

• General Description

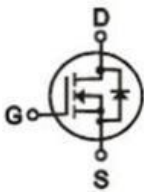
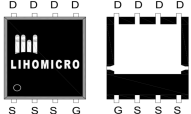
The N-Channel MOSFET LH04N03 has the low $R_{DS(on)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is suitable for fast charge and lighting.

• Features

- ✓ Advance high cell density Trench technology
- ✓ Low $R_{DS(on)}$ to minimize conductive loss
- ✓ Low Gate Charge for fast switching
- ✓ Low Thermal resistance

• Application

- ✓ Led Driver
- ✓ PD Charger
- ✓ POL application
- ✓ BLDC Motor driver

	$V_{DS} = 30V$ $R_{DS(ON)} = 4.0m\Omega$ $I_D = 70A$
	■ RoHS COMPLIANT DFN5*6

• Ordering Information:

Part number	LH04N03
Package	DFN3*3
Basic ordering unit (pcs)	5000
Normal Package Material Ordering Code	LH04N03N-DFN5*6-TAP
Halogen Free Ordering Code	LH04N03N-DFN5*6-TAP-HF

• Absolute Maximum Ratings ($T_c = 25^\circ C$)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ C$)	I_D	70	A
Pulsed Drain Current ¹	I_{DM}	140	A
Total Power Dissipation ($T_C = 25^\circ C$)	$P_D @ T_C = 25^\circ C$	40	W
Total Power Dissipation ($T_A = 25^\circ C$)	$P_D @ T_A = 25^\circ C$	2.4	W
Operating Junction Temperature	T_J	-55 to 150	$^\circ C$
Storage Temperature	T_{STG}	-55 to 150	$^\circ C$
Single Pulse Avalanche Energy ²	E_{AS}	45	mJ

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	3.1	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	33	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	°C

●Electronic Characteristics

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	1.0	-	2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1.0	μA
Gate- Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 10A$	-	4.0	5.0	m Ω
		$V_{GS} = 4.5V, I_D = 10A$	-	5.0	8.0	m Ω
Forward Transconductance	g_{FS}	$V_{DS} = 25V, I_D = 10A$	-	15	-	S
Gate Resistance	R_G	$f = 1MHz$	-	2.2	-	Ω
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 1A$	-	-	1	V

●Dynamic

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	$f = 1MHz$	-	1060	-	pF
Output capacitance	C_{oss}		-	220	-	
Reverse transfer capacitance	C_{rss}		-	140	-	
Turn-On Delay Time	$T_d(on)$	$V_{DS} = 15V$ $R_G = 3.3\Omega$ $V_{GS} = 10V$	-	20.2	-	nS
Turn-Off Delay Time	$T_d(off)$		-	37.7	-	
Turn-On Rise Time	T_r		-	42	-	
Turn-Off Fall Time	T_f		-	10	-	
Total gate charge	Q_g	$V_{DD} = 25V$ $I_D = 8A$ $V_{GS} = 10V$	-	17	-	nC
Gate - Source charge	Q_{gs}		-	5	-	
Gate - Drain charge	Q_{gd}		-	8	-	

Note:

- 1.Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$;
2. $I_{AS} = 30A$, $V_{DD} = 15V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

