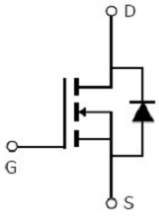
Main Product Characteristics

V_{DSS}	70V
R_{DS}(on)	7mΩ (typ.)
I_D	68A ①

TO-220

Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced Process Technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature

Description

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute max Rating

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	68	A
I_{DM}	Pulsed Drain Current ②	272	
P_D @TC = 25°C	Power Dissipation ③	88	W
V_{DS}	Drain-Source Voltage	70	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy	380	mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

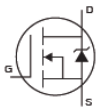
Thermal Resistance

Symbol	Characterizes	Value	Units
$R_{\theta JC}$	Junction-to-case ③	1.7	°C/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

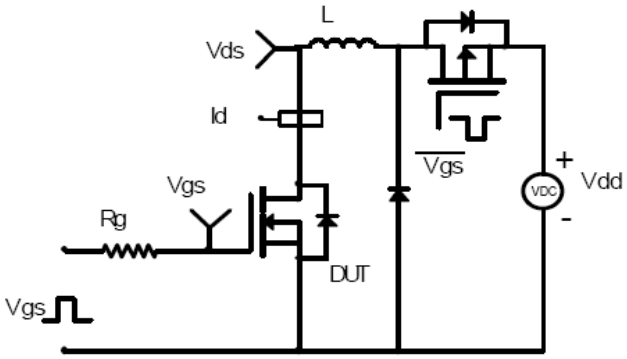
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	70	—	—	V	V_{GS} = 0V, I_D= 250uA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	7	8.4	mΩ	V_{GS}=10V,I_D =40A
$V_{GS(th)}$	Gate threshold voltage	2.0	—	4.0	V	V_{DS} = V_{GS}, I_D =250μA
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} =68V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =25V
		—	—	-100		V_{GS} = -25V
Q_g	Total gate charge	—	75	—	nC	I_D = 40A,
Q_{gs}	Gate-to-Source charge	—	15	—		V_{DS}=50V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	35	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on delay time	—	18	—	ns	V_{GS}=10V, V_{DD} =30V,
t_r	Rise time	—	30	—		R_{GEN}=2.5Ω
$t_{d(off)}$	Turn-Off delay time	—	54	—		I_D =2A
t_f	Fall time	—	26	—		
C_{iss}	Input capacitance	—	2800	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	280	—		V_{DS} = 25V
C_{rss}	Reverse transfer capacitance	—	260	—		f = 1MHz

Source-Drain Ratings and Characteristics

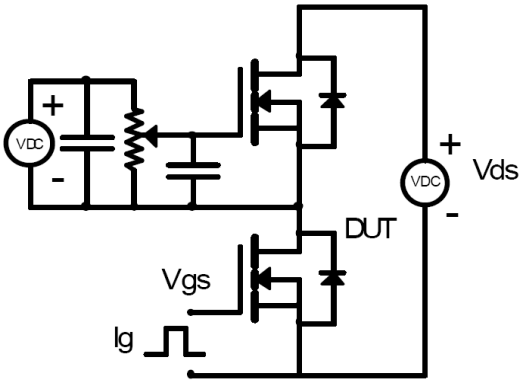
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode) ①	—	—	68	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Maximum Body-Diode Pulse Current	—	—	272	A	
V_{sd}	Diode Forward Voltage	—	—	0.99	V	I_S=40A, V_{GS}=0V, T_J = 25°C
trr	Reverse Recovery Time	—	25	—	ns	I_S=75A,di/dt=100A/us
Qrr	Reverse Recovery Charge	—	30	—	nC	

Test circuits and Waveforms

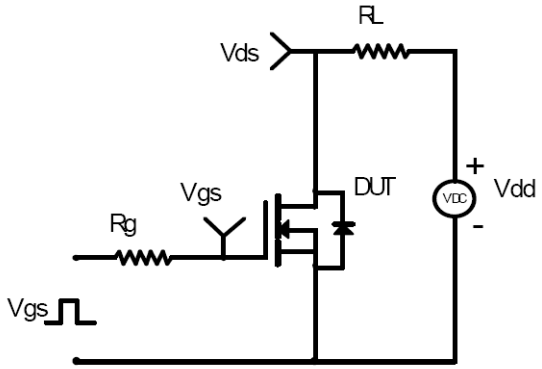
EAS Test Circuit:



