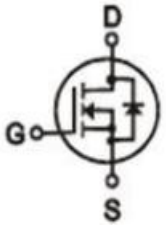
●General Description

The MOSFET LH40N04 has the low $R_{DS(on)}$, low gate charge,fast switching and excellent avalanche characteristics.This device is suitable for fast charge and lighting.

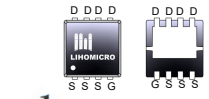


V_{DS}=40V

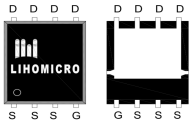
$R_{DS(ON)}$=6.5mΩ

I_D =40A

■ RoHS COMPLIANT



DFN3*3



DFN5*6

●Features

■Fast switching

■Low $R_{DS(on)}$ to minimize conductive loss

■Advance high sell density trench technology

■100% EAS Guaranteed

●Application

■LED/LCD/PDP TV and monitor Lighting

■Power Supplies

■PD Charger

●Ordering Information:

Part Number	LH40N04	LH40N04
Package	DFN3*3	DFN5*6
Basic Ordering Unit (pcs)	5000	5000
Normal Package Material Ordering Code	LH40N04D3-DFN3*3-TAP	LH40N04D-DFN5*6-TAP
Halogen Free Ordering Code	LH40N04D3-DFN3*3-TAP -HF	LH40N04D-DFN5*6-TAP-HF

●Absolute Maximum Ratings（TC =25℃）

PARAMETER	SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D@ T_C = 25°C	50	A
	I_D@ T_C = 75°C	40	A
	I_D@ T_C = 100°C	33	A
Pulsed drain current[1]	I_{DM}	125	A
Single Pulse Avalanche Energy[2]	E_{AS}	67	mJ
Power Dissipation(TC=25℃)	P_D	40	W
Operating 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	40	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	1.2	--	3.0	V
Drain-source On Resistance[3]	$R_{DS(ON)}$	V_{GS} =10V, I_D=20A	--	6.5	8.5	mΩ
		V_{GS} =4.5V, I_D=20A	--	10	15	
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V,T_J=25℃	--	--	1	uA
		V_{DS}=40V,V_{GS}=0V,T_J=85℃	--	--	10	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20,V_{DS}=0V	--	--	±100	nA
Input Capacitance	Ciss	f = 1.0MHz	--	690	--	pF
Output Capacitance	Coss		--	195	--	
Reverse transfer Capacitance	Crss		--	38	--	
Turn-On Delay Time	Td(on)	V_{DD} = 20V V_{GS} = 10V R_G=3.3Ω	--	14.3	--	nS
Rise Time	Tr		--	5.5	--	
Turn-Off Delay Time	Td(off)		--	20	--	
Fall Time	Tf		--	12	--	
Total Gate Charge	Qg	I_D = 20A, V_{DD} = 20V V_{GS} = 4.5V	--	6	---	nC
Gate-to-Source Charge	Qgs		--	3	--	
Gate-to-Drain Charge	Qgd		--	1.5	---	
Continuous Diode Forward Current	I_S	--	--	--	40	A
Diode Forward Voltage	V_{SD}	Tj=25°C, Is=20A V_{GS} =0V	--	--	1.2	V

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	Rth_{JC}	3.2	℃/W
Thermal Resistance Junction-ambient	Rth_{JA}	60	℃/W
Soldering temperature,wave soldering for 10s	Tsold	265	℃

Notes:

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

2.I_{AS} =30A, V_{DD} = 20V,L=0.1Mh, R_G = 25Ω, Starting T_J = 25°C

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

●Typical Characteristics

Figure 1. Typ. output characteristics

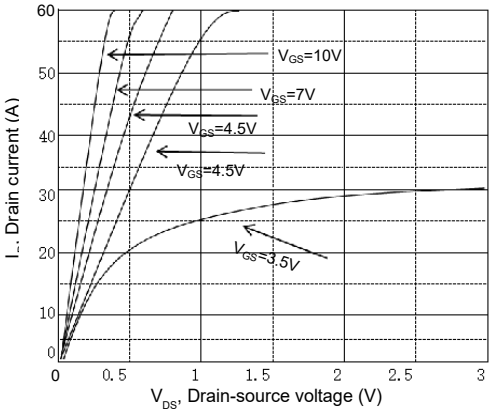


Figure 2. Typ. transfer characteristics

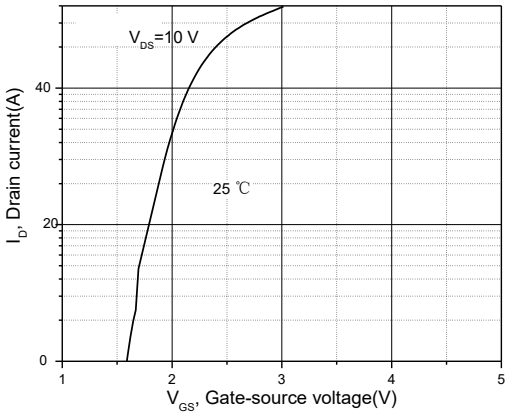


Figure 3. Typ. capacitances

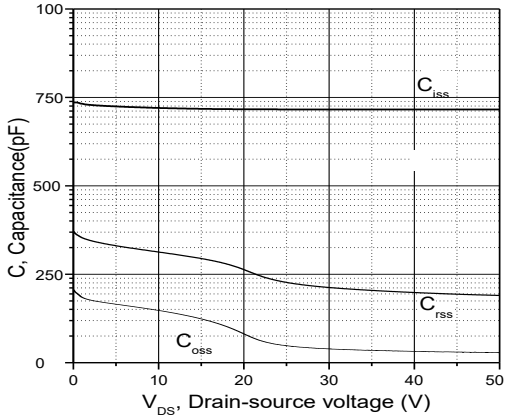


Figure 4.Typ. gate charge

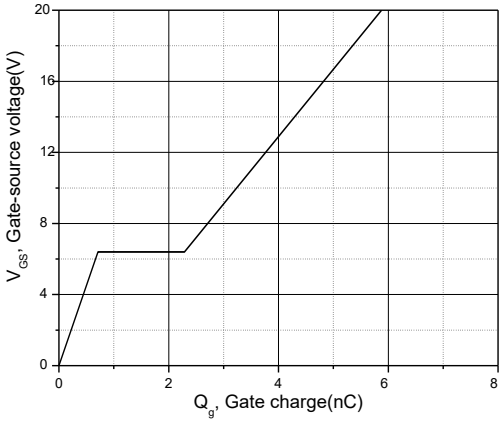


Figure 5. Source Drain Foward Charateristics

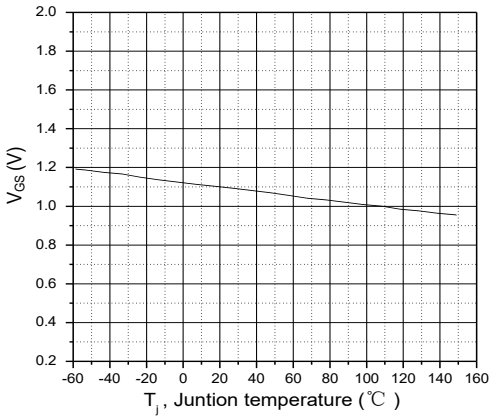
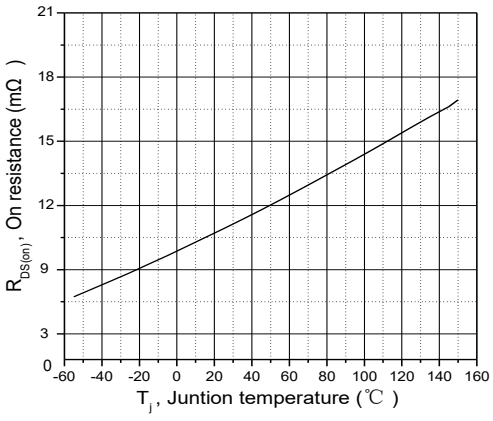


Figure 6. Drain-source on-state resistance



●Typical Characteristics(Cont.)

