

●General Description

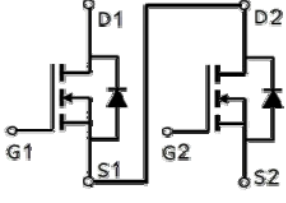
The LH3020 uses trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. This device is suitable for high current load applications.

●Features

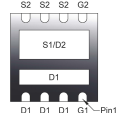
- Advance high cell density trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching

●Application

- Lighting
- Power Supplies
- PD Fast Charging



$V_{DS1} = 30V$
 $R_{DS(ON)1} = 8m\Omega$
 $ID_1 = 30A$
 $V_{DS2} = 30V$
 $R_{DS(ON)2} = 8m\Omega$
 $ID_2 = 30A$

■ RoHS COMPLIANT

1 : G1
2,3,4 : D1
5,6,7 : S2
8 : G2
9 : S1/D2

TDFN3*3L

●Ordering Information:

Part Number	LH3020
Package	TDFN3*3L
Basic Ordering Unit (pcs)	5000
Normal Package Material Ordering Code	LH3020TD3L-TDFN3*3L-TAP
Halogen Free Ordering Code	LH3020TD3L-TDFN3*3L-TAP-HF

●Absolute Maximum Ratings (TC = 25°C)

PARAMETER	SYMBOL	VALUE	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, $T_C = 25^\circ C$	I_D	30	A
Pulsed drain current ($T_C = 25^\circ C$, t_p limited by T_{jmax})	I_{DM}	36	A
Single Pulse Avalanche Energy ¹	E_{AS}	65	mJ
Power Dissipation ³	$P_D(T_C=25^\circ C)$	20	W
	$P_D(T_A=25^\circ C)$	0.65	W
Avalanche Current	I_{AS}	12	A
Storage Temperature	T_{STG}/T_J	-55~+150	°C

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	--	--	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, $I_D=1mA$	--	0.034	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	--	3.0	V
Drain-source On Resistance ²	$R_{DS(ON)}$	$V_{GS}=10V, I_D=15A$	--	8	11	mΩ
		$V_{GS}=4.5V, I_D=15A$	--	10	13	
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ C$	--	--	1	μA
		$V_{DS}=30V, V_{GS}=0V, T_J=55^\circ C$	--	--	5	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	±100	nA
Forward Transconductance	G_{FS}	$V_{DS}=5V, I_D=12A$	--	4	--	S
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	--	0.9	--	Ω
Input Capacitance	C_{iss}	$V_{GS}=0V,$ $V_{DS}=15V,$ $f=1.0MHz$	--	700	--	pF
Output Capacitance	C_{oss}		--	120	--	
Reverse transfer Capacitance	C_{rss}		--	35	--	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=15V,$ $V_{GS}=10V,$ $R_G=3.0\Omega,$ $I_D=1A$	--	14	--	nS
Turn-Off Delay Time	$T_{d(off)}$		--	43	--	
Turn-On Rise Time	T_r		--	12	--	
Turn-Off Fall Time	T_f		--	4	--	
Total Gate Charge	Q_g	$I_D=10A,$ $V_{DS}=15V,$ $V_{GS}=4.5V$	--	11	--	nC
Gate-to-Source Charge	Q_{gs}		--	5	--	
Gate-to-Drain Charge	Q_{gd}		--	5	--	
Diode Forward Voltage	V_{SD}	$T_J=25^\circ C, I_S=1A,$ $V_{GS}=0V$	--	--	1.2	V

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case ³	R_{thJC}	6.25	°C/W
Thermal Resistance Junction-ambient ³	R_{thJA}	62	°C/W

Notes:

1. The EAS data shows Max. rating. The Test condition is $L=0.5mH, R_G=25\Omega, V_{DD}=15V, V_{GS}=10V$;
2. The data tested by Pulsed, Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper;

