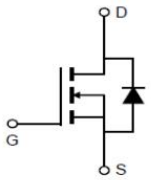
900V Super Junction MOSFET

•General Description

The SJ MOSFET LH90R1k4 has the low RDS(on), gate charge,fast switching and excellent avalanche characteristics.This device offers extremely fast and robust body diode,and is suitable for telecom and power supplies.



V_{DS}=800V

$R_{DS(ON)}$=1.2Ω

I_D=5A

TO-220F1

■ RoHS COMPLIANT

•Features

■Low Thermal Resistance
■Fast Switching
■High Input Resistance

•Application

■LED/LCD/PDP TV and monitor Lighting
■Power Supplies

•Ordering Information:

Part number	LH90R1K4
Package	TO-220F1
Basic ordering unit (pcs)	1000
Normal Package Material Ordering Code	LH90R1K4F1-TO220F1-TU
Halogen Free Ordering Code	LH90R1K4F1-TO220F1-TU-HF

•Absolute Maximum Ratings（TC =25℃）

PARAMETER		SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage[1]		BV_{DSS}	900	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	TC = 25°C	I_D	5	A
	TC = 100°C		3.0	
Pulsed drain current (TC = 25°C, tp limited by Tjmax)[2,4]		I_{DM}	20	A
Single Pulse Avalanche Energy[2]		E_{AS}	175	mJ
Power Dissipation(TC=25℃)		P_D	83	W
Peak Diode Recovery dv/dt[3]		dv/dt	15	V/ns
Junction Temperature		T_J	-55~+150	℃
Storage Temperature		T_{STG}	-55~+150	℃

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D=250uA	900	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=VGS,I_D=250uA	2.0	--	4.0	V
Drain-source On Resistance[3]	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.5A	--	1.2	1.4	Ω
Drain-Source Leakage Current	I_{DSS}	V_{DS}=900V,V_{GS}=0V,T_J=25℃	--	--	1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V	--	--	100	uA
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = 400V, f = 1.0MHz	--	480	--	pF
Output Capacitance	Coss		--	428	--	
Reverse transfer Capacitance	Crss		--	12	--	
Turn -Off Delay Time[3]	Td(off)	V_{DD}=720V, ID=1A, V_{GS}=10V R_G=25Ω	--	49	--	ns
Turn -On Delay Time[3]	Td(on)		--	19	--	
Rise Time	Tr		--	23	--	
Fall Time	Tf		--	20	--	
Total Gate Charge	Qg	I_D =5A, V_{DS} =720V V_{GS} = 0~10V	--	14	--	nC
Gate-to-Source Charge	Qgs		--	3.5	--	
Gate-to-Drain Charge	Qgd		--	6.0	---	

●Reverse Diode Characteristics

Continuous Diode Forward Current	I_S	--	--	--	5	A
Pulsed Diode Forward Current	I_{SM}	--	--	--	20	A
Diode Forward Voltage	V_{SD}	Is=1A V_{GS} =0V	--	--	1.4	V
Reverse Recovery Time	trr	If=11A di_F/dt=100A/μs	--	460	--	ns
Reverse Recovery Charge	Qrr		--	2.7	--	uC

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	Rth_{JC}	1.5	℃/W
Thermal Resistance Junction-ambient	Rth_{JA}	62.5	℃/W

Notes:

1.Repetitive Rating: Pulse width limited by maximum junction temperature.

