

•General Description

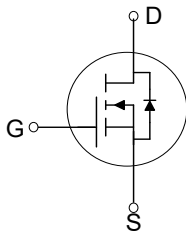

The SJ MOSFET LH65R190FD has the low $R_{DS(on)}$, low gate charge, fast switching and excellent avalanche characteristics. This device offers extremely fast and robust body diode, and is suitable for telecom and power supplies.

•Features

- Much lower $R_{on} \cdot A$ performance for On-state efficiency
- Much lower FOM for fast switching efficiency

•Application

- LED/LCD/PDP TV and monitor Lighting
- Solar/Renewable/UPS-Micro Inverter System
- Power Supplies

	$V_{DS} = 650V$ $R_{DS(ON)} = 190m\Omega$ $I_D = 18A$
	■ RoHS COMPLIANT TO-247

•Ordering Information:

Part number	LH65R190FD
Package	TO-247
Basic ordering unit (pcs)	450
Normal Package Material Ordering Code	LH65R190FDT2-TO247-TU
Halogen Free Ordering Code	LH65R190FDT2-TO247-TU-HF

•Absolute Maximum Ratings (TC = 25°C)

PARAMETER	SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	650	V
Gate-Source Voltage	V_{GS}	± 25	V
Continuous Drain Current	I_D	TC = 25°C	18
		TC = 100°C	11
Pulsed drain current (TC = 25°C, tp limited by Tjmax) ¹	I_D pulse	54	A
Single Pulse Avalanche Energy ¹	E_{AS}	3.5	A
Single Pulse Avalanche Energy ²	E_{AS}	78	mJ
Repetitive Avalanche Energy ¹	E_{AR}	0.7	mJ
Power Dissipation (TC=25°C)	P_D	110	W
Operating Temperature and Storage Temperature Range	T_J/T_{STG}	-55~+150	°C
Reverse Diode dv/dt ³	dv/dt	50	V/ns
Maximum Diode Commutation Speed ³	di/dt	900	A/ns

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.5	--	4.5	V
Drain-source On Resistance ³	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 7.5A$	--	0.16	0.19	Ω
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V, T_J = 25^\circ C$	--	--	1	μA
		$V_{DS} = 650V, V_{GS} = 0V, T_J = 125^\circ C$	--	--	100	
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 25V$	--	--	± 100	nA
Forward Transconductance ³	R_G	f=1.0MHz open drain	--	--	12	Ω
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 100V$ f = 1.0MHz	--	1550	--	pF
Output Capacitance	C_{oss}		--	30	--	
Reverse transfer Capacitance	C_{rss}		--	3.7	--	
Turn-on delay time	$T_d(on)$	$V_{DD} = 400V,$ $I_D = 20A$ $R_G = 25\Omega$	--	34	--	nF
Rise time	T_r		--	32	--	
Turn -Off Delay Time	$T_d(off)$		--	114	--	
Fall time	T_f		--	6.1	--	
Total Gate Charge	Q_g	$I_D = 20A,$ $V_{DS} = 520V$ $V_{GS} = 10V$	--	29.3	---	nC
Gate-to-Source Charge	Q_{gs}		--	10	--	
Gate-to-Drain Charge	Q_{gd}		--	17	---	
Continuous Diode Forward Current	I_S		--	--	18	A
Pulsed Diode Forward Current	I_{SM}		--	--	54	A
Diode Forward Voltage	V_{SD}	$T_J = 25^\circ C, I_S = 20A$ $V_{GS} = 0V$	--	0.9	1.2	V
Reverse Recovery Time	trr	$V_{RR} = 400V,$ $I_f = I_S$ $di_F/dt = 100A/\mu s$	--	112	--	ns
Reverse Recovery Charge	Q_{rr}		--	1.58	--	μC
Peak Reverse Recovery Current	I_{RRM}		--	15.6	--	A

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	R_{thJC}	1.14	$^\circ C/W$
Thermal Resistance Junction-ambient	R_{thJA}	62	$^\circ C/W$

Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $I_{AS} = 2.8A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ C$
3. Pulse Test : Pulse width $\leq 300\mu s, \text{Duty cycle } \leq 2\%$

● **Typical Characteristics** $T_J=25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

