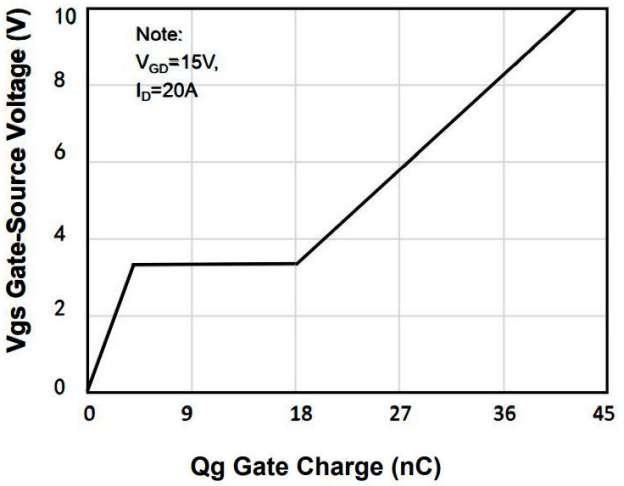


Figure 6. Gate Charge

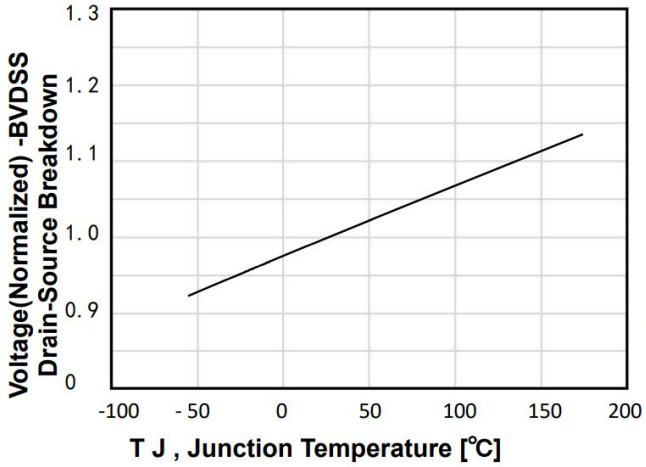


Figure 7. Breakdown Voltage Variation vs. Temperature

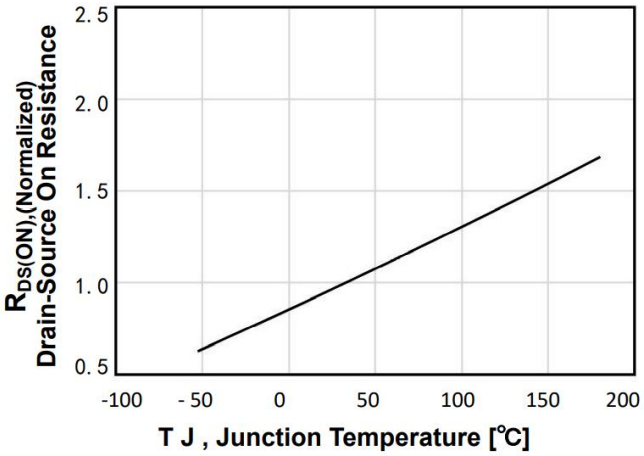


Figure 8. On-Resistance Variation vs. Temperature

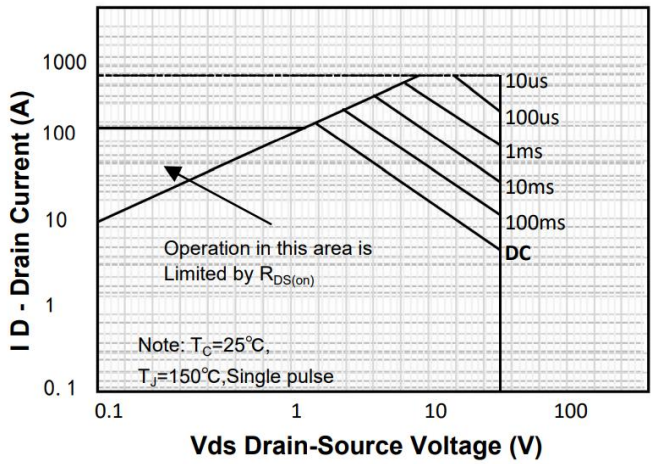


Figure 9. Maximum Safe Operating Area

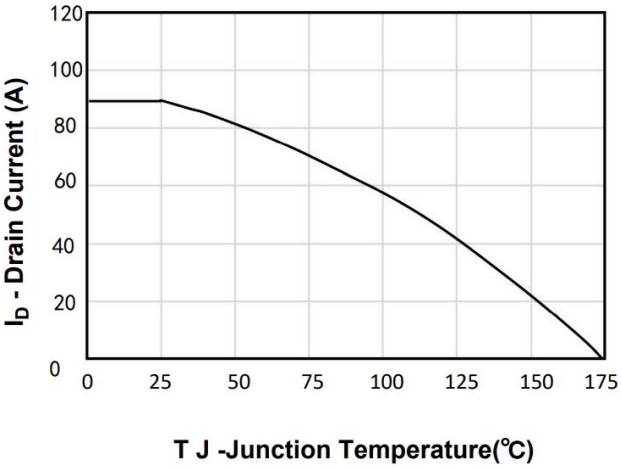


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

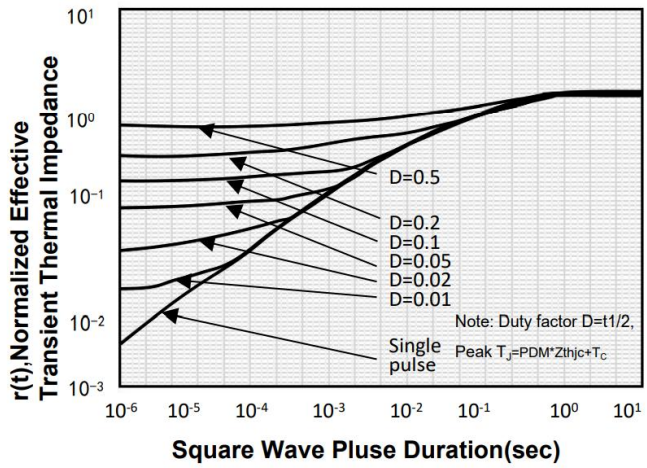


Figure 11. Transient Thermal Response Curve