2. I_{AS} =5A, V_{DD} = 50V, R_G = 25Ω,Starting T_J = 25°C

3. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

●Typical Characteristics

Figure 1. Output Characteristics

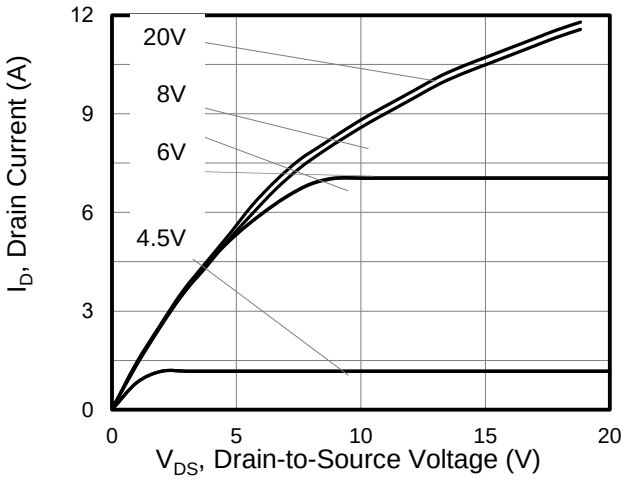


Figure 2. Transfer Characteristics

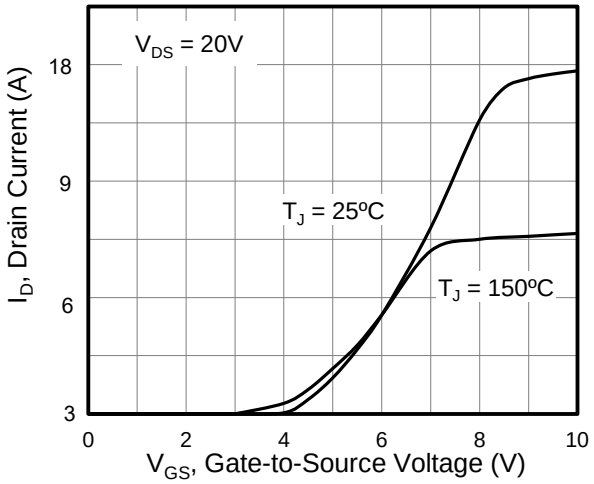