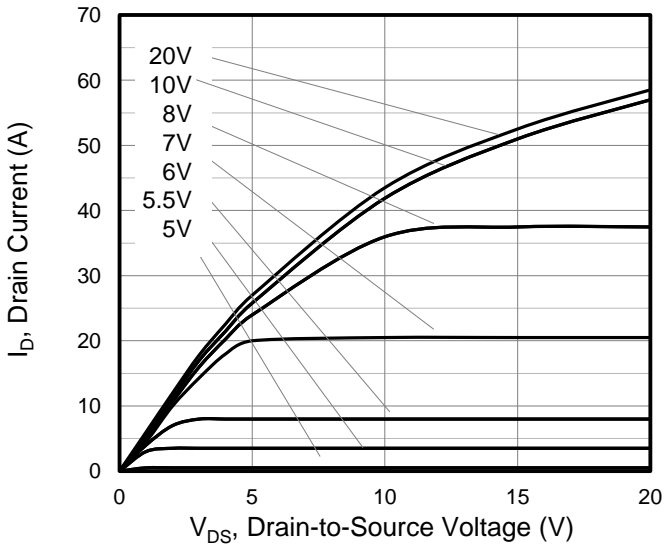


Figure 2. Transfer Characteristics

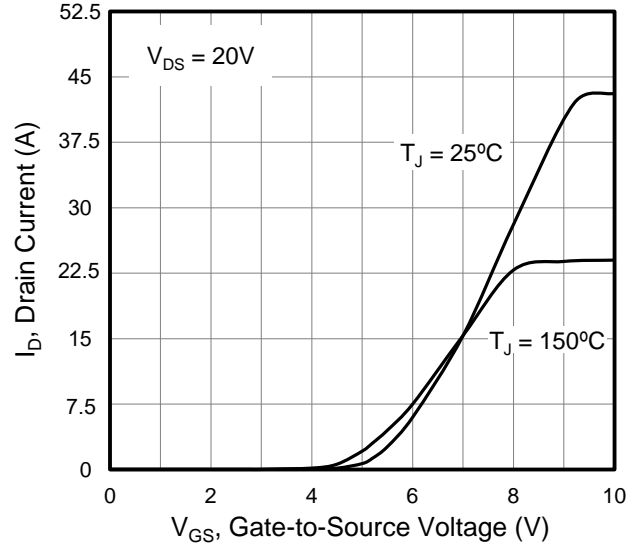


Figure 3. On-Resistance vs. Drain Current

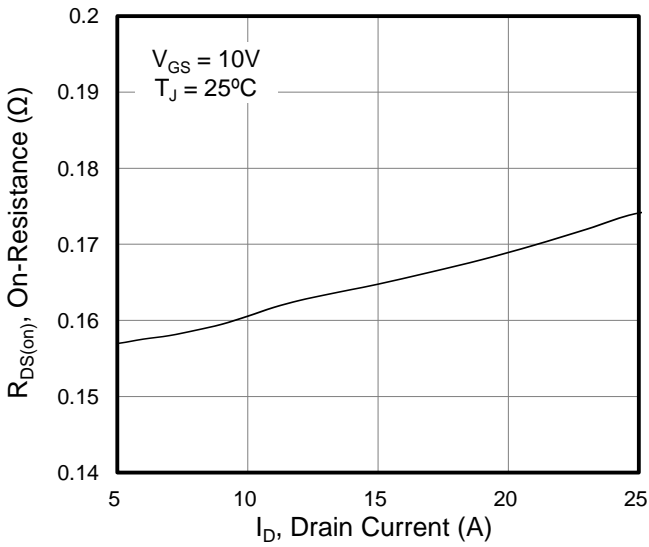


Figure 4. Capacitance

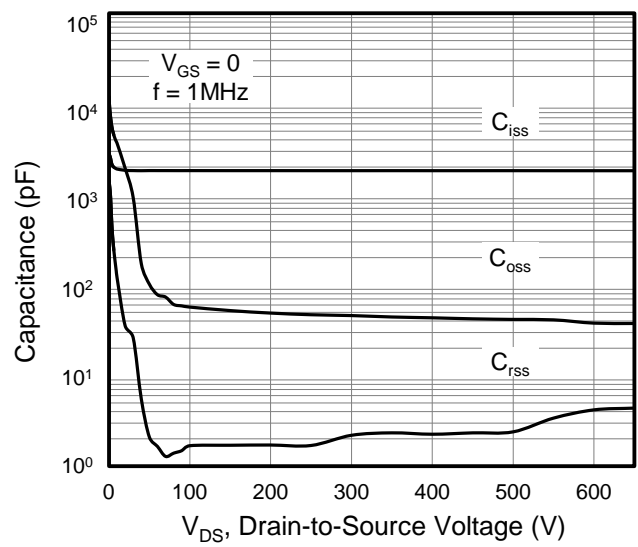


Figure 5. Gate Charge

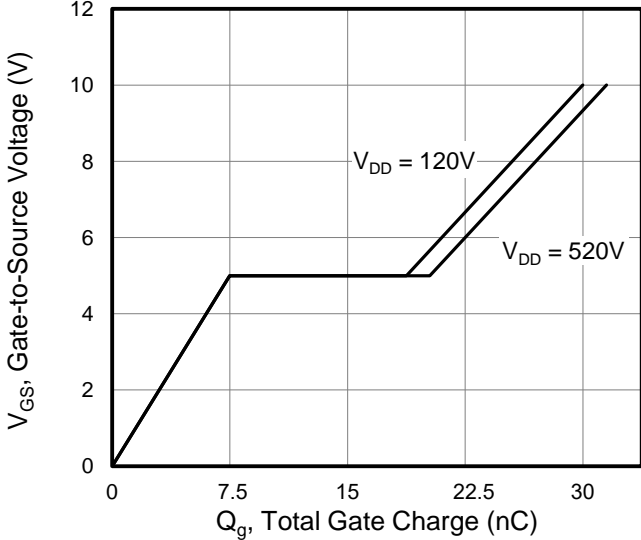
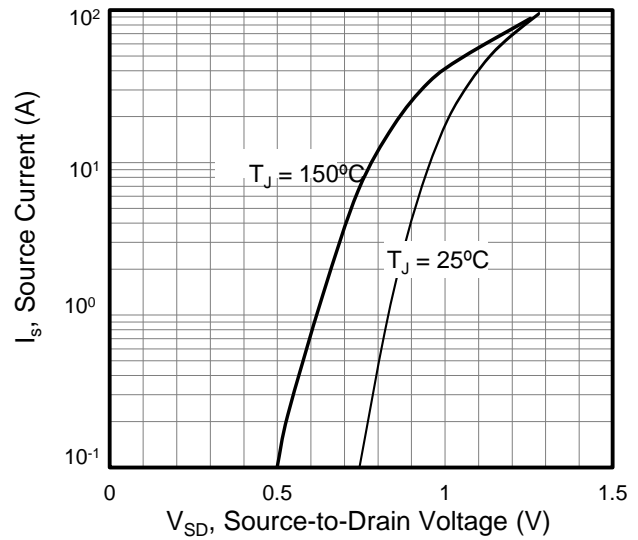


Figure 6. Body Diode Forward Voltage



• Typical Characteristics (Cont.)