● **Typical Characteristics**

Fig.1 Typical Output Characteristics

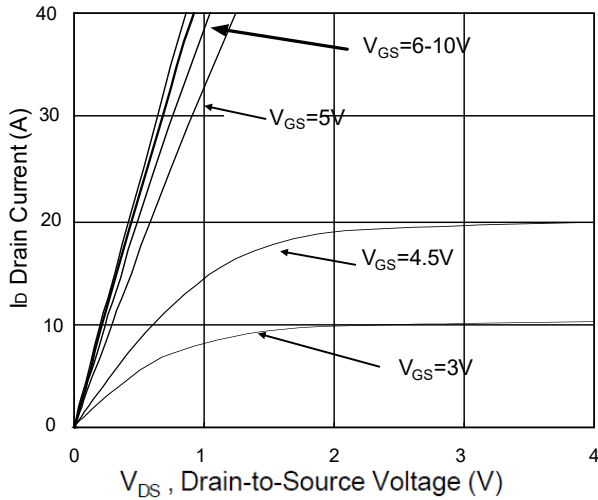


Fig.2 On-Resistance vs G-S Voltage

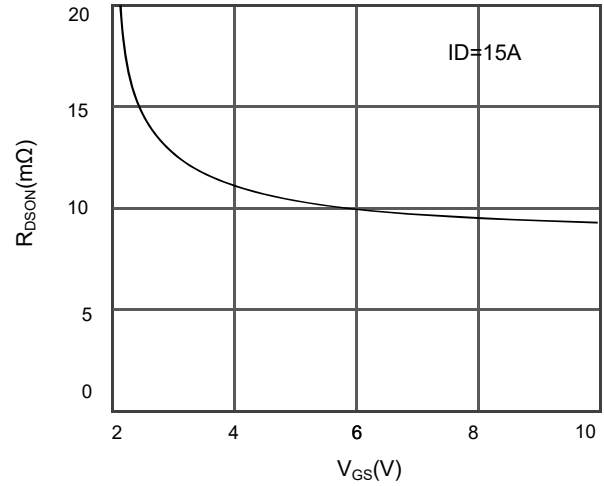


Fig.3 Source Drain Forward Characteristics

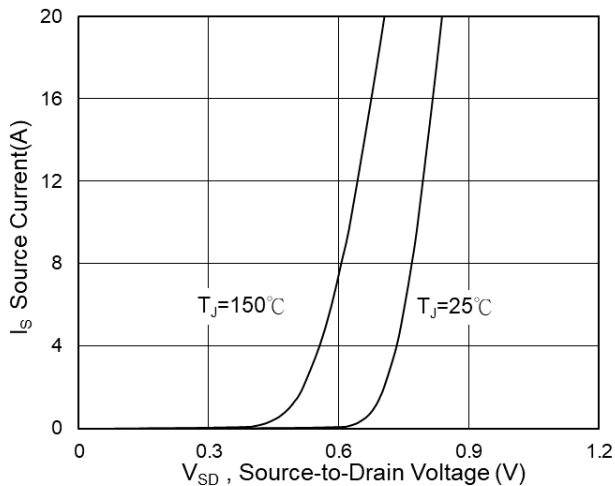


Fig.4 Gate-Charge Characteristics

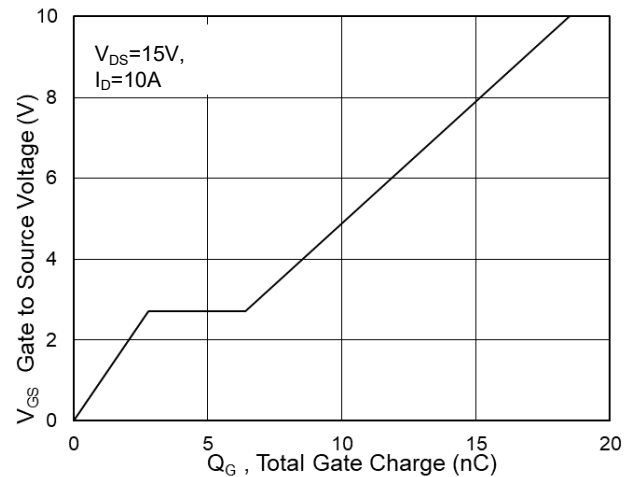


Fig.5 Normalized VGS(th) vs TJ

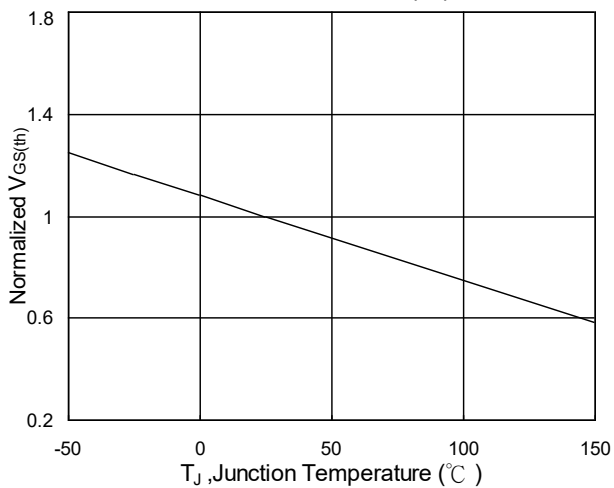
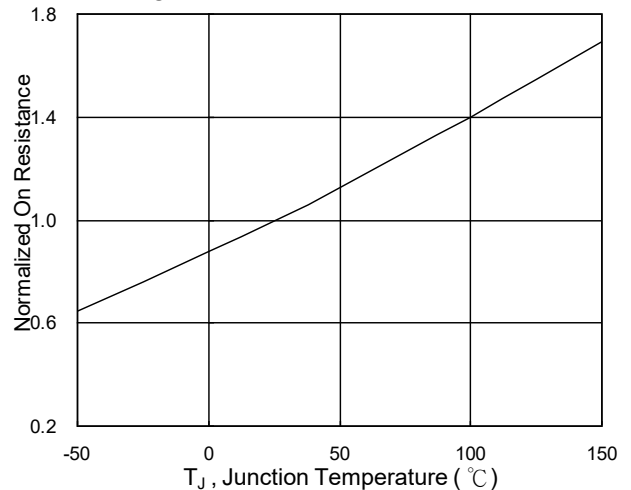


Fig.6 Normalized RDSON vs TJ



● **Typical Characteristics(cont.)**

Fig.7 Capacitance

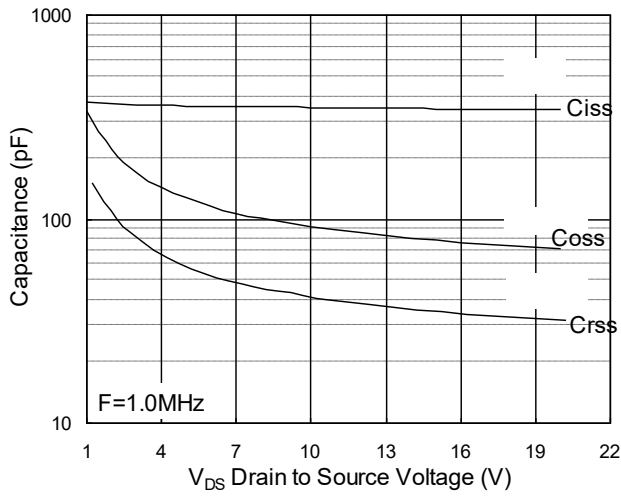


Fig.8 Safe Operating Area

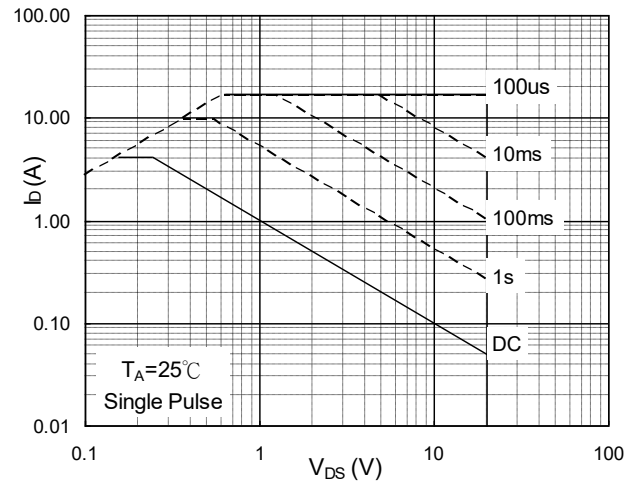


Fig.9 Normalized Maximum Transient Thermal Impedance

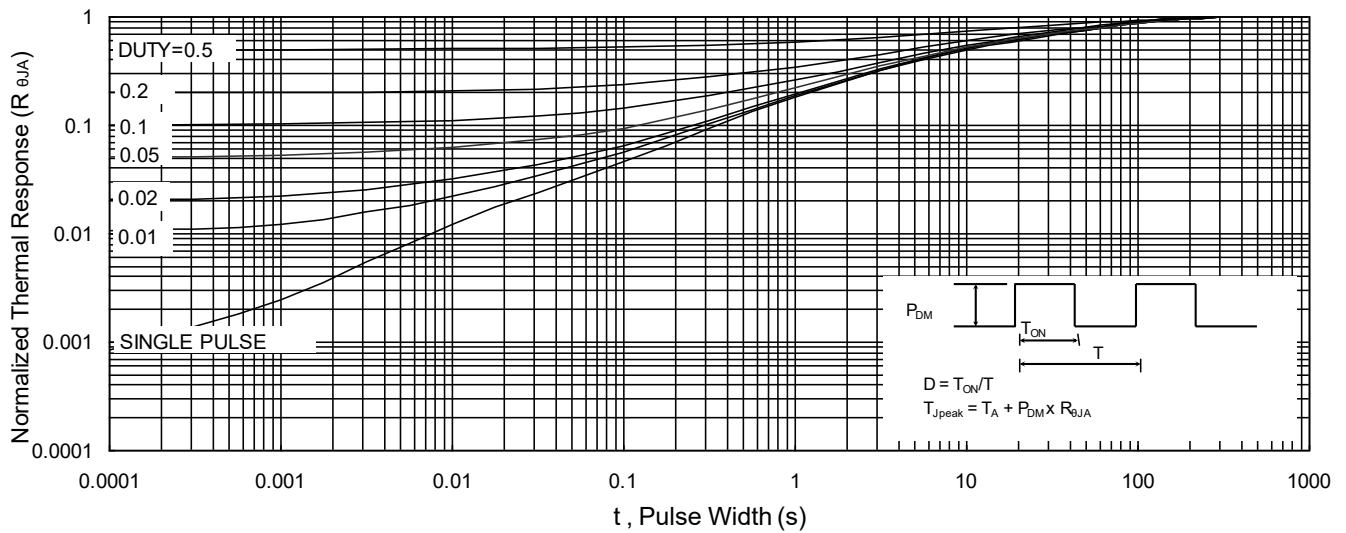


Fig.10 Switching Time Waveform

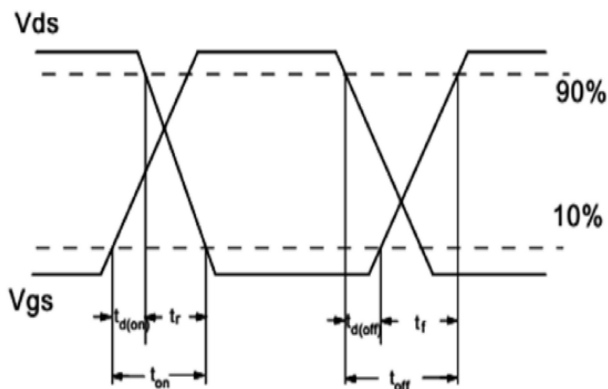