•Typical Characteristics

Fig.1 On Resistance VS. Junction Temperature

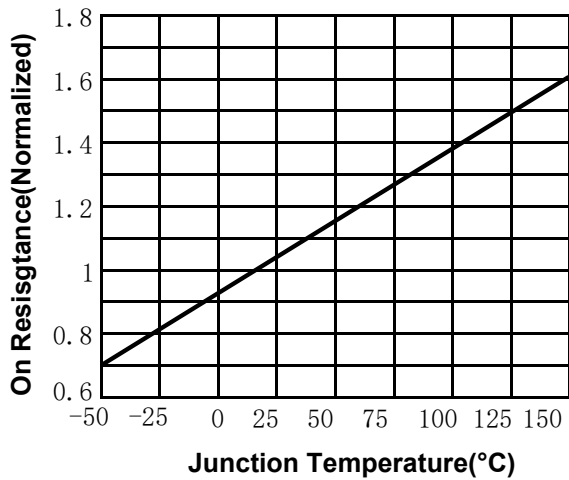


Fig.2 On Resistance VS. Gate to Source Voltage

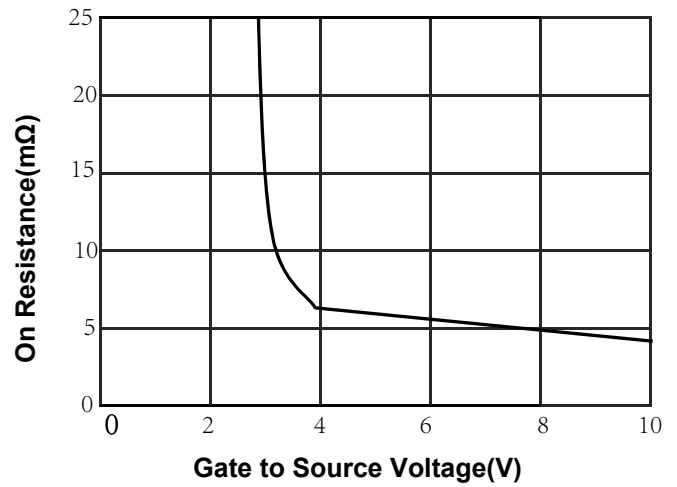


Fig.3 Threshold Voltage VS. Junction Temperature

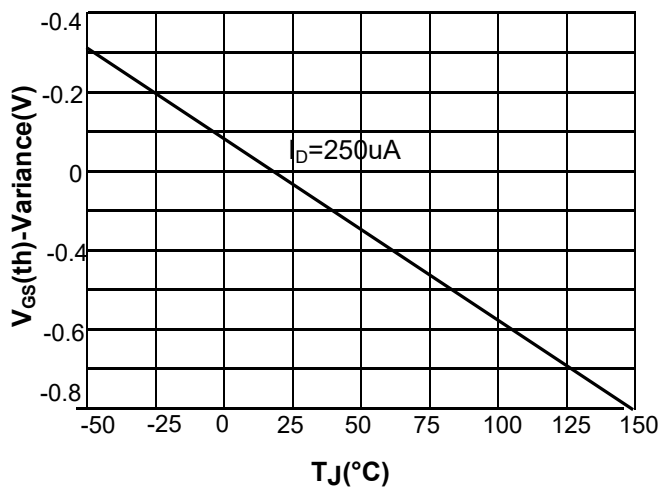


Fig.4 Resistance VS. Drain Current

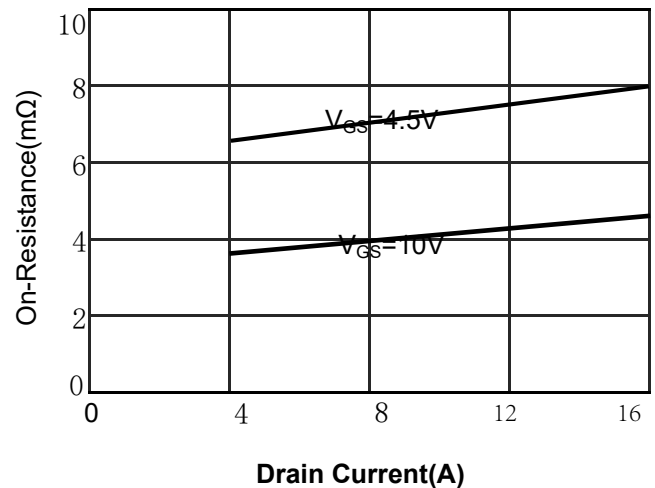


Fig.5 Capacitance

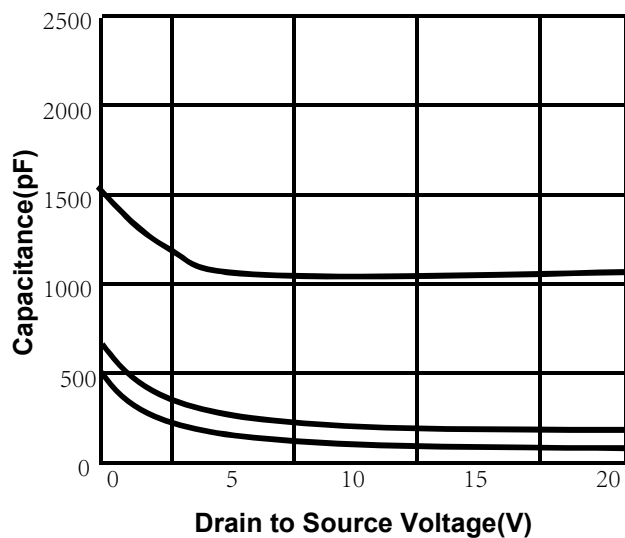
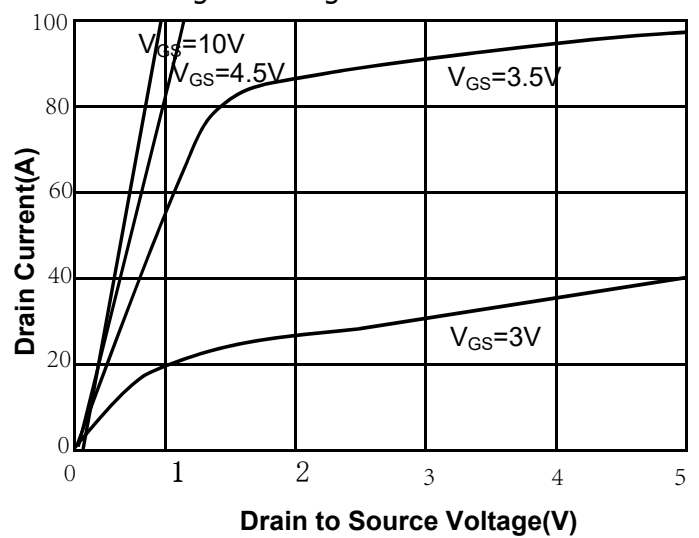


Fig.6 On-Region Characteristics



• **Test Circuits & Waveforms**

Fig.7 Switching Time Measurement Circuit

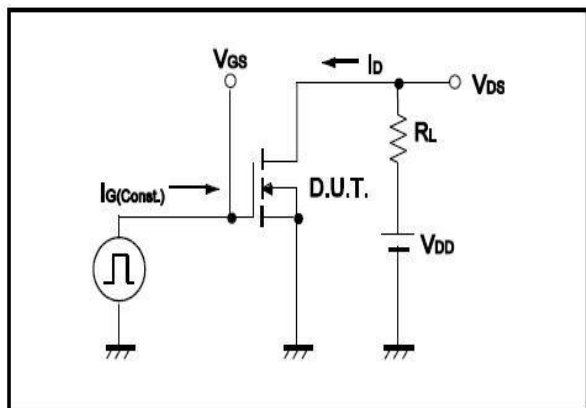


Fig.8 Gate Charge Waveform

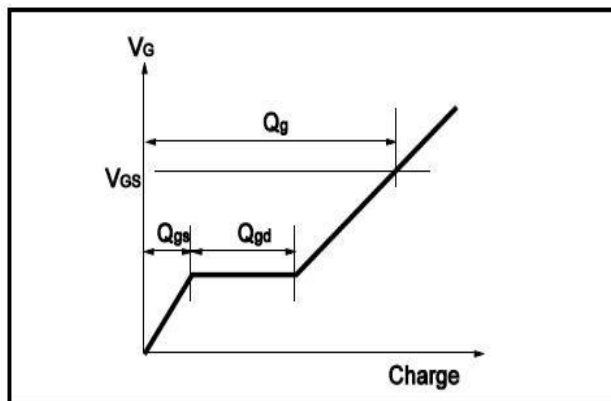


Fig.9 Switching Time Measurement Circuit

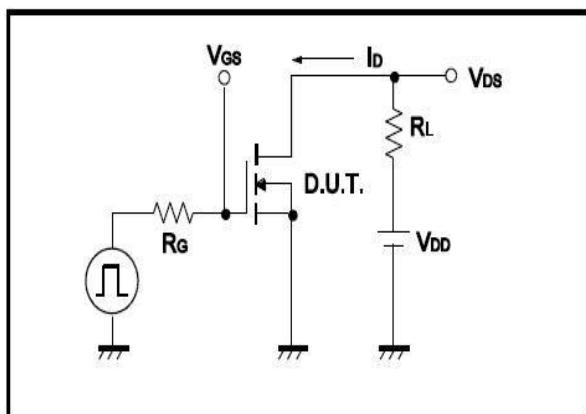


Fig.10 Gate Charge Waveform

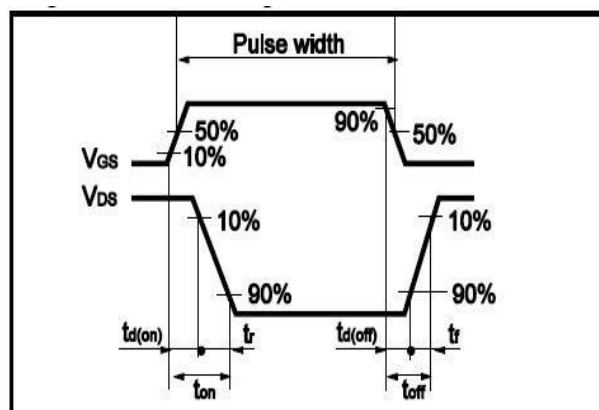


Fig.11 Avalanche Measurement Circuit

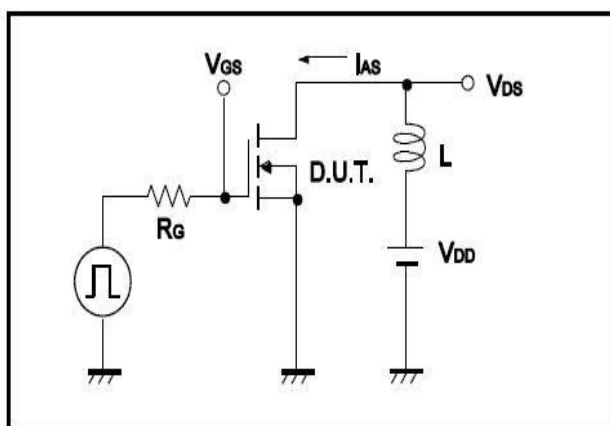
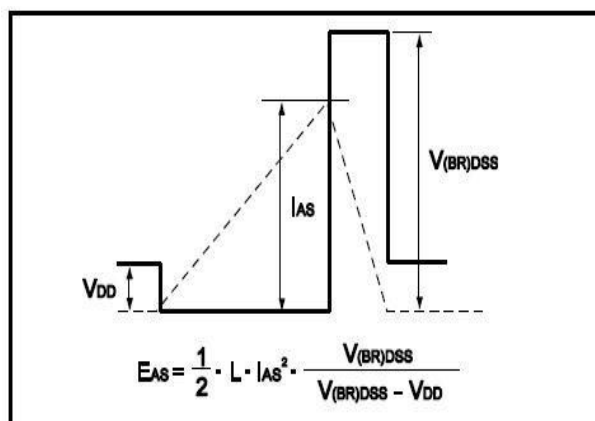


Fig.12 Avalanche Waveform



• Dimensions (DFN5*6)

Unit: mm

SYMBOL	min	max	SYMBOL	min	max
A	1.00	1.20	e	1.27BSC	
b	0.30	0.50	L	0.05	0.30
c	0.20	0.30	L1	0.40	0.80
D	4.80	5.20	L2	1.20	2.00
D1	3.90	4.30	H	3.30	3.80
E	5.50	5.90	I	—	0.18
E1	5.90	6.40			