Figure 7. On-Resistance vs. Junction Temperature

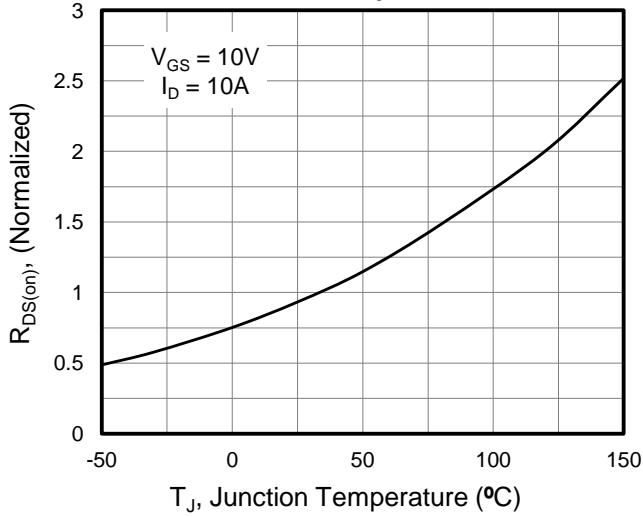


Figure 8. Breakdown voltage vs. Junction Temperature

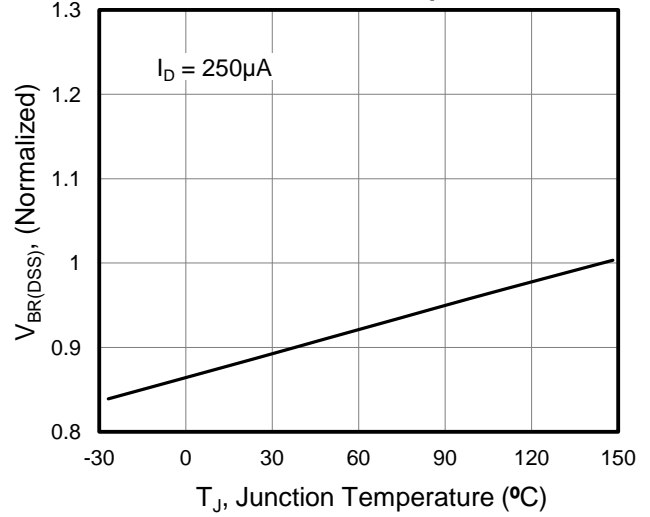


Figure 9. Transient Thermal Impedance

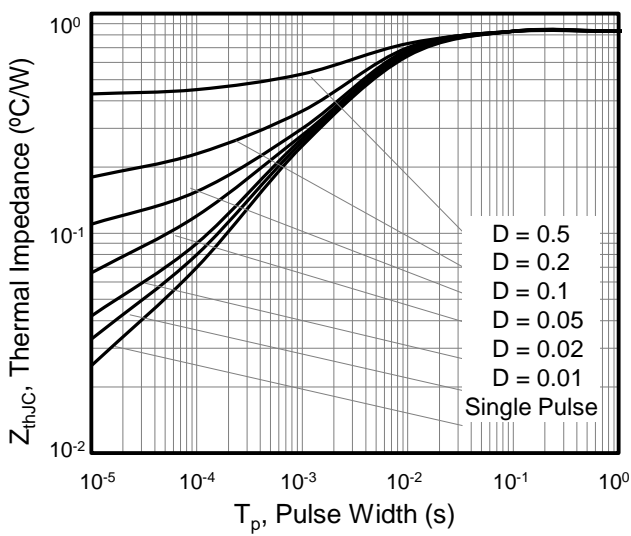
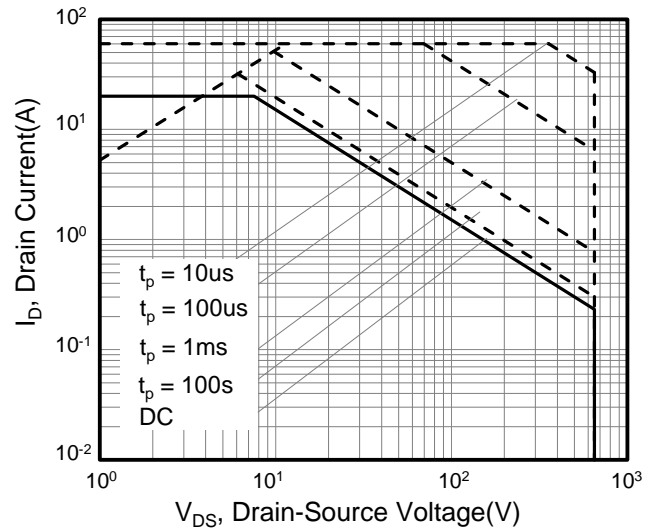


