

30V Dual P-Channel Fast Switching MOSFETs

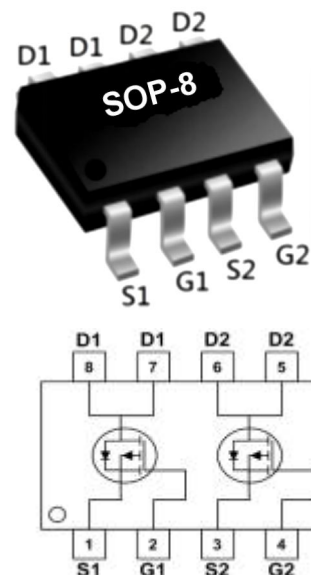
Features

- $V_{DS} = -30V$ $I_D = -4.9A$
- $R_{DS(ON)} = 45m\Omega$ (Max.) @ $V_{GS} = -10V$
- $R_{DS(ON)} = 82m\Omega$ (Max.) @ $V_{GS} = -4.5V$
- Green Device Available
- Excellent CdV/dt effect decline
- Super Low Gate Charge
- 100% EAS Guaranteed

Applications

- The SI3301S is the high cell density trenched P-ch MOSFETs, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.
- The SI3301S meet the ROHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PIN DESCRIPTION



Part Number	Package	Marking	ROHS Status	Packing
SI3301S	SOP-8	S3301	Halogen-Free	Tape&Reel

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Max.	Unit	
V_{DS}	Drain-Source Voltage	-30	V	
V_{GS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current ($V_{GS} @ -10V$)	$T_A = 25^\circ C$	-4.9	A
		$T_A = 70^\circ C$	-3.9	A
I_{DM}	Pulsed Drain Current	-10	A	
I_{AS}	Avalanche Current	-19	A	
E_{AS}	Repetitive Avalanche Energy	18.1	mJ	
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ C$	
P_D	Total Power Dissipation	$T_A = 25^\circ C$	1.5	W

THERMAL RESISTANCE RATINGS

Symbol	Parameter	Typical	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	85	$^\circ C/W$
$R_{\theta Jc}$	Thermal Resistance Junction-Case	50	$^\circ C/W$

