

N-Channel Power MOSFET
•General Description

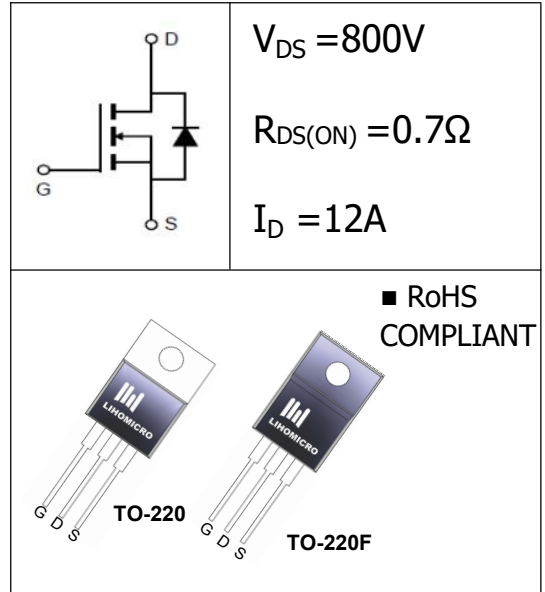
The Power MOSFET LH12N80 has the low $R_{DS(on)}$, low gate charge, fast switching and excellent avalanche characteristics. This device offers extremely fast and robust body diode, and is suitable for telecom and power supplies.

•Features

- Low Thermal Resistance
- Fast Switching
- High Input Resistance

•Application

- LED/LCD/TV and monitor Lighting
- Power Supplies


•Ordering Information:

Part number	LH12N80	LH12N80
Package	TO-220F	TO-220
Basic ordering unit (pcs)	1000	1000
Normal Package Material Ordering Code	LH12N80F-TO220F-TU	LH12N80T-TO220-TU
Halogen Free Ordering Code	LH12N80F-TO220F-TU -HF	LH12N80T-TO220-TU -HF

•Absolute Maximum Ratings (TC =25℃)

PARAMETER		SYMBOL	Value		UNIT
Drain-Source Breakdown Voltage		BV _{DSS}	800		V
Gate-Source Voltage		V _{GS}	±30		V
Continuous Drain Current	TC = 25°C	I _D	12		A
	TC = 100°C		7.5		
Pulsed drain current (TC = 25°C, tp limited by Tjmax) ¹		I _{DM}	40		A
Single Pulse Avalanche Energy ²		E _{AS}	1400		mJ
Power Dissipation(TC=25°C)		P _D	TO-220F: 43	TO-220: 150	W
Junction Temperature		T _J	-55~+150		°C
Storage Temperature		T _{STG}	-55~+150		°C
Reverse Diode dv/dt(I _{sd} ≤10A,T _j =25°C)		dv/dt	5.0		V/nS

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	800	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	V
Drain-source On Resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A$	--	0.7	0.9	Ω
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800V, V_{GS}=0V, T_J=25^\circ C$	--	--	20	μA
		$V_{DS}=680V, V_{GS}=0V, T_J=125^\circ C$	--	--	200	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30$	--	--	± 10	μA
Forward Transconductance ³	g_{fs}	$V_{DS}=40V, I_D=7A$	--	16	--	S
Input Capacitance	C_{iss}	$V_{GS}=0V,$ $V_{DS}=25V$ $f=1.0MHz$	--	2660	--	pF
Output Capacitance	C_{oss}		--	200	--	
Reverse transfer Capacitance	C_{rss}		--	13	--	
Turn-Off Delay Time	$T_d(off)$	$V_{DD}=400V, I_D=10A, R_G=24\Omega$	--	53	--	nS
Total Gate Charge	Q_g	$I_D=10A,$ $V_{DS}=640V$ $V_{GS}=10V$ 3	--	52	---	nC
Gate-to-Source Charge	Q_{gs}		--	12	--	
Gate-to-Drain Charge	Q_{gd}		--	18	---	
Continuous Diode Forward Current	I_S		--	--	12	A
Pulsed Diode Forward Current	I_{SM}		--	--	48	A
Diode Forward Voltage ³	V_{SD}	$T_J=25^\circ C, I_S=1A$ $V_{GS}=0V$	--	--	1.4	V
Reverse Recovery Time	t_{rr}	$I_f=I_S$ $di_F/dt=100A/\mu s$ 3	--	489	--	ns
Reverse Recovery Charge	Q_{rr}		--	8.4	--	μC