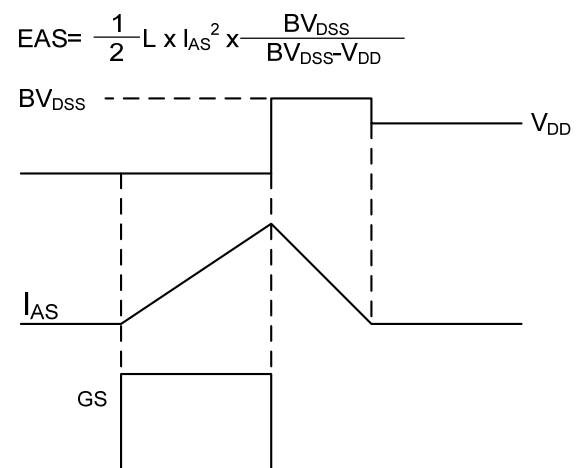


Fig.11 Unclamped Inductive Waveform



$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

•Dimensions (TDFN3*3L)

Unit: mm

SYMBOL	min	max	SYMBOL	min	max
A	0.68	0.82	H1	0.40	0.65
B	0.27	0.32	H2	0.20	0.50
C	0.14	0.26	H3	0.10	0.40
D	2.90	3.10	e	0.65BSC	
E	2.90	3.10	L	2.25	2.55
F	0.25	0.35			
H	0.85	1.15			