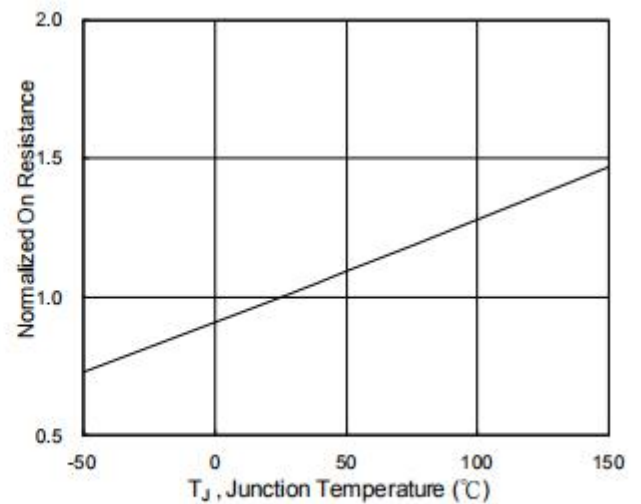
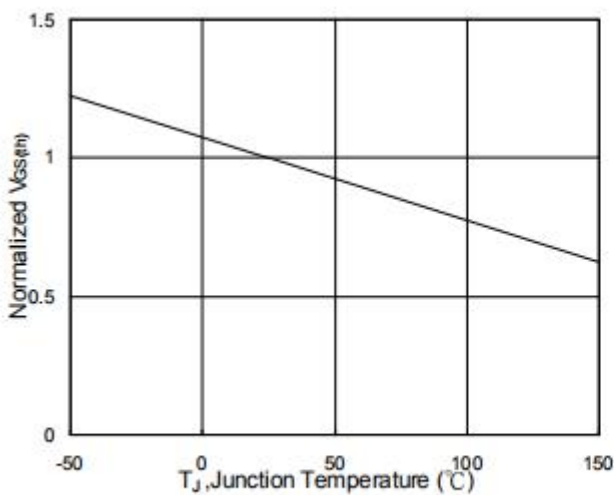
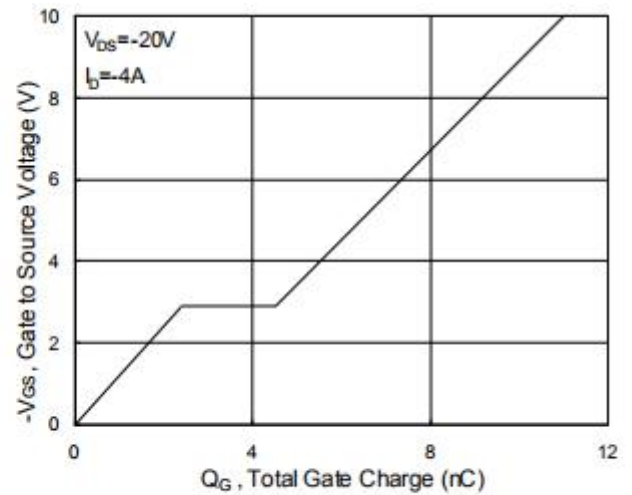
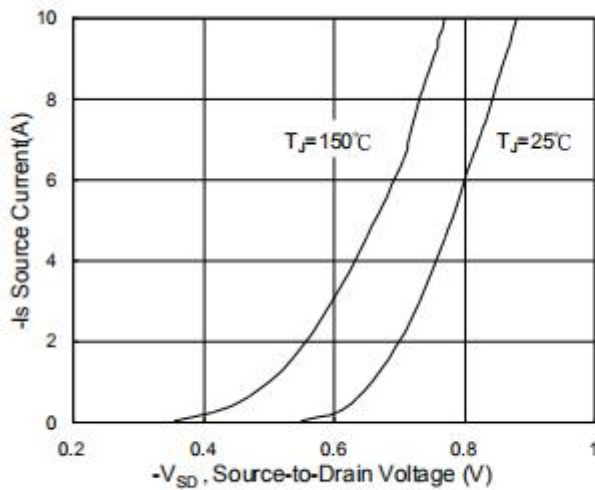
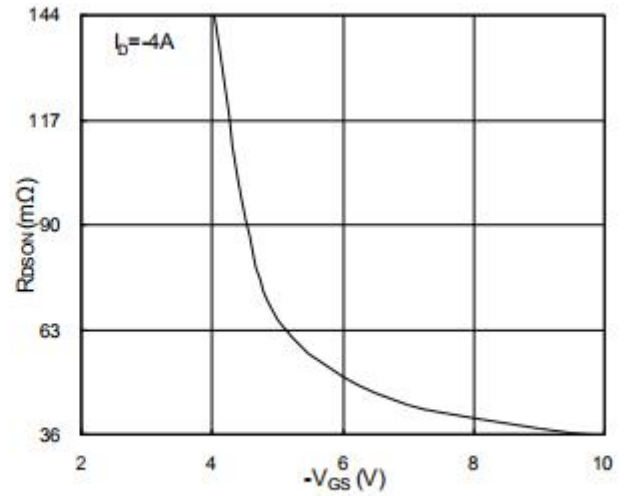
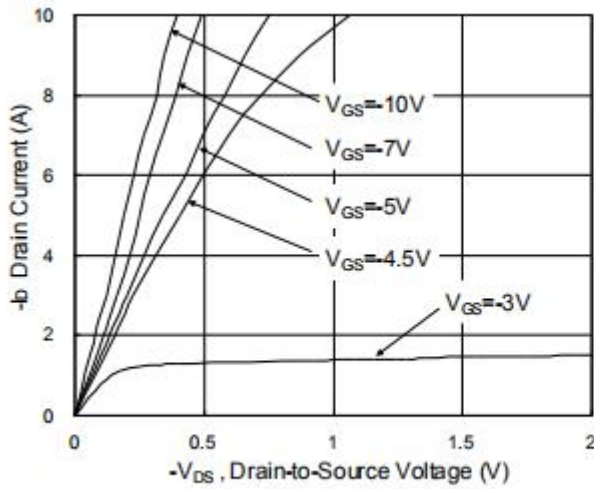
Electrical Characteristics (TA=25°C unless otherwise Ratings)