●Thermal Characteristics

PARAMETER	SYMBOL	MAX		UNIT
		TO-220F	TO-220	
Thermal Resistance Junction-case	R_{thJC}	2.9	0.84	$^\circ C/W$
Thermal Resistance Junction-ambient	R_{thJA}	62.5	62.5	$^\circ C/W$

Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $I_{AS}=10A, V_{DD}=50V, R_G=25\Omega, L=10Mh$, Starting $T_J=25^\circ C$
3. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

• **Typical Characteristics**

Fig1 Typical Output Characteristics, $T_c=25^\circ\text{C}$

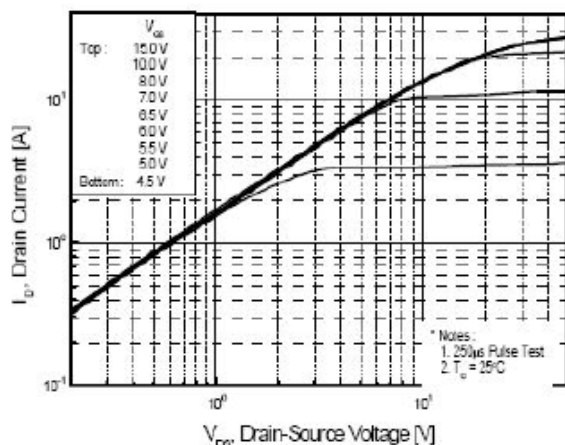