Figure 3. On-Resistance vs. Drain Current

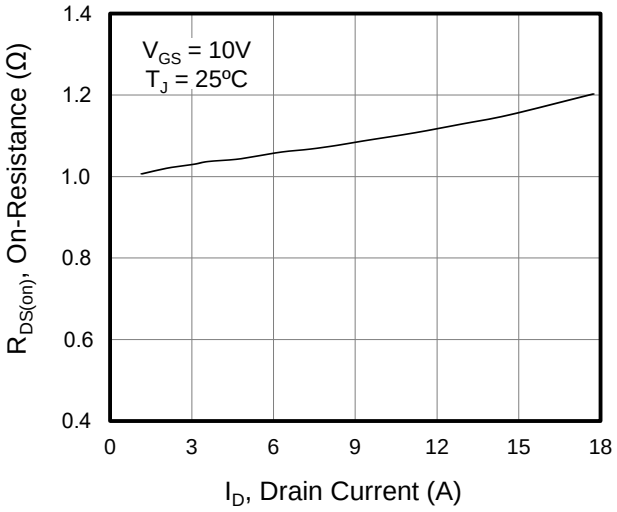


Figure 4. Capacitance

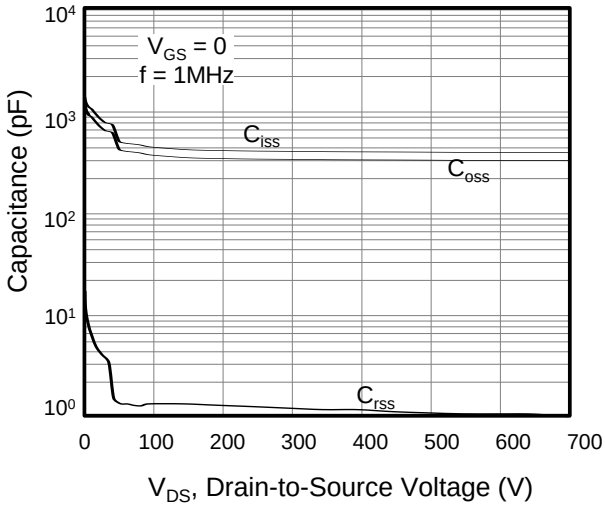


Figure 5. Gate Charge

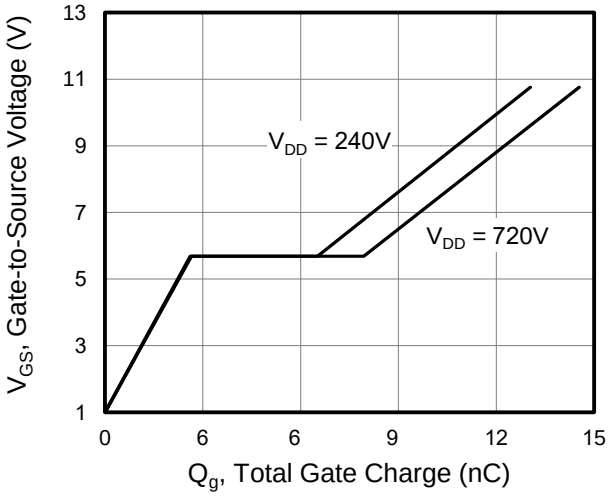
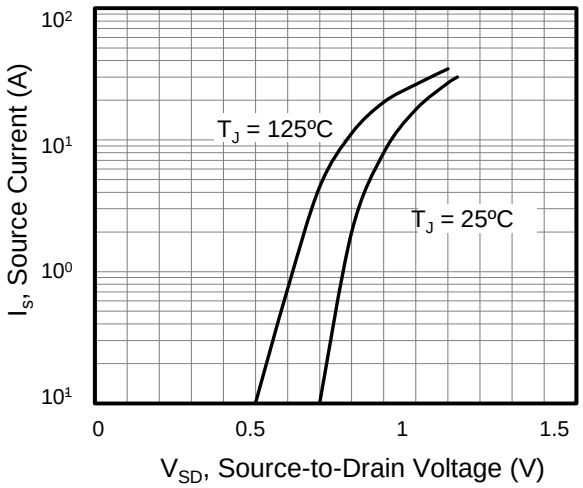


Figure 6. Body Diode Forward Voltage



●Typical Characteristics(Cont.)

