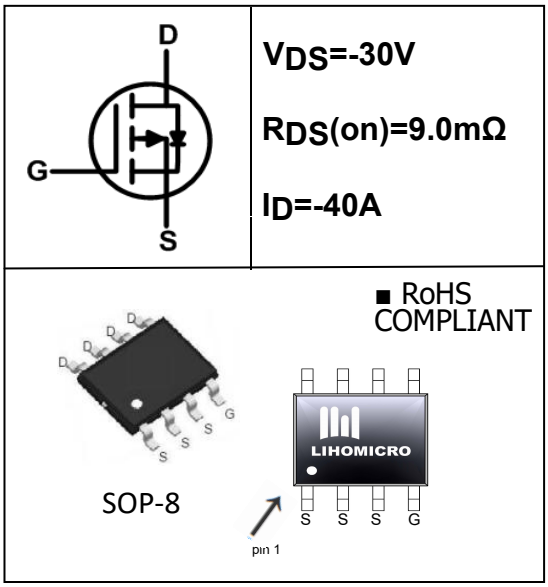
•General Description

The LH40P03 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 RDS(ON) to minimize conductive loss
■Low Gate Charge for fast switching

•Application

■Lighting
■Power Supplies

•Ordering Information:

Part Number	LH40P03
Package	SOP-8
Basic Ordering Unit (pcs)	4000
Normal Package Material Ordering Code	LH40P03S-SOP8-TAP
Halogen Free Ordering Code	LH40P03S-SOP8-TAP-HF

•Absolute Maximum Ratings（TC =25℃）

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°C	I_D	-40	A
Pulsed drain current (TC = 25°C, tp limited by Tjmax)[1]	I_{DM}	-80	A
Single Pulse Avalanche Energy[2]	E_{AS}	96	mJ
Power Dissipation[3]	$P_D(T_A$=25℃)	3	W
	$P_D(T_A$=70℃)	2	
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	-30	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS},I_D=250uA	-1.0	-1.5	-3.0	V
Drain-source On Resistance[1]	$R_{DS(ON)}$	V_{GS} =-10V, I_D=-20A	7.0	8.0	9.0	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℃	--	--	-1	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20,V_{DS}=0V	--	--	±100	nA
Forward Transconductance	G_{FS}	V_{DS} =-5V, I_D=-20A	--	5	--	S
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = -15V, f = 1.0MHz	--	2379	--	pF
Output Capacitance	Coss		--	409	--	
Reverse transfer Capacitance	Crss		--	388	--	
Turn-On Delay Time	$Td_{(on)}$	V_{DS}=-15V, V_{GS}=-10V, R_G=1Ω, I_D=-15A	--	26	--	nS
Turn-Off Delay Time	$Td_{(off)}$		--	136.5	--	
Turn-On Rise Time	T_r		--	65.7	--	
Turn-Off Fall Time	T_f		--	86.2	--	
Total Gate Charge	Qg	I_D =-20A, V_{DS} = -15V, V_{GS} =-4.5V	--	31	---	nC
Gate-to-Source Charge	Qgs		--	10.1	--	
Gate-to-Drain Charge	Qgd		--	17.4	---	
Continuous Diode Forward Current[1]	I_S	V_{Gs}=V_{DS}=0V, Force Current	--	--	-40	A
Pulsed Diode Forward Current	I_{SM}	--	--	--	-80	A
Diode Forward Voltage	V_{SD}	Tj=25°C, Is=-20A, V_{GS} =0V	--	--	-1.0	V

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	Rth_{JC}	2.1	℃/W
Thermal Resistance Junction-ambient[4](t≤1S)	Rth_{JA}	50	℃/W

Notes:

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

2.The EAS data shows Max. rating.The Test condition is L=0.5mH,I_D=16A,V_{DD}=-15V;

3.The Power Dissipation is limited by 150℃ junction temperature;