Symbol	Parameter	Test Conditions	Min.	TYP.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-source breakdown voltage	V _{GS} =0V, I _D = -250uA	-30	-	-	V
V _{GS(th)}	Gate threshold voltage	V _{DS} =V _{GS} , I _D = -250uA	-1.0	-	-2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-24V, V _{GS} =0V	-	-	-1	uA
		V _{DS} =-24V, T _j =55°C	-	-	-5	
I _{GSS}	Gate-source leakage current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(on)}	Drain-source on-state resistance	V _{GS} =-10V, I _D =-4A	-	-	45	mΩ
		V _{GS} = -4.5V, I _D =-3A	-	-	82	mΩ
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-4A	-	6	-	S
Switching Characteristics						
Q _g	Total Gate Charge	V _{GS} =-4.5V, V _{DS} =-20V I _D =-4A	-	6.4	-	nC
Q _{gs}	Gate-Source Charge		-	2.2	-	nC
Q _{gd}	Gate-Drain Charge		-	2.3	-	nC
T _{d(on)}	Turn-on delay time	V _{GS} =-10V, V _{DD} =-12V R _{GS} =3.3Ω, I _D =-4A	-	9	-	nS
T _r	Rise time		-	16.6	-	nS
T _{d(off)}	Turn-off delay time		-	21	-	nS
T _f	Fall time		-	21.6	-	nS
Dynamic Characteristic						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz	-	632	-	pF
C _{oss}	Output Capacitance		-	100	-	pF
C _{rss}	Reverse Transfer Capacitance		-	74	-	pF
Source-Drain Diode						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A	-	-	-1.2	V
I _{SM}	Pulsed Source Current	V _{GS} =V _{DS} =0V, Force Current	-	-	-26	A
I _S	Continuous Source Current		-	-	-6.5	V
t _{rr}	Reverse Recoveryv Time	I _F =-6A, di/dt=100A/us	-	16.3	-	nS
Q _{rr}	Reverse Recoveryv chager		-	5.9	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
3. The E_{AS} data shows Max.rating . The test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-19A
4. The power dissipation is limited by 150 °C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Performance Characteristic



Typical Performance Characteristics (Cont.)