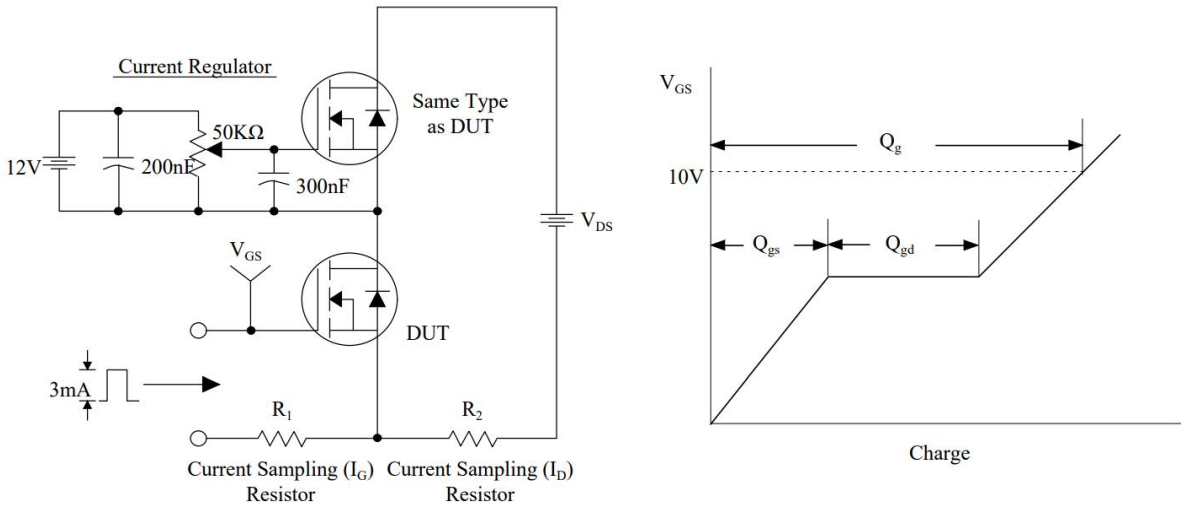


Figure 12. Gate Charge Test Circuit & Waveform

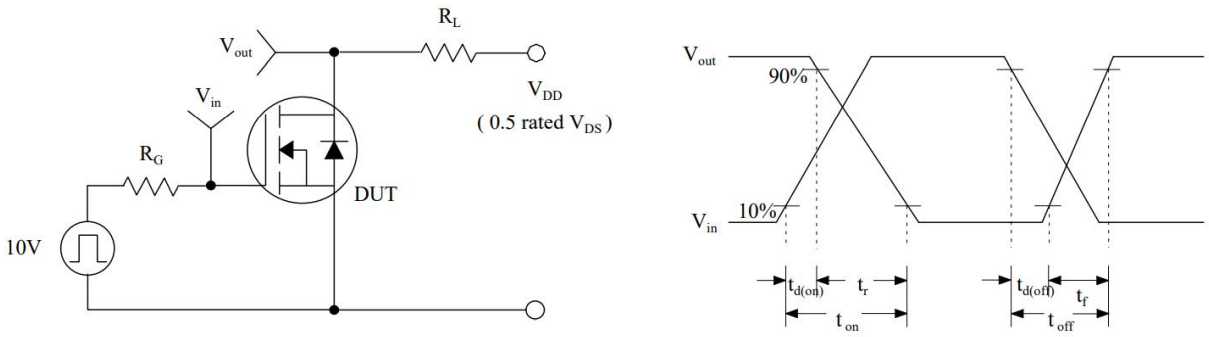


Figure 13. Resistive Switching Test Circuit & Waveforms

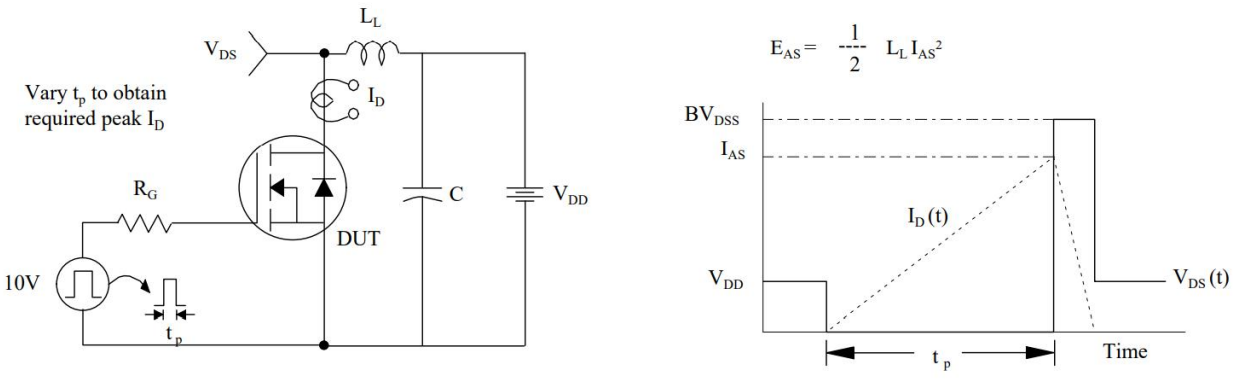
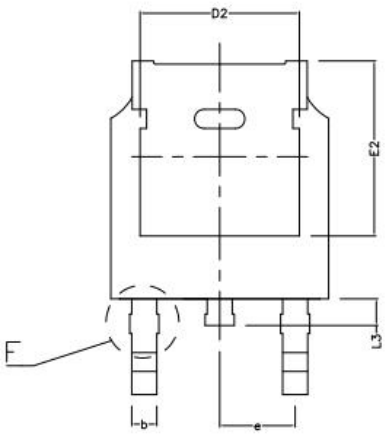
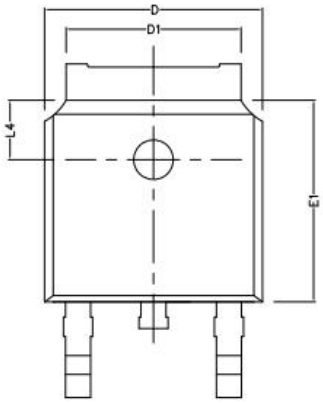


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

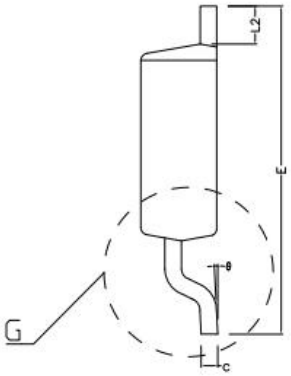
TO252 Package Information



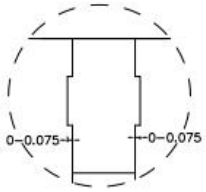
BOTTOM VIEW



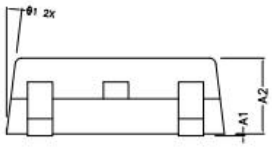
TOP VIEW



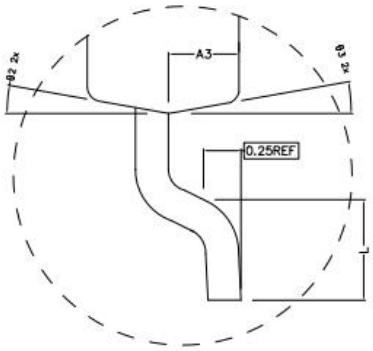
SIDE VIEW



DETAIL F



SIDE VIEW



DETAIL G

	MIN	NORMAL	MAX		MIN	NORMAL	MAX
A1	0.000	0.100	0.150	E2	5.600REF		
A2	2.200	2.300	2.400	e	2.286TYPE		
A3	1.020	1.070	1.120	L	1.400	1.550	1.700
b	0.710	0.760	0.810	L2	1.10REF		
c	0.460	0.508	0.550	L3	0.80REF		
D	6.500	6.600	6.700	L4	1.8REF		
D1	5.330REF			θ	0~8°		
D2	4.830REF			θ1	7° TYPE		
E	9.900	10.100	10.300	θ2	10° TYPE		
E1	6.000	6.100	6.200	θ3	10° TYPE		

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