4.Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

●Typical Characteristics

Fig.1 Power Dissipation Derating Curve

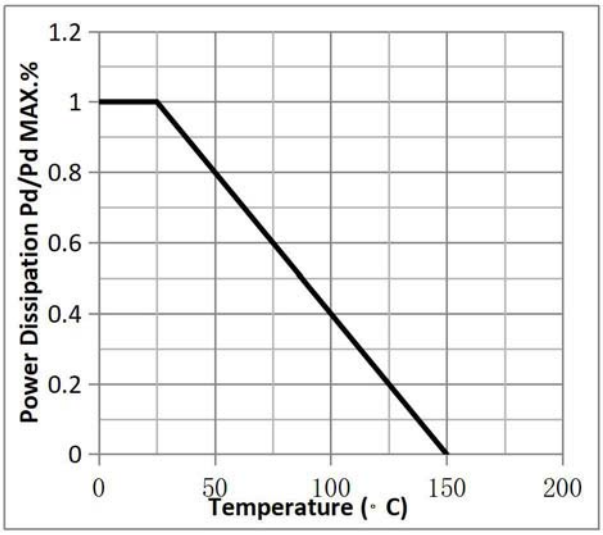


Fig.2 Typical output Characteristics

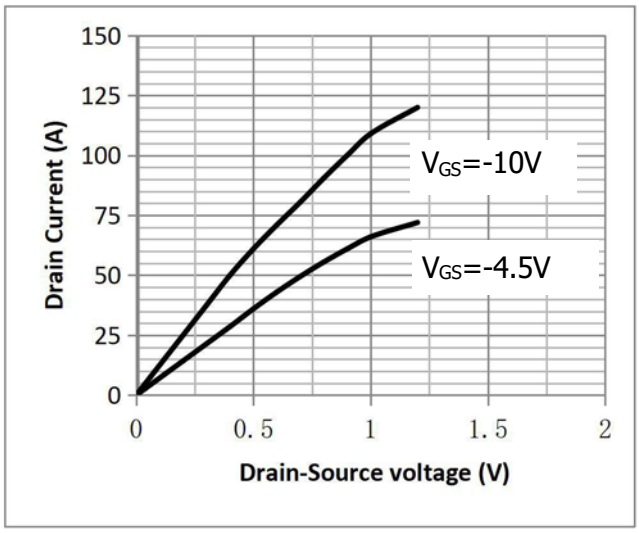


Fig.3 Threshold Voltage V.S Junction Temperature