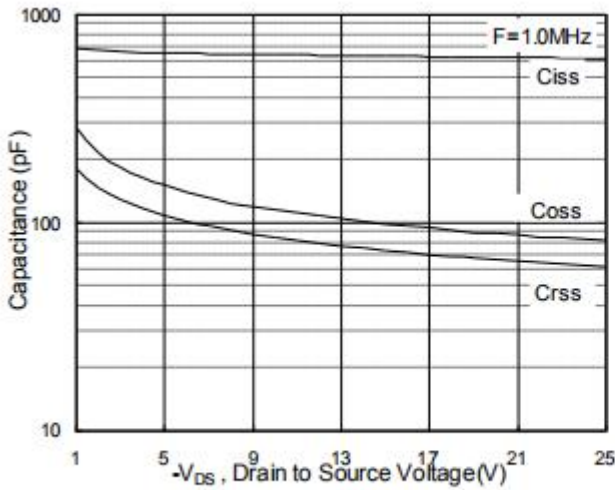


Fig.7 Capacitance

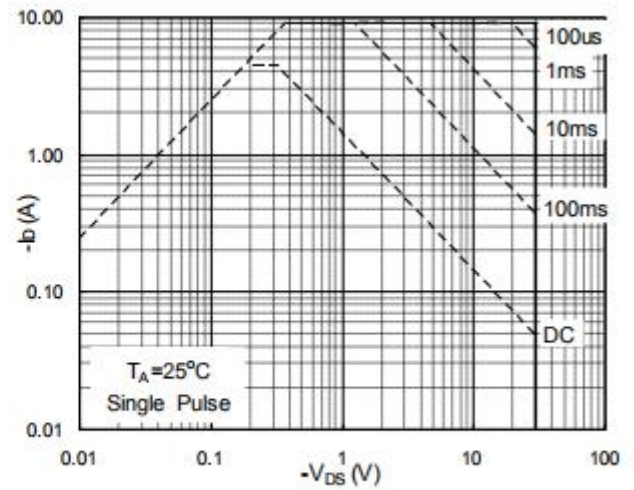


Fig.8 Safe Operating Area

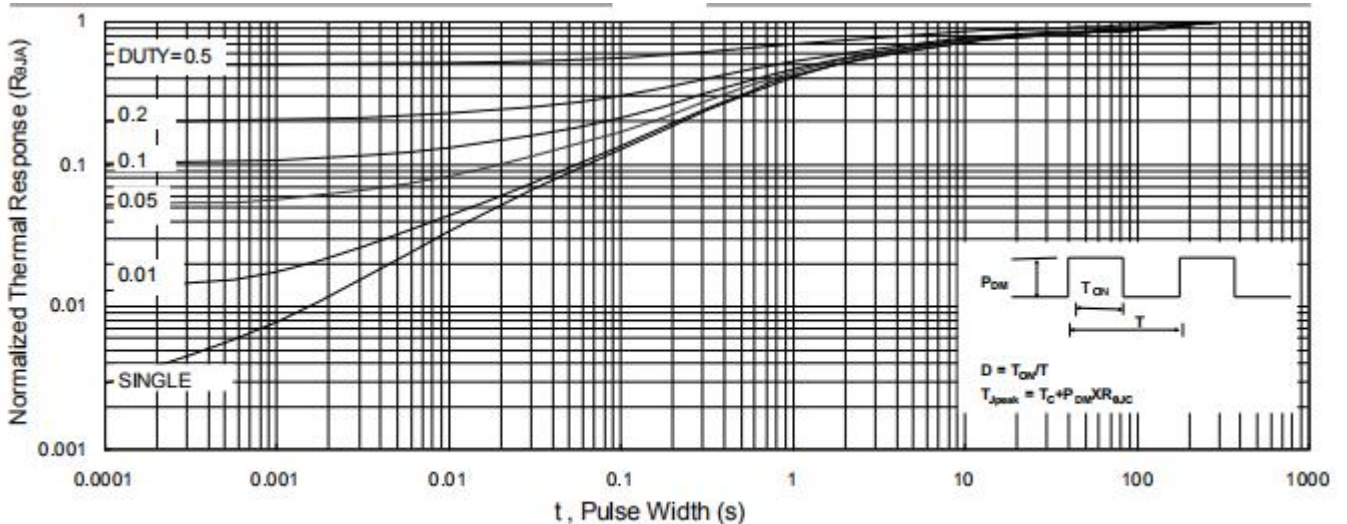


