

•General Description

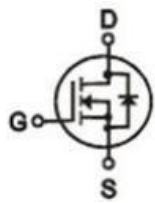
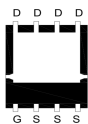
The SGT MOSFET LH012N04G has the low $R_{DS(on)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is suitable for fast charge and lighting.

•Features

- Fast switching
- Low $R_{DS(on)}$ & FOM
- Low Gate Charge

•Application

- LED/LCD/PDP TV and monitor Lighting
- Power Supplies
- DC/DC Converters

	$V_{DS} = 40V$ $R_{DS(on)} = 1.2m\Omega$ $I_D = 280A$
  DFN5*6	

■ RoHS COMPLIANT

•Ordering Information:

Part Number	LH012N04G
Package	DFN5*6
Basic Ordering Unit (pcs)	5000
Normal Package Material Ordering Code	LH012N04GN-DFN5*6-TAP
Halogen Free Ordering Code	LH012N04GN-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 , $T_C = 25^\circ C$	I_D	280	A
Pulsed drain current ($T_C = 25^\circ C$, t_p limited by T_{jmax}) ¹	I_D pulse	560	A
Single Pulse Avalanche Energy ²	E_{AS}	462	mJ
Power Dissipation($T_C=25^\circ C$)	P_D	125	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}	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.8	V
Drain-source On Resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	0.9	1.2	1.4	mΩ
		$V_{GS}=4.5V, I_D=20A$	--	1.6	1.8	
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V, T_J=25^{\circ}C$	--	--	1	μA
		$V_{DS}=32V, V_{GS}=0V, T_J=85^{\circ}C$	--	--	5	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20, V_{DS}=0V$	--	--	±100	nA
Input Capacitance	C_{iss}	$V_{GS}=0V,$ $V_{DS}=20V$ $f=1.0MHz$	--	3200	--	pF
Output Capacitance	C_{oss}		--	325	--	
Reverse transfer Capacitance	C_{rss}		--	80	--	
Turn -Off Delay Time	$T_d(off)$	$V_{GS}=10V,$ $I_D=20.0A$ $R_G=3.3\Omega$	--	52	--	ns
Turn-on delay time	$T_d(on)$		--	18	--	
Rise time	T_r		--	10	--	
Fall time	T_f		--	42	--	
Total Gate Charge	Q_g	$I_D=20A,$ $V_{DS}=15V$ $V_{GS}=10V$	--	41	---	nC
Gate-to-Source Charge	Q_{gs}		--	13	--	
Gate-to-Drain Charge	Q_{gd}		--	12	---	
Continuous Diode Forward Current	I_S	--	--	--	280	A
Pulsed Diode Forward Current	I_{SM}	--	--	--	560	A
Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}C, I_S=10.0A$ $V_{GS}=0V$	--	--	1.2	V

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	R_{thJC}	1.0	°C/W
Thermal Resistance Junction-ambient	R_{thJA}	50	°C/W

Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $I_{AS}=43A, V_{DD}=25V, R_G=25\Omega$, Starting $T_J=25^{\circ}C$
3. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