Figure 7. On-Resistance vs. Junction Temperature

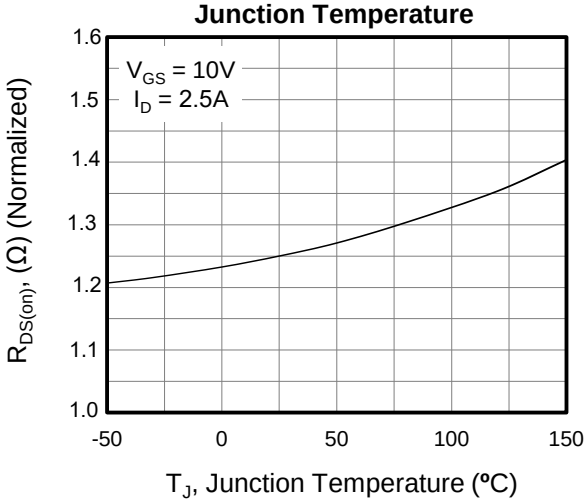


Figure 8. Breakdown voltage vs. Junction Temperature

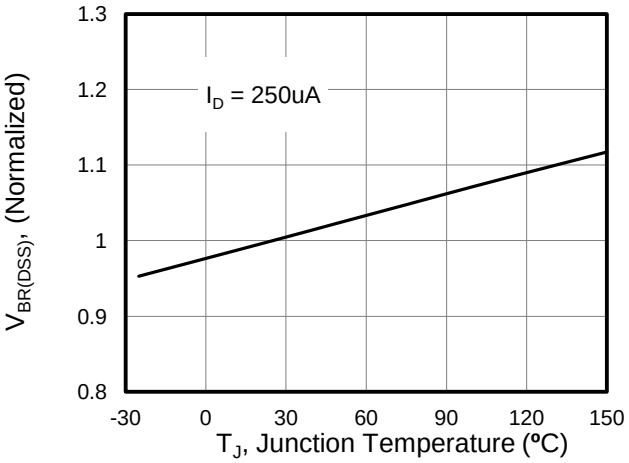


Figure 9. Transient Thermal Impedance

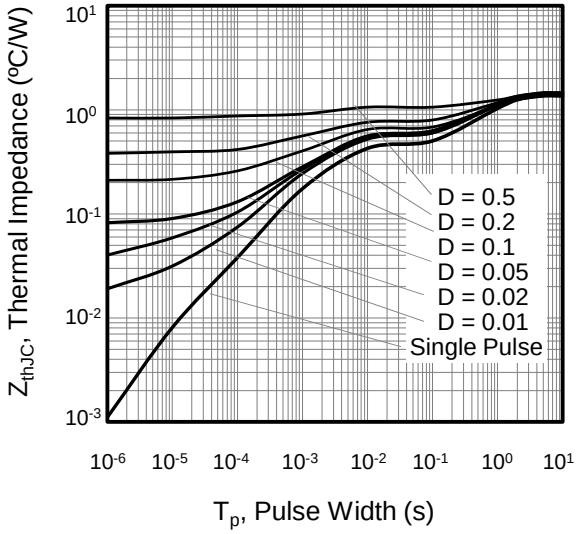
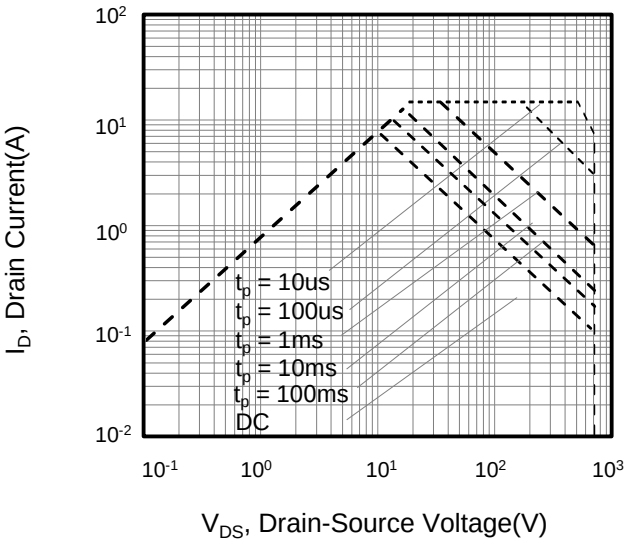