Fig2 On-Resistance Vs. Drain Current and Gate Voltage

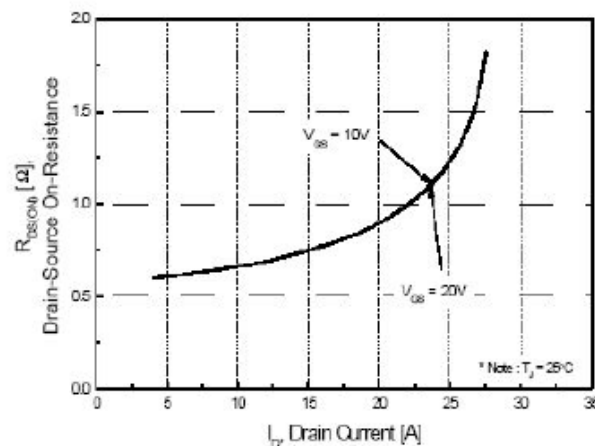


Fig3 Normalized On-Resistance Vs. Temperature

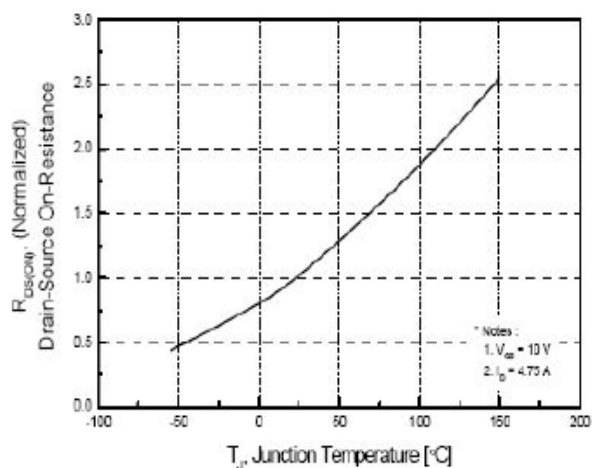


Fig4 Typical Source-Drain Diode Forward Voltage

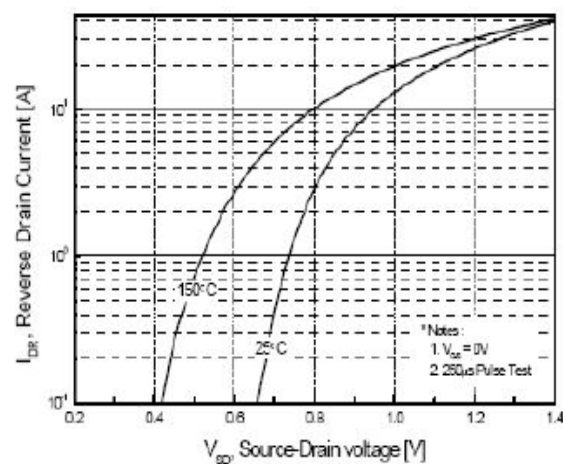
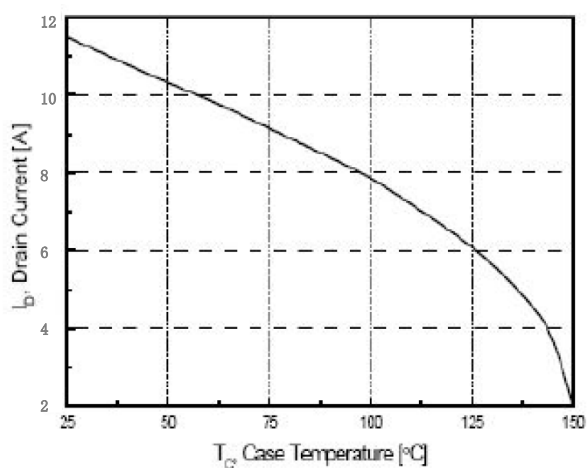


Fig5 Maximum Drain Current Vs. Case Temperature



• **Typical Characteristics**(cont.)

Fig6-1 Maximum Safe Operating Area

TO-220

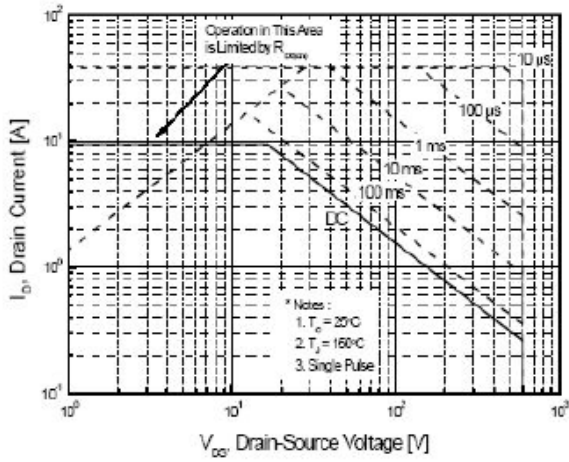
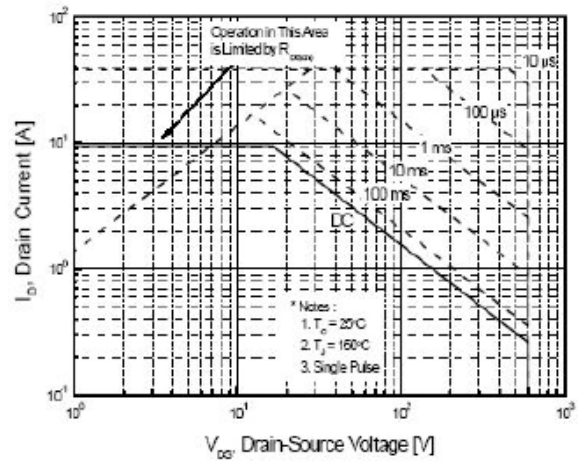