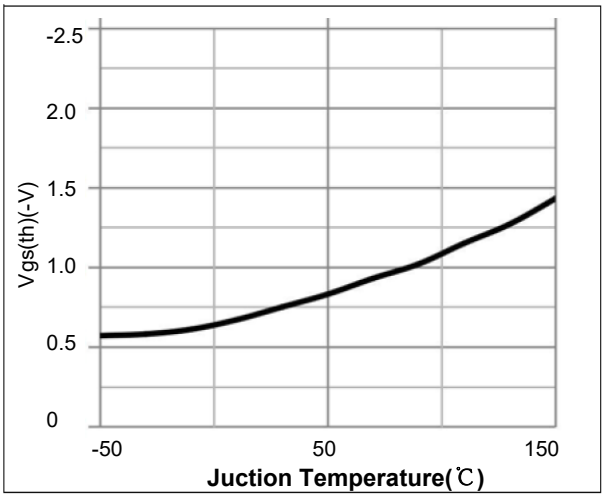


Fig.4 Resistance V.S Drain Current

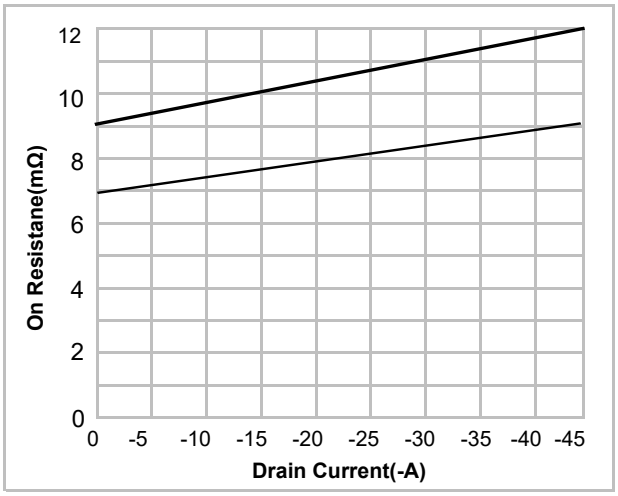


Fig.5 On-Resistance VS Gate Source Voltage

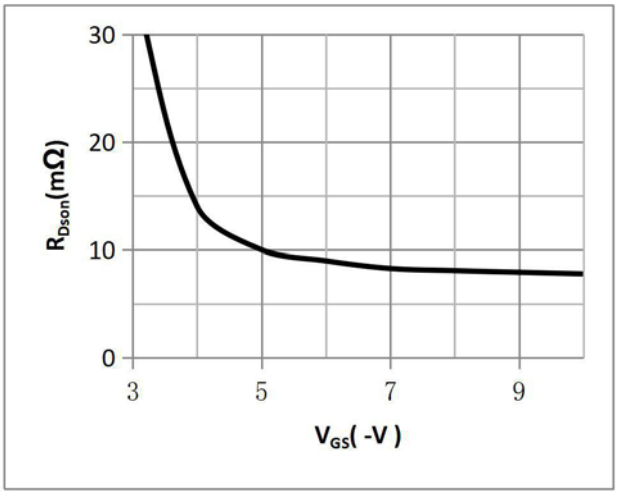
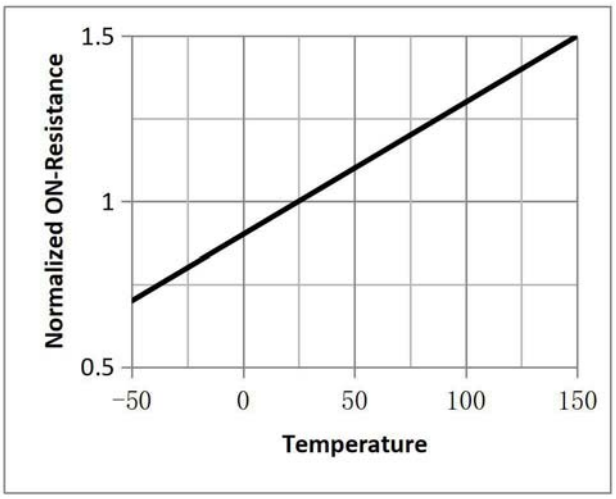


Fig.6 On-Resistance V.S Junction Temperature



●Test Circuits & Waveforms

Fig.7 Switching Time Measurement Circuit

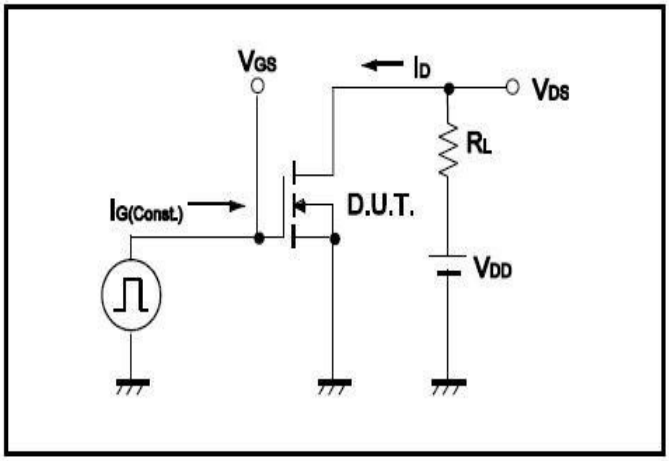


Fig.8 Gate Charge Waveform

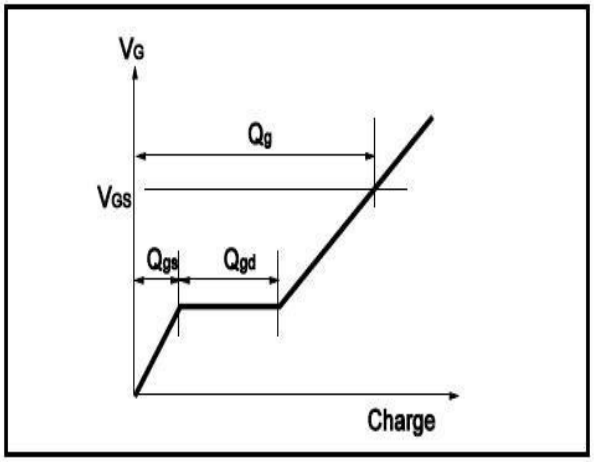


Fig.9 Switching Time Measurement Circuit

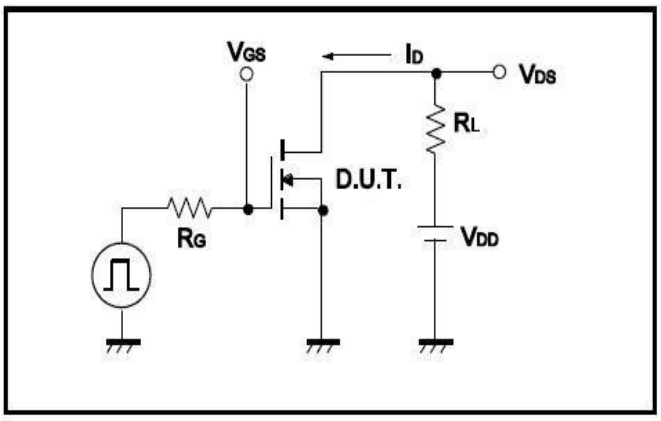


Fig.10 Gate Charge Waveform

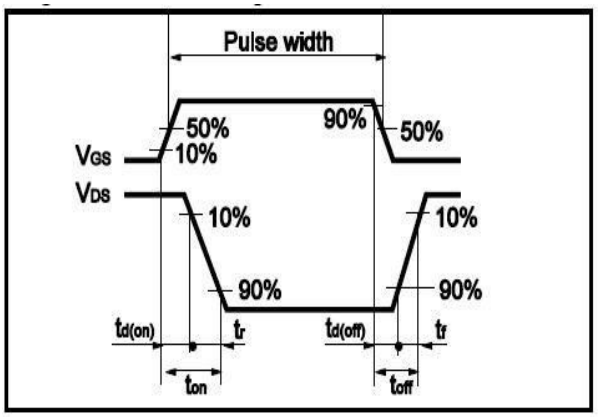


Fig.11 Avalanche Measurement Circuit

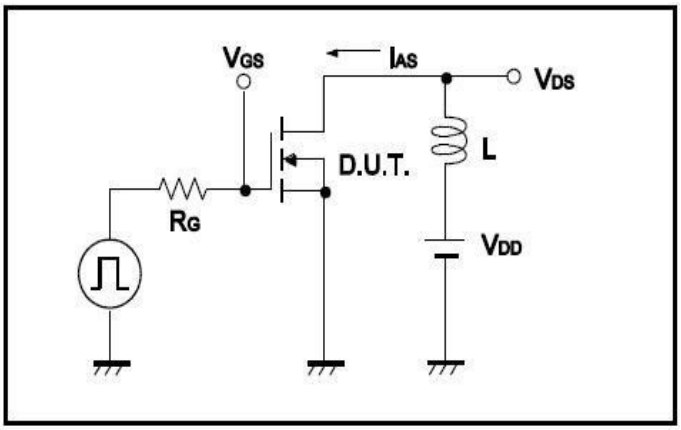
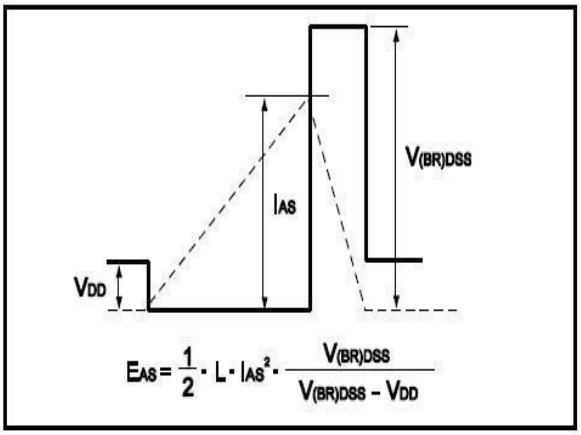