Figure 10. Safe operation area



• Test Circuit and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

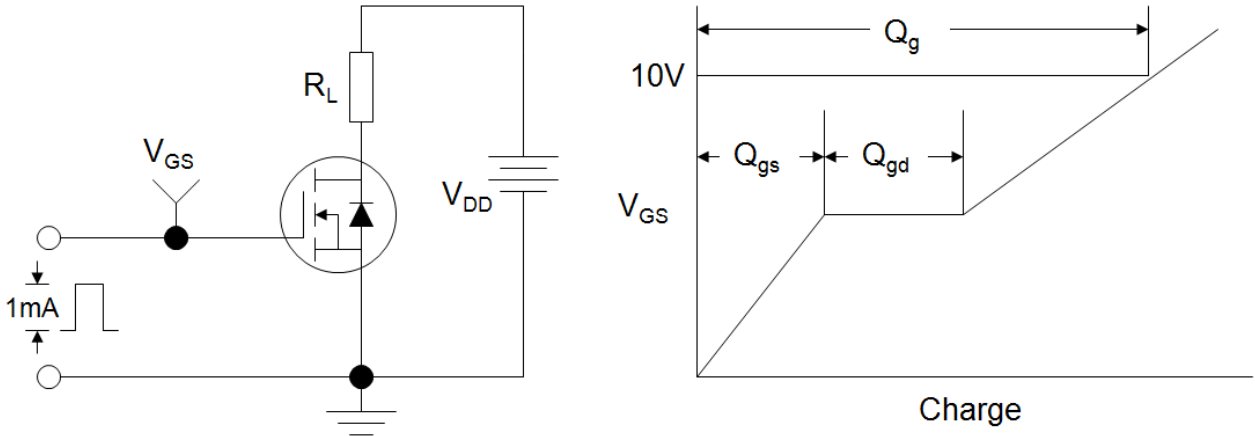


Figure B: Resistive Switching Test Circuit and Waveform

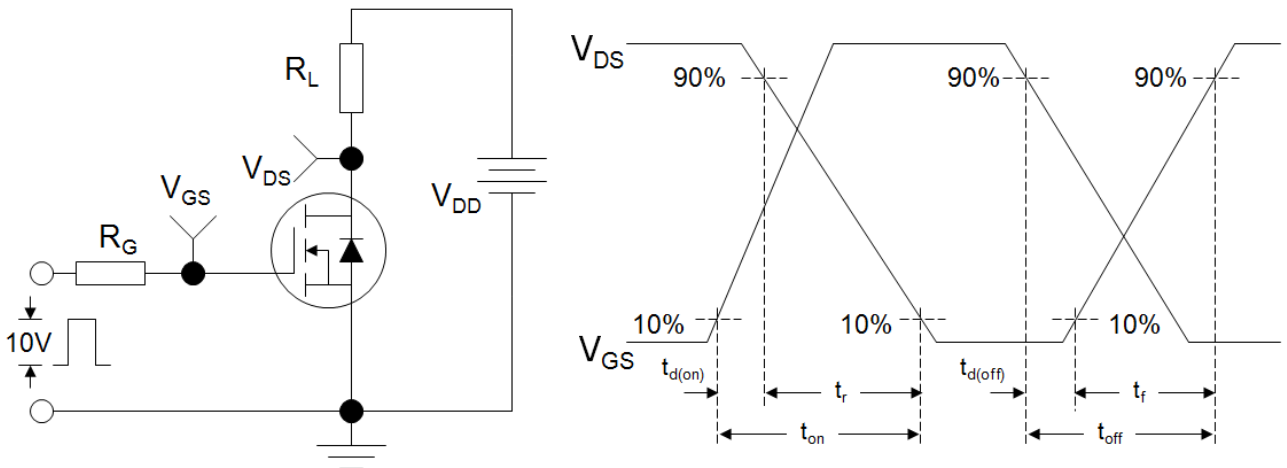
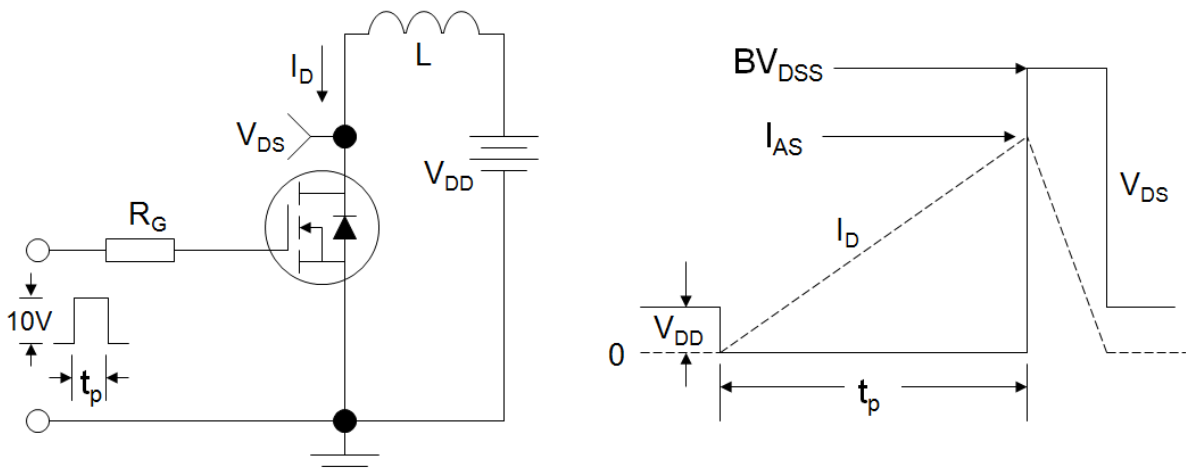


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



•Dimensions (TO-247)

UNIT:mm

SYMBOL	min	max	SYMBOL	min	max
A	15.60	16.00	G2	1.95	2.25
B	20.80	21.20	N	5.25	5.65
C	4.85	5.15	L1	4.00	4.30
D	1.85	2.15	L	19.60	20.40
E	1.00	1.40	I	2.30	2.50
F	0.50	0.70	ΦP	3.30	3.70
G1	3.00	3.30			