Fig.9 Normalized Maximum Transient Thermal Impedance

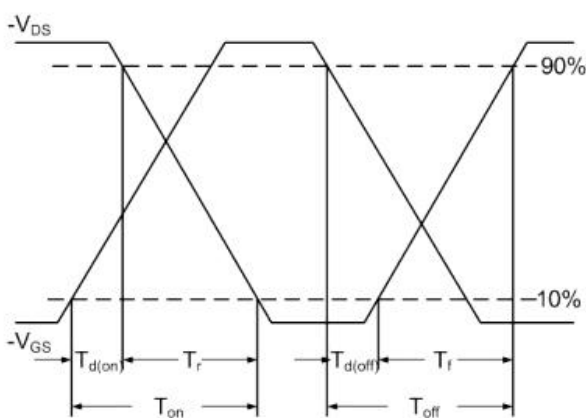


Fig.10 Switching Time Waveform

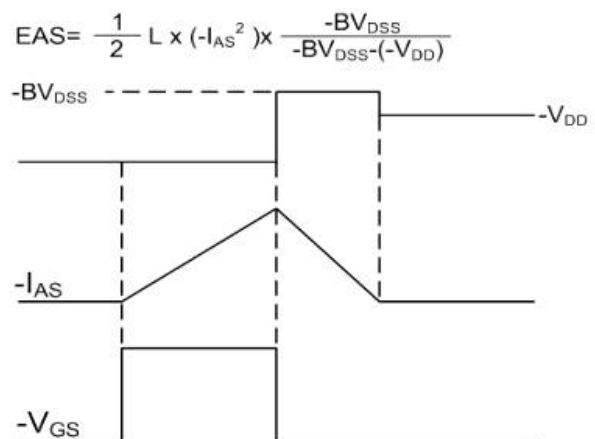
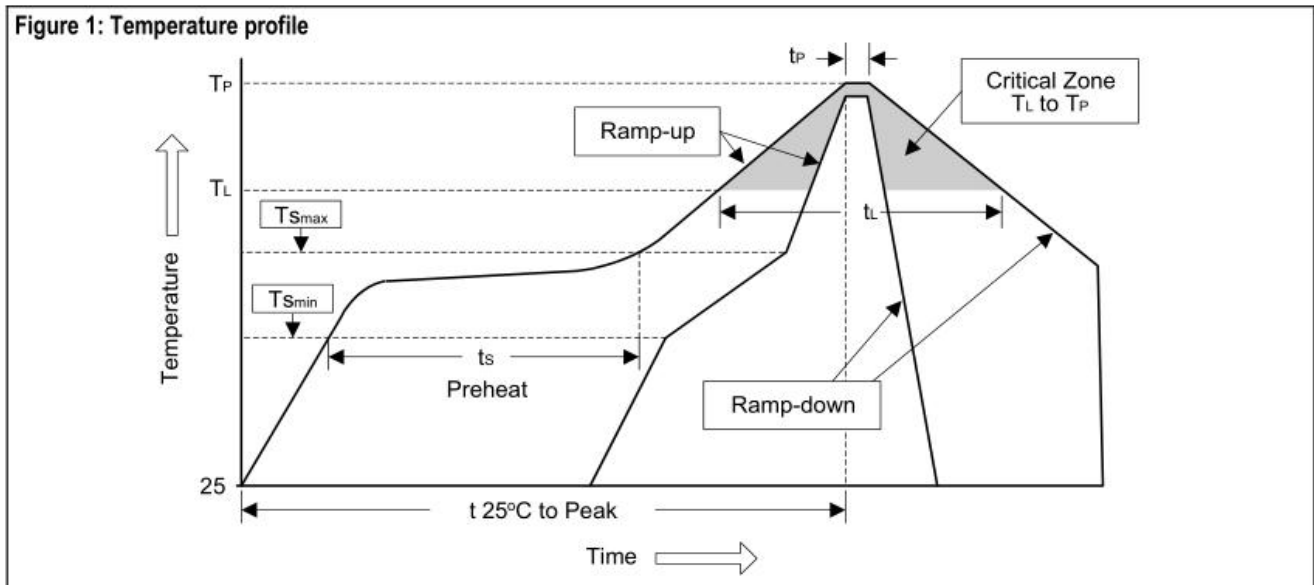