Figure 7. Forward characteristic of body diode

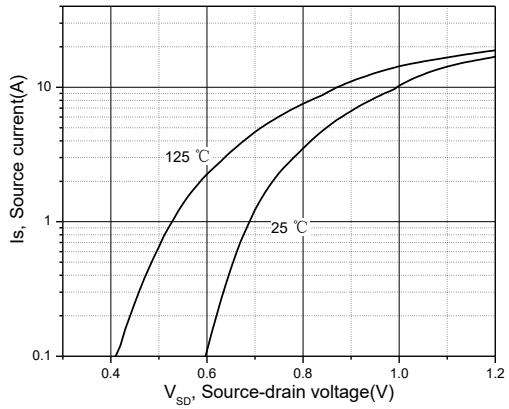


Figure 8. Drain-source on-state resistance

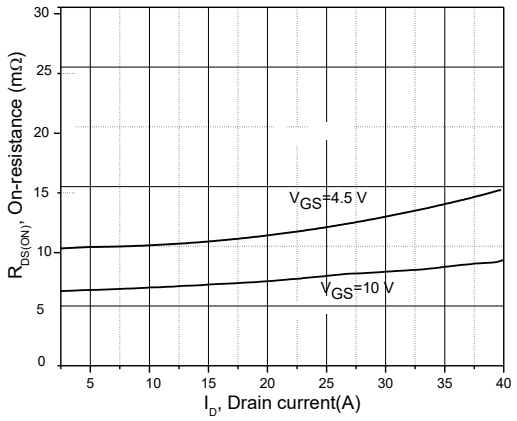


Figure 9. Safe operation area TC=25 ℃

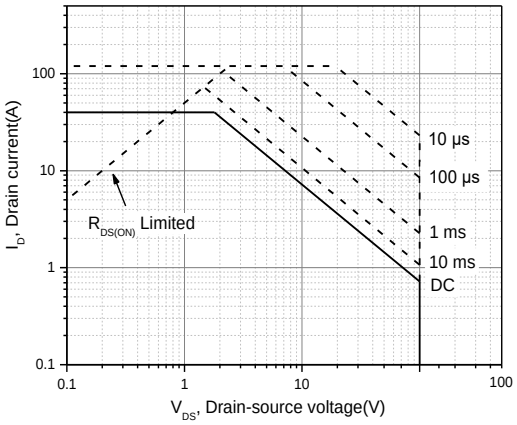
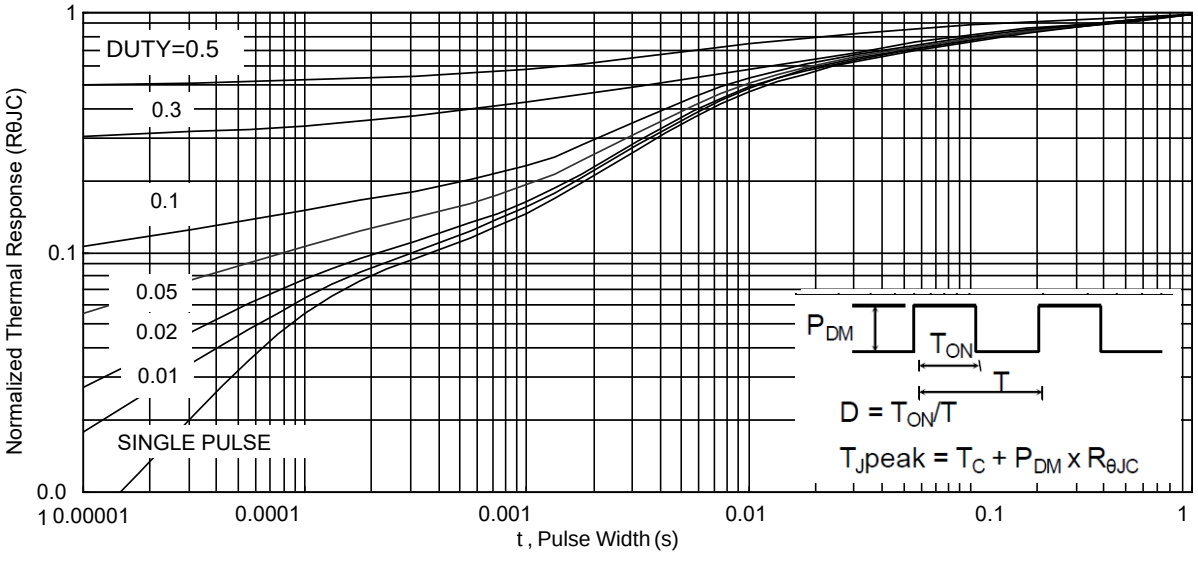