Figure 10. Safe operation area



● Test Circuit and Waveforms

Figure A：Gate Charge Test Circuit and Waveform

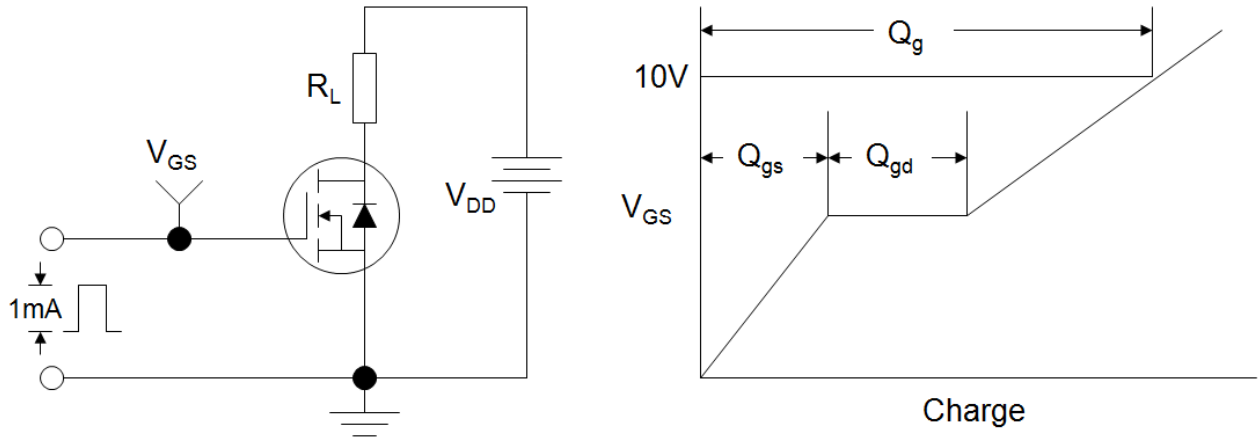


Figure B：Resistive Switching Test Circuit and Waveform

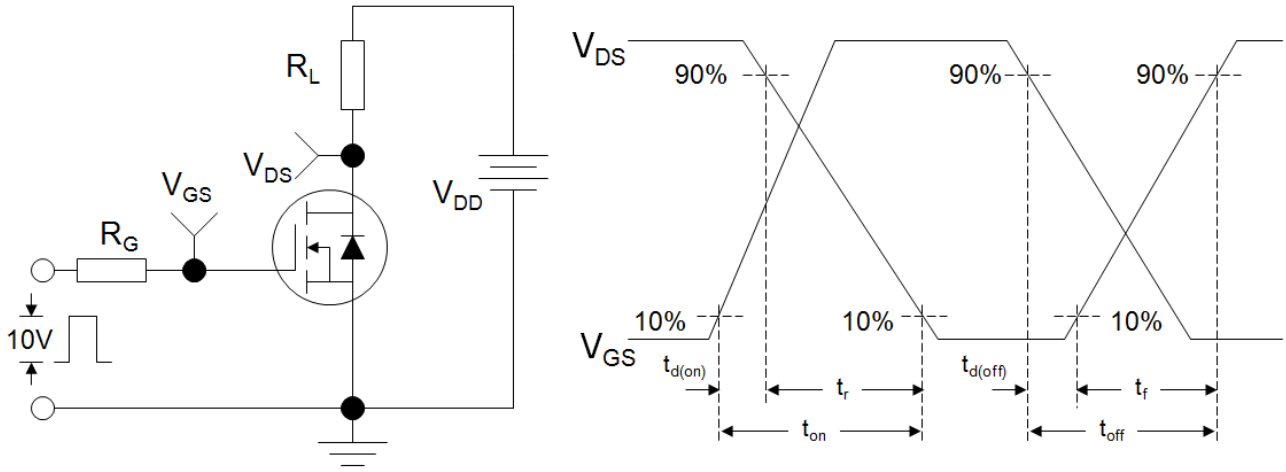
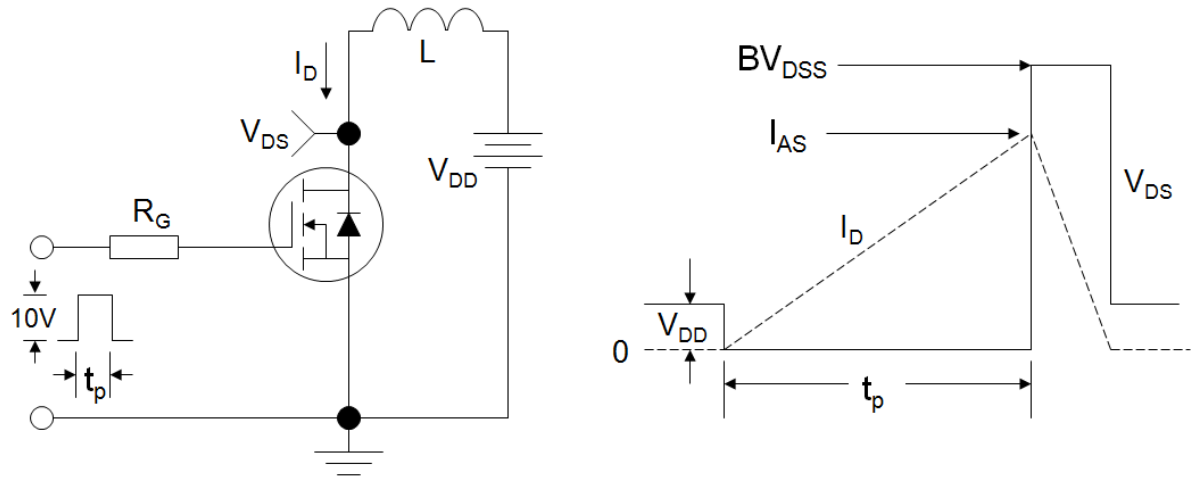


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



●Dimensions（TO-220F1）

UNIT:mm

SYMBOL	min	max	SYMBOL	min	max
A	4.40	4.90	B1	2.90	3.70
A1	2.40	3.00	e	2.40	2.70
A2	2.30	3.00	e1	4.95	5.25
b	0.60	0.90	L	12.40	14.20
b1	1.10	1.70	L1	2.40	3.40
c	0.40	0.70	⌀P	2.90	3.50
D	9.80	10.60			
B	15.40	16.40