Fig6 -2Maximum Safe Operating Area

TO-220F



• **Test Circuit and Waveform**

Figure A: Gate Charge Test Circuit and Waveform

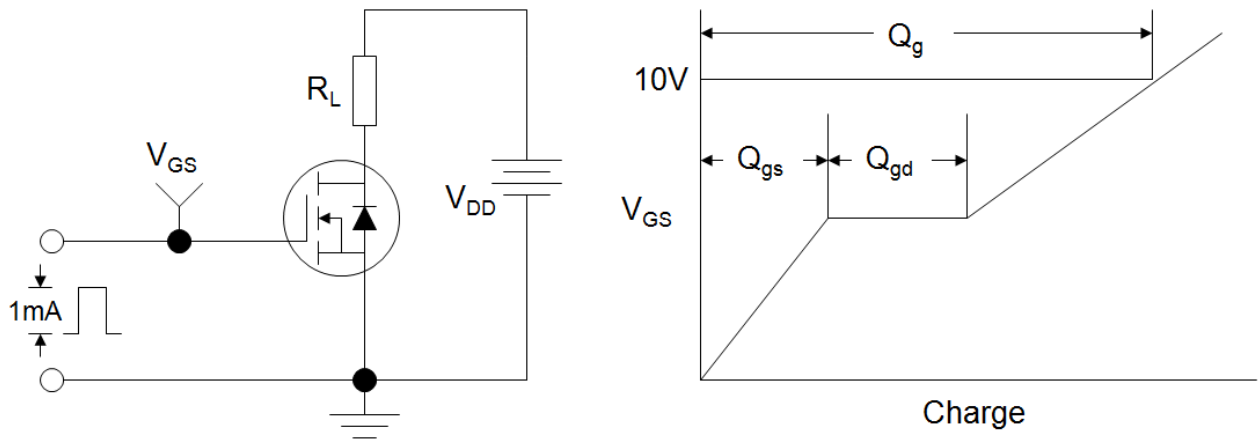


Figure B: Resistive Switching Test Circuit and Waveform

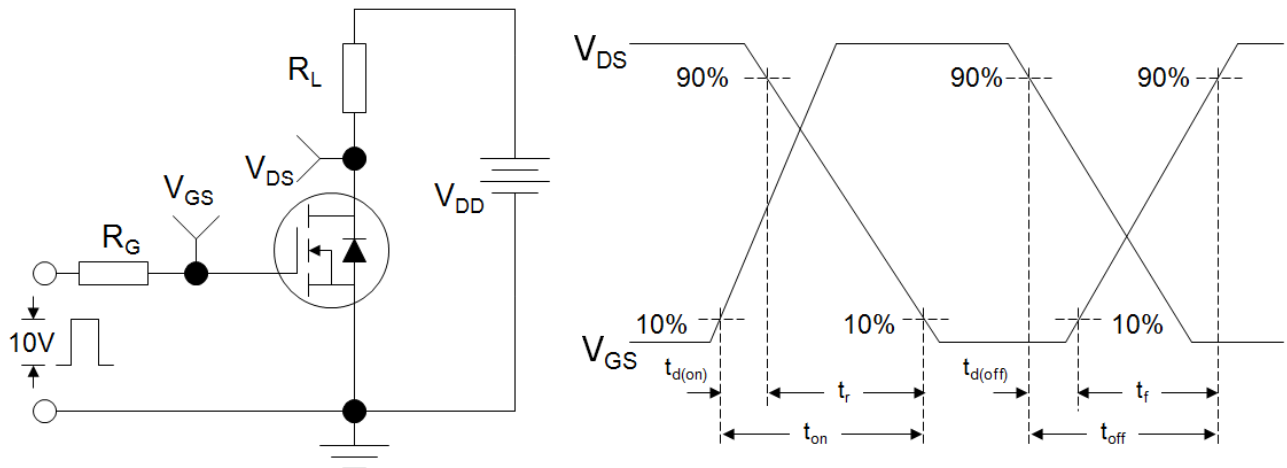
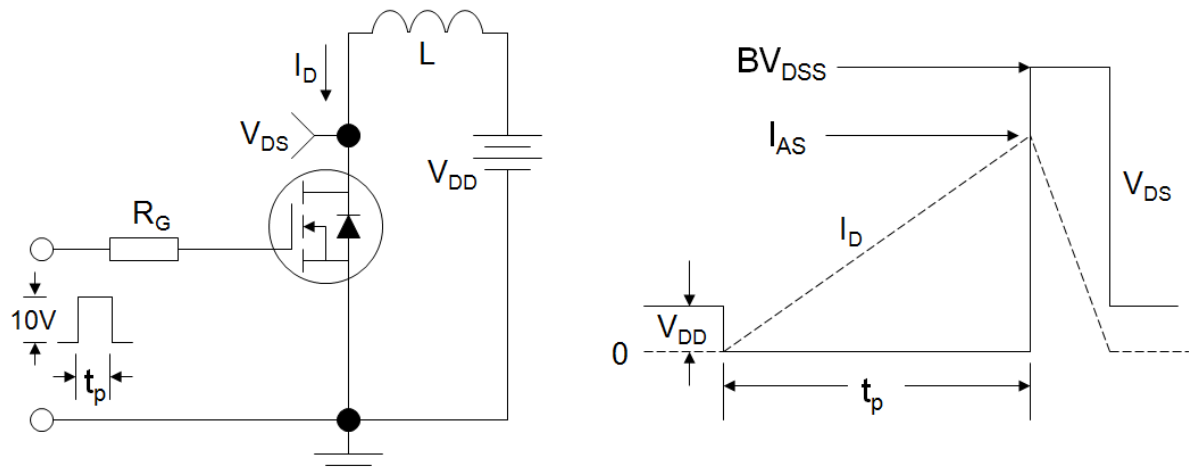