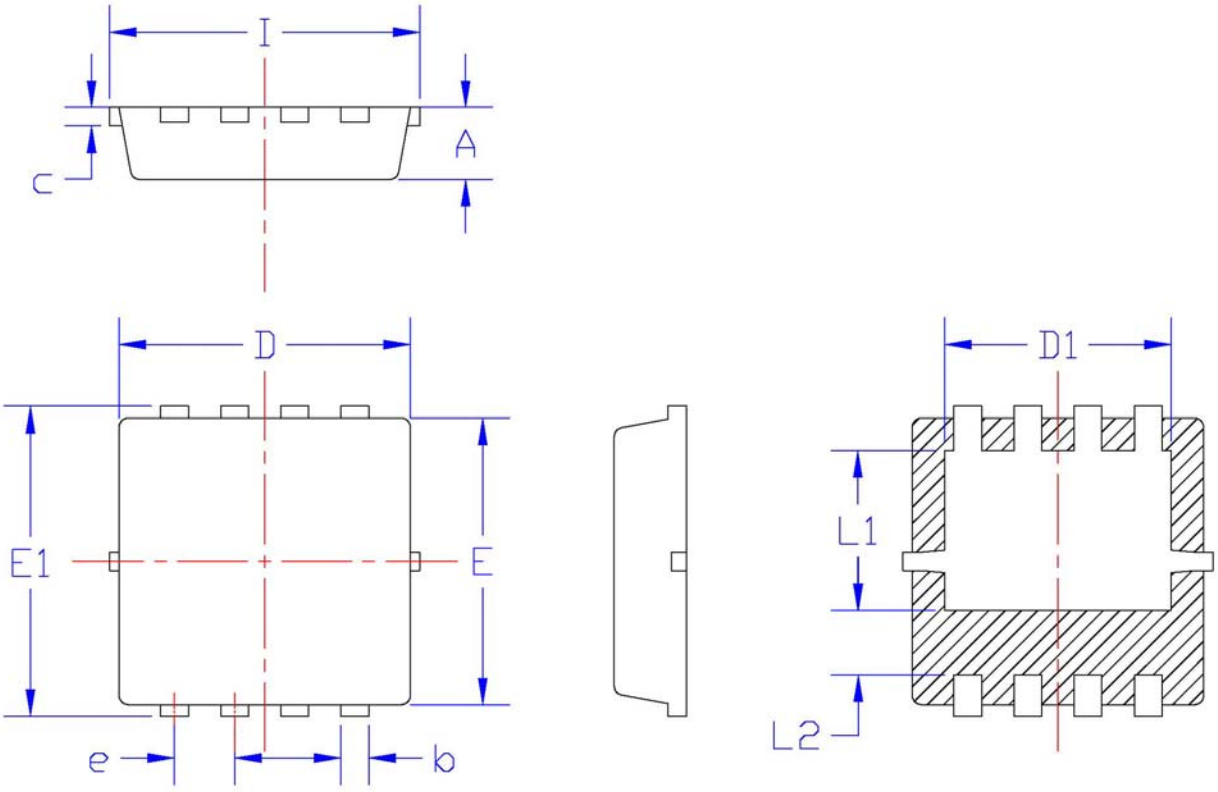
Fig.9 Normalized Maximum Transient Thermal Impedance