Fig.11 Unclamped Inductive Switching Waveform

Soldering Methods for Products

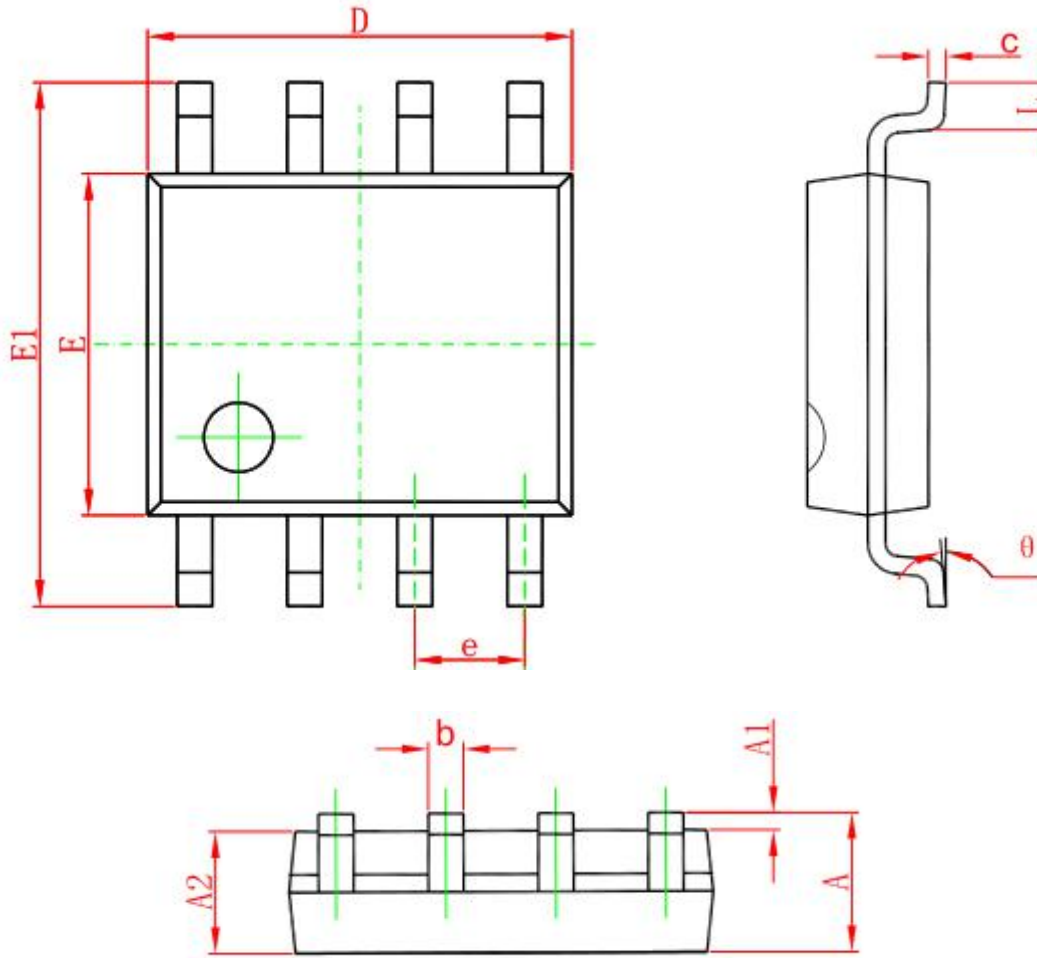
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp -up rate(TL to TP)	<3°C/sec	<3°C/sec
Preheat -Temperature Min(Ts min) -Temperature Max(Ts max) -Time(min to max)(ts)	- 100°C 150°C 60 to 120 sec	- 150°C 200°C 60 to 180 sec
Ts max to TL - ramp-up rate	<3°C/sec	<3°C/sec
Time maintained above: -Temperature(TL) -Time(TL)	183°C 60 to 150 sec	217°C 60 to 150 sec
Peak Temperature(TP)	240°C+0/-5°C	250°C+0/-5°C
Time within 5°C of actual Peak Temperature	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



- Note :**
- 1.Storage environment: Temperature=10°C to 35@Humidity=45%±15%
 - 2.Reflow soldering of surface-mount devices
 - 3.Flow(wave) soldering(solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices	245°C±5°C	5sec±1sec
Pb-free devices	250°C+0/-5°C	5sec±1sec

Package Outline



Millimeter					
Symbol	Min	Max	Symbol	Min	Max
A	1.50	1.70	E	3.84	4.04
A1	0.05	0.15	E1	5.90	6.10
A2	1.35	1.55	e	1.27BSC	
b	0.30	0.50	L	0.52	0.72
C	0.19	0.25	θ	0°	8°
D	4.80	5.00	-	-	-

Important Notice

Si-Trend reserves the right to change all product , product specifications and data without prior notice ; Our customer Please confirm to place an order confirmation before make the integrity of information complete and up-to-date .

Any semiconductor under specific conditions are possible to certain failure or malfunction rate ; Customers are responsible in the use of Si-Trend products to system design and manufacturing in compliance with safety standards and adopting safety measures , To avoid the potential risk of failure may cause the personal safety and property loss .

Si-Trend Always refine on to provide more excellent products

Modify record

Date	Version	Description	Pagination
20171128	A.0	original	7