● **Typical Characteristics**

Fig.1 Typical Output Characteristics

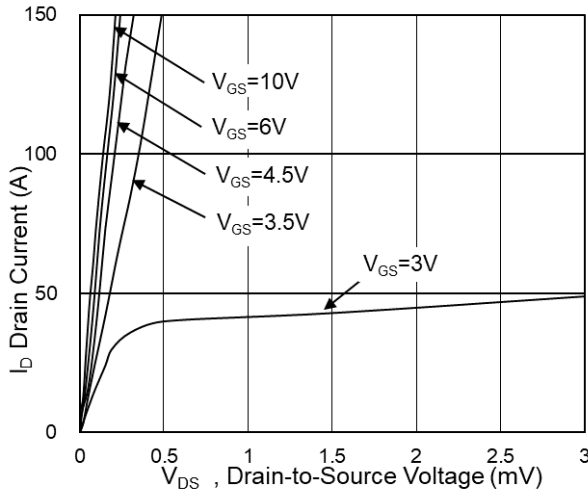


Fig.2 On-Resistance vs G-S Voltage

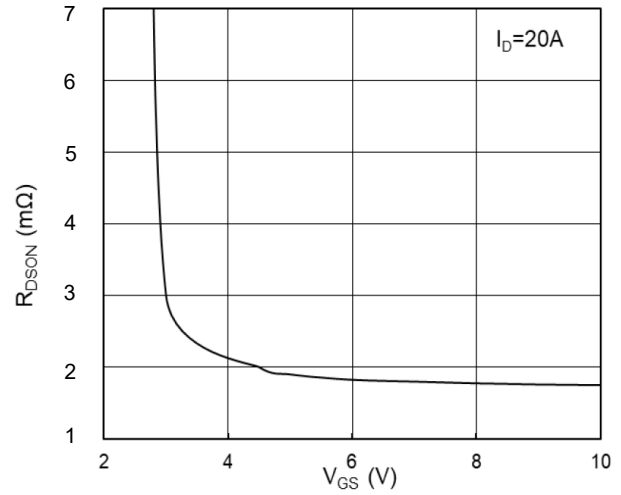


Fig.3 Source Drain Forward Characteristics

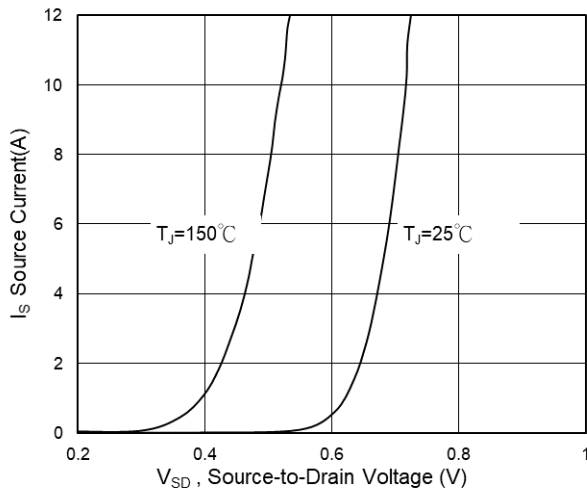


Fig.4 Capacitance

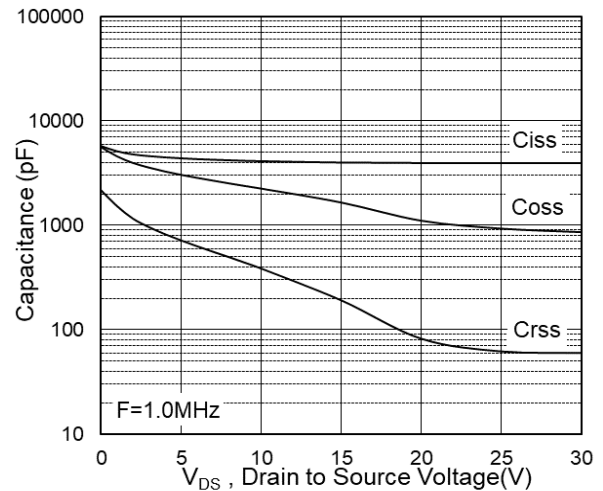


Fig.5 Normalized $V_{GS(th)}$ vs T_J

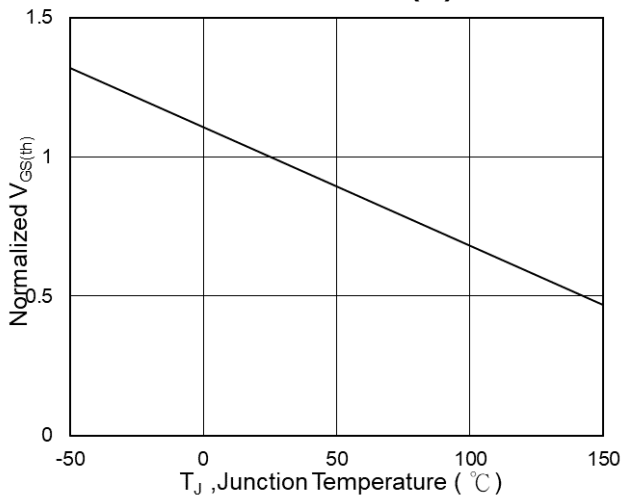
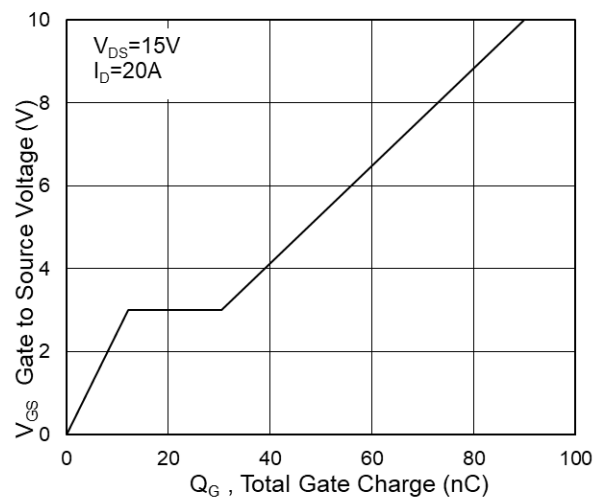


Fig.6 Gate-Charge Characteristics



• **Typical Characteristics**_(cont.)

Fig.7 Normalized RDSON vs TJ

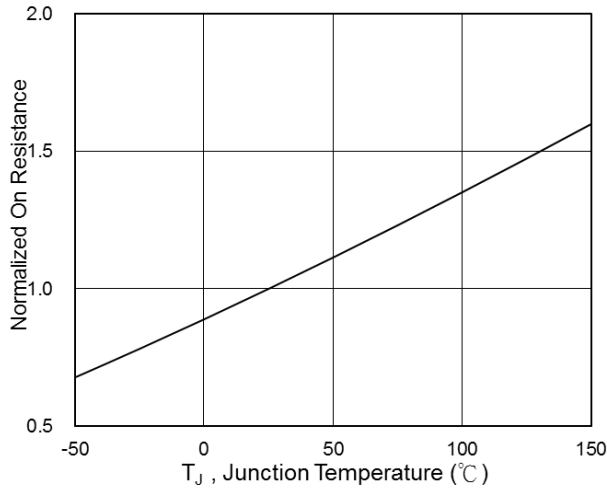


Fig.8 Safe Operating Area

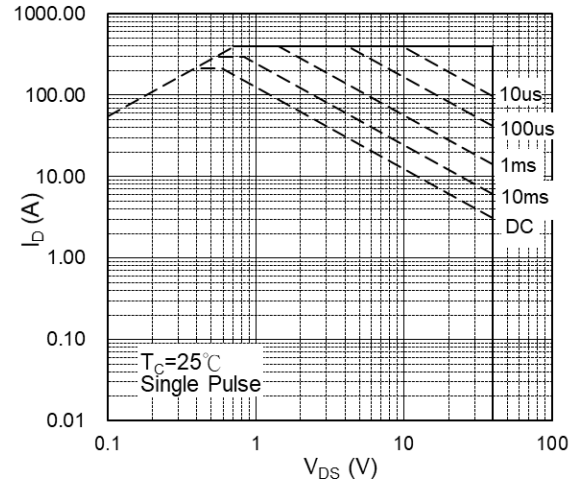
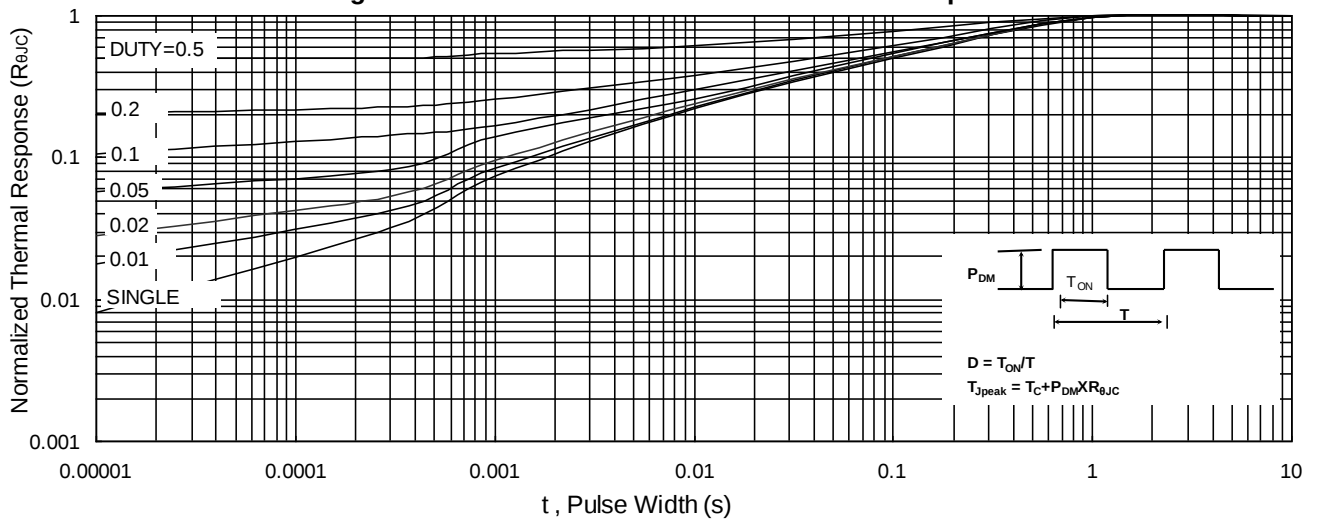


Fig.9 Normalized Maximum Transient Thermal Impedance



• Test Circuits & Waveforms

Fig1.EAS test Circuits

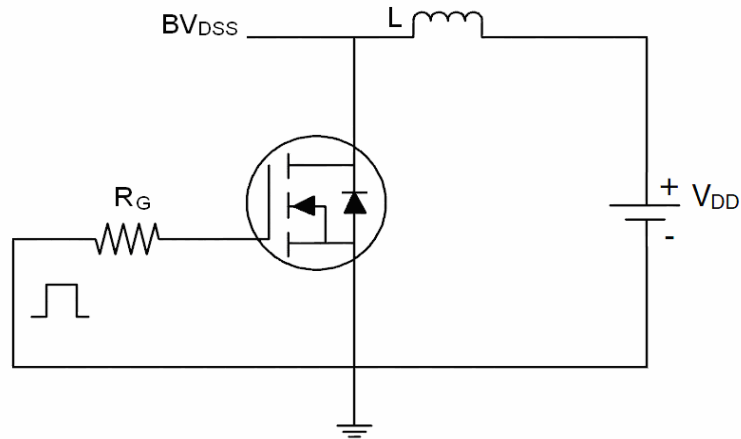


Fig2.Gate charge test Circuit

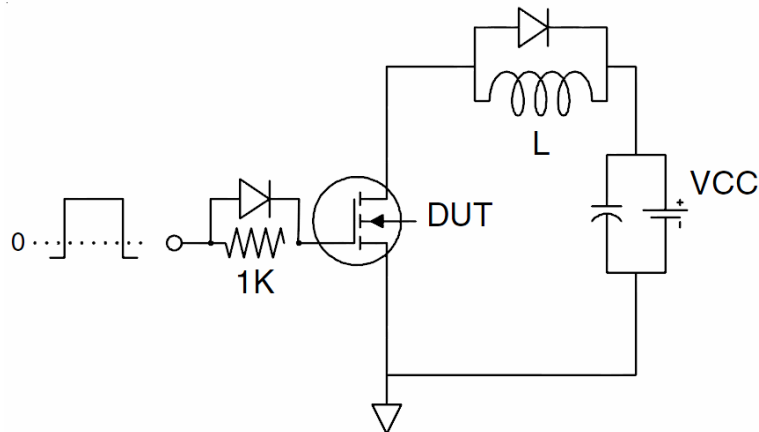
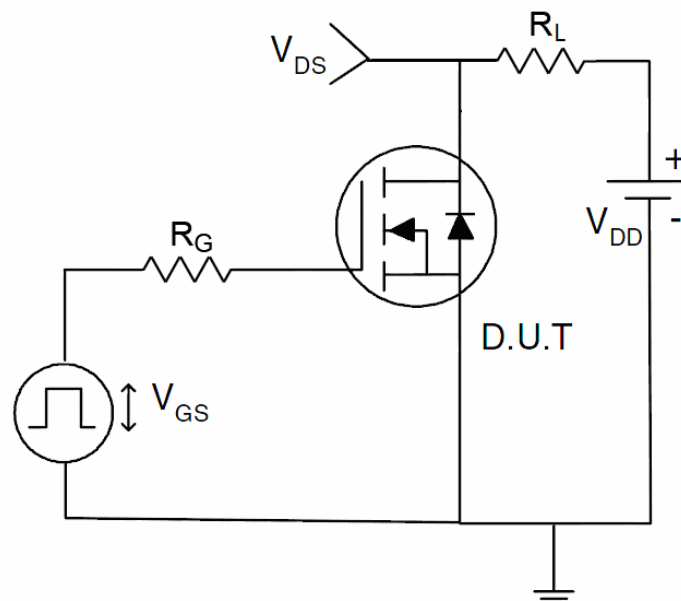