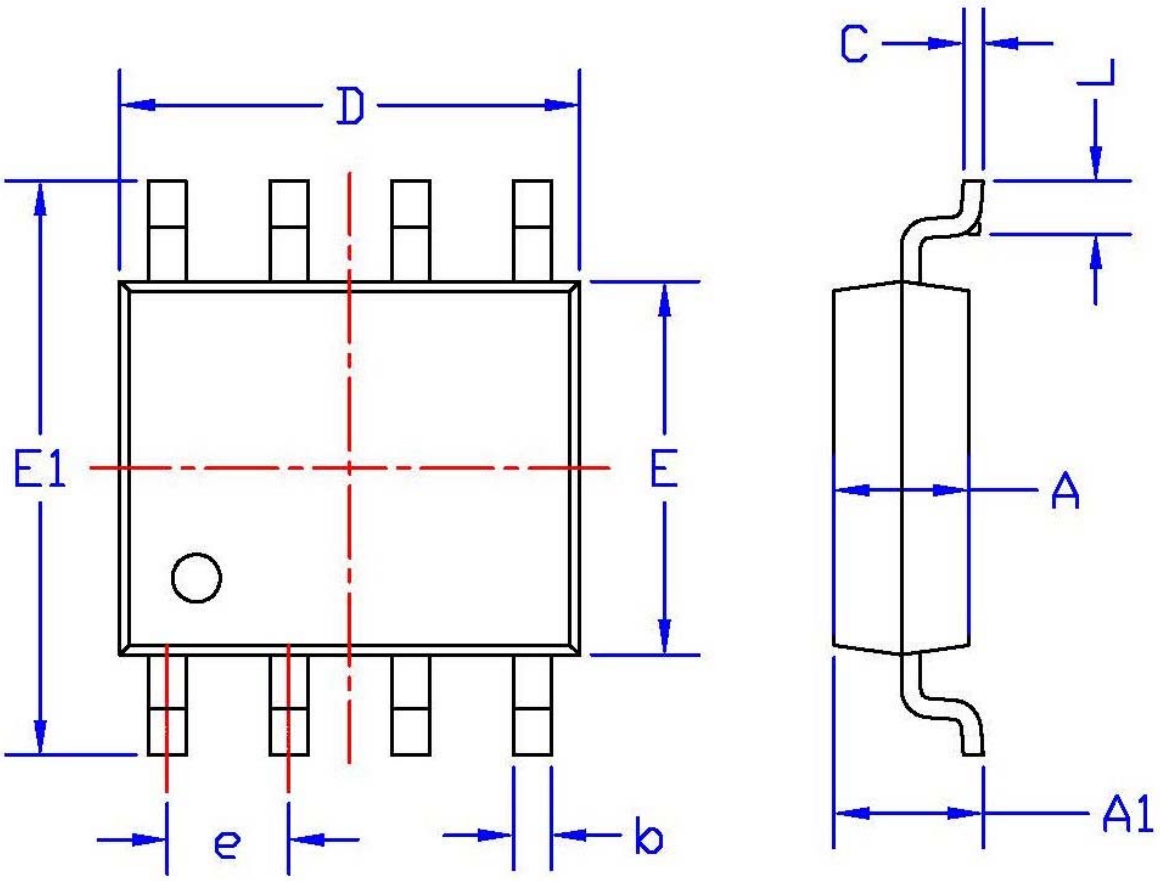
Fig.12 Avalanche Waveform



●Dimensions（SOP-8)

UNIT:mm

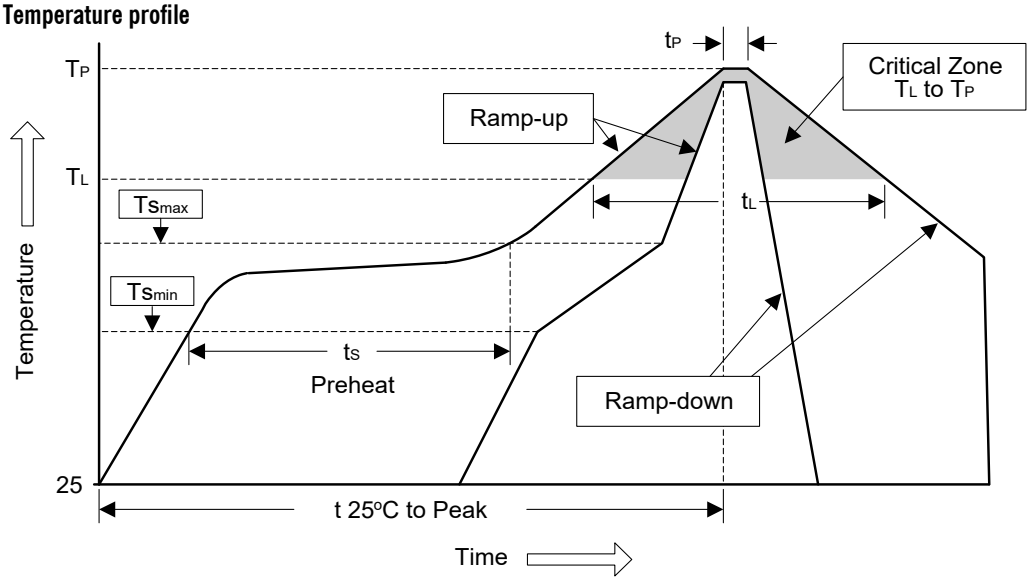
SYMBOL	min	max	SYMBOL	min	max
A	1.30	1.60	e	1.27BSC	
A1	1.35	1.85	L	0.40	1.30
b	0.30	0.60			
C	0.15	0.35			
D	4.60	5.20			
E	3.70	4.10			
E1	5.70	6.30			



• 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