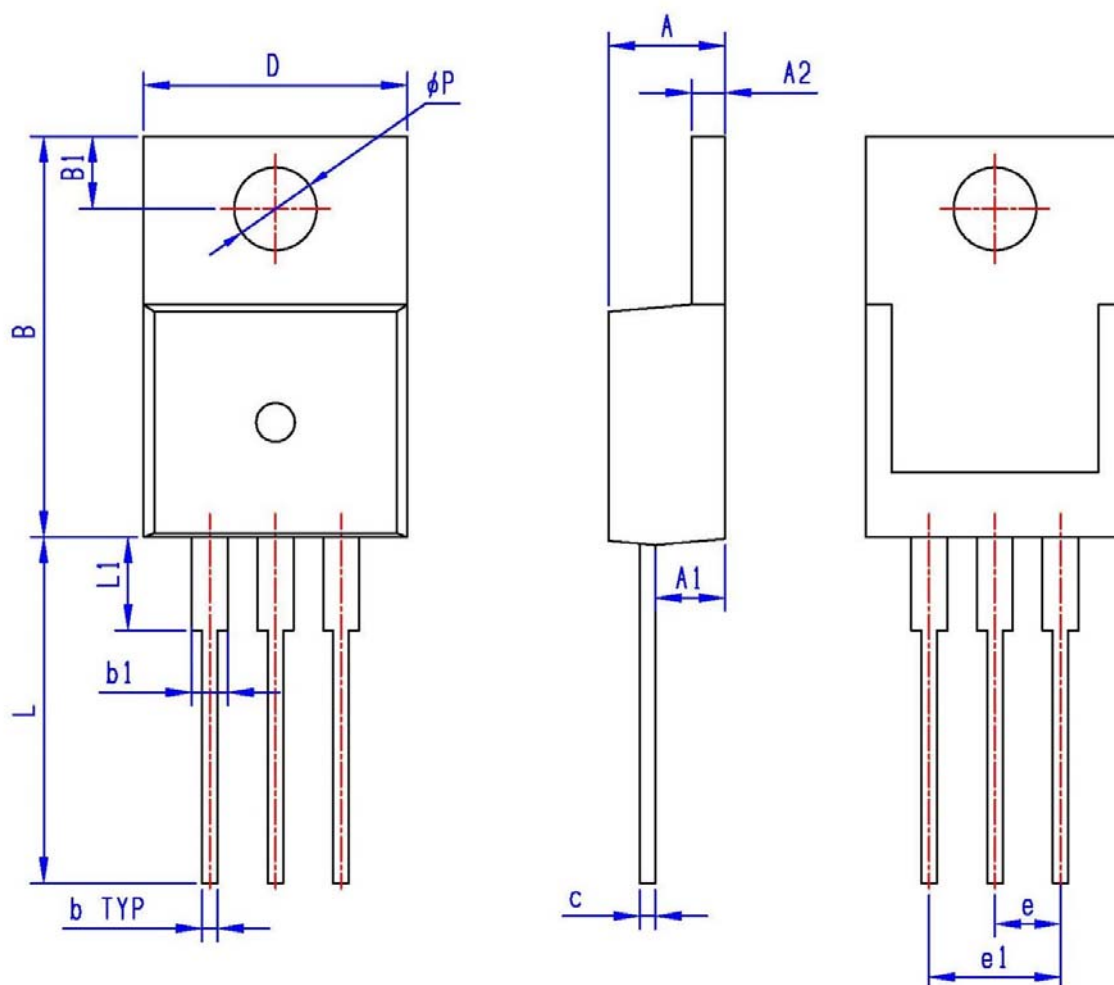
Figure C: Unclamped Inductive Switching Test Circuit and Waveform



●Dimensions (TO-220)

UNIT:mm

SYMBOL	min	max	SYMBOL	min	max
A	4.25	4.85	B1	2.60	3.00
A1	2.30	3.00	e	2.40	2.70
A2	1.20	1.40	e1	4.95	5.25
b	0.60	0.90	L	12.60	14.40
b1	1.10	1.70	L1	2.40	4.00
c	0.40	0.70	∅P	3.50	3.90
D	9.80	10.60			
B	15.20	16.20			



●Dimensions (TO-220F)

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	øP	2.90	3.50
D	9.80	10.60			
B	15.40	16.40			