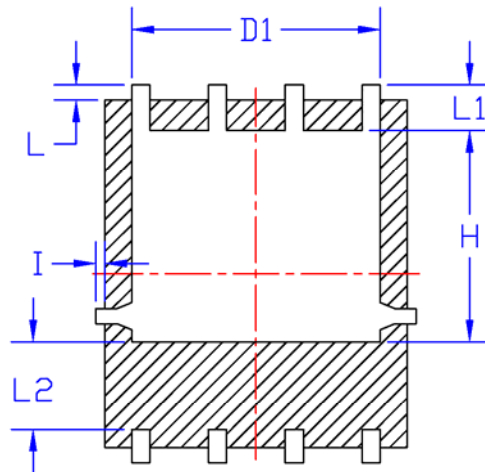
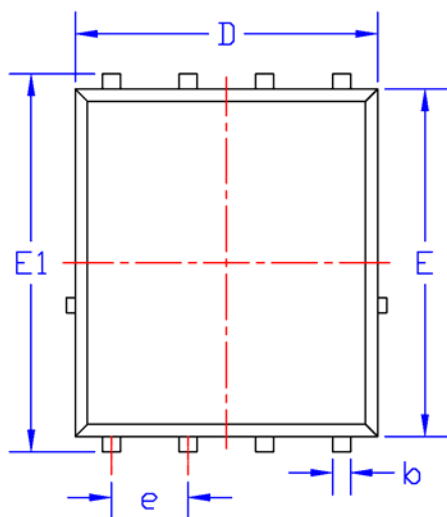
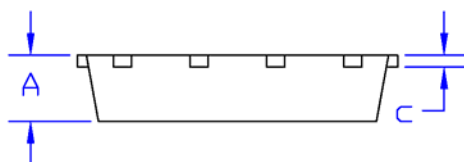
Fig3.Switch Time Test Circuit



●Dimensions (DFN5*6)

UNIT:mm

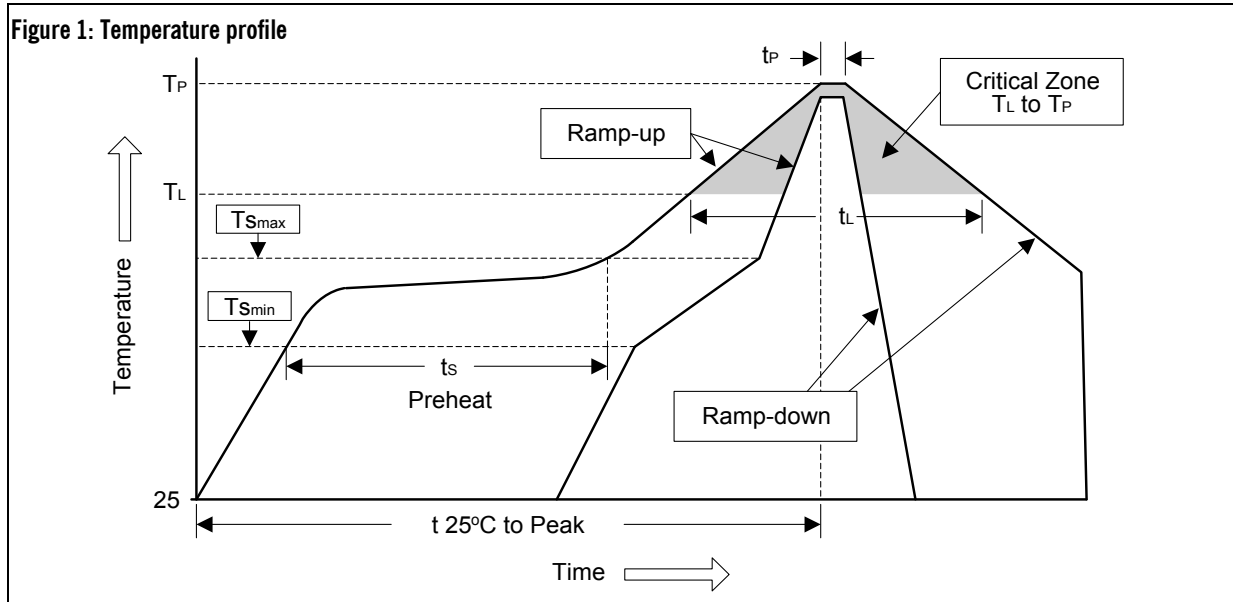
SYMBOL	min	max	SYMBOL	min	max
A	1.00	1.20	e	1.27BSC	
b	0.30	0.50	L	0.05	0.30
c	0.20	0.30	L1	0.40	0.80
D	4.80	5.20	L2	1.20	2.00
D1	3.90	4.30	H	3.30	3.80
E	5.50	5.90	I	—	0.18
E1	5.90	6.40			



• Soldering Methods for Lihomicro'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 (T_{smin})	100°C	150°C
- Temperature Max (T_{smax})	150°C	200°C
- Time (min to max) (t_s)	60 to 120 sec	60 to 180 sec
T_{smax} to T_L		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature (T_L)	183°C	217°C
- Time (t_l)	60 to 150 sec	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