- **Dimensions（DFN3*3)**

Unit：mm

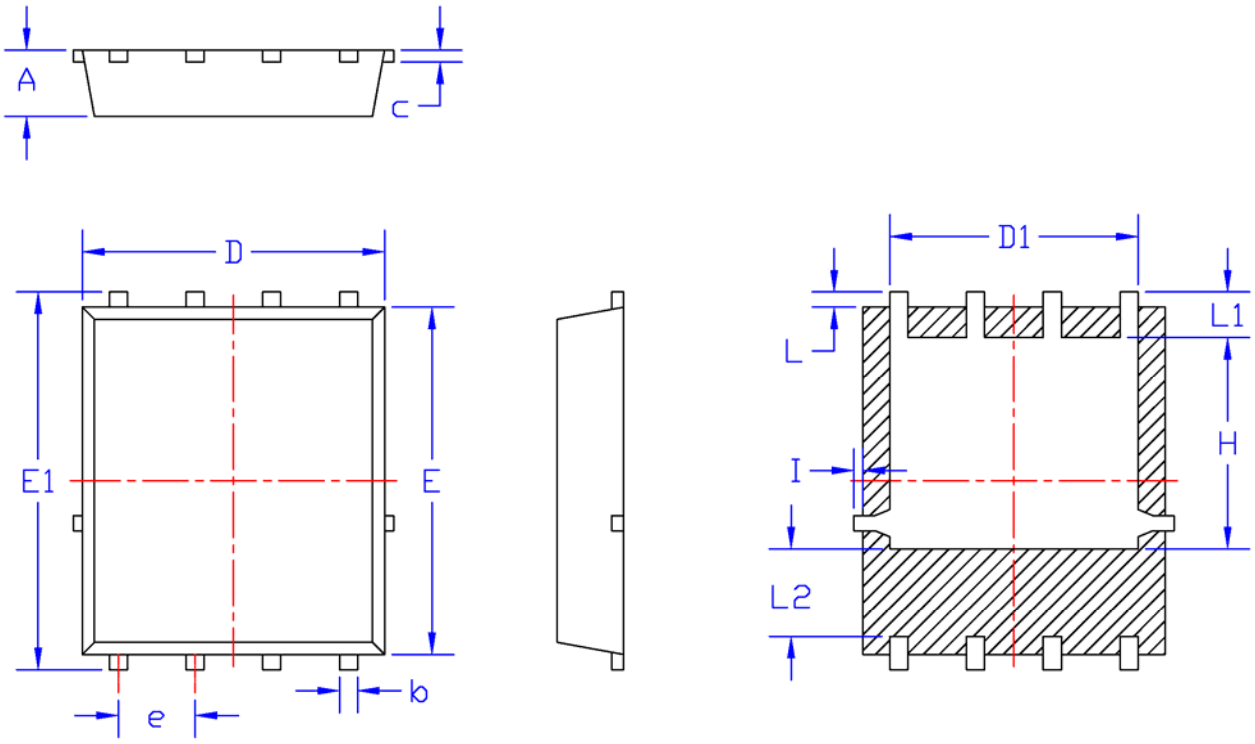
SYMBOL	min	max	SYMBOL	min	max
A	0.68	0.88	e	0.65BSC	
b	0.27	0.47	L1	1.55	1.95
c	0.15	0.35	L2	0.5	0.9
D	3.05	3.25	I	3.10	3.50
D1	2.25	2.65			
E	3.05	3.25			
E1	3.15	3.55			



●Dimensions（DFN5*6)

UNIT:mm

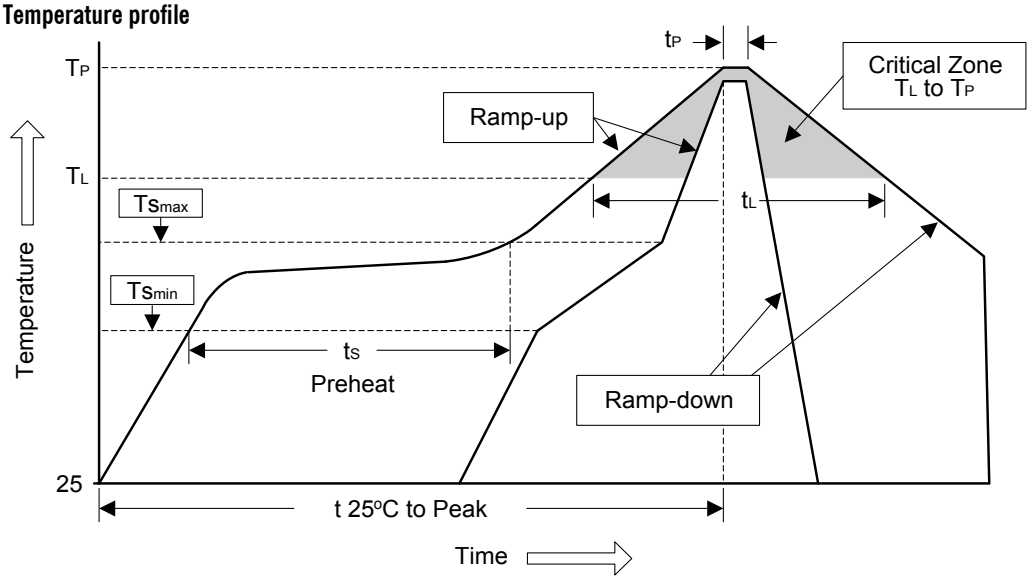
SYMBOL	min	max	SYMBOL	min	max
A	1.00	1.20	e	1.27BSC	
b	0.30	0.50	L	0.05	0.30
c	0.20	0.30	L1	0.40	0.80
D	4.80	5.20	L2	1.20	2.00
D1	3.90	4.30	H	3.30	3.80
E	5.50	5.90	I	-	0.18
E1	5.90	6.40			



• Soldering Methods for Silicongear's Products

1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	<3°C/sec	<3°C/sec
Preheat - Temperature Min (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60 to 120 sec	 150°C 200°C 60 to 180 sec
Tsmax to T_L - Ramp-up Rate	 <3°C/sec	 <3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60 to 150 sec	 217°C 60 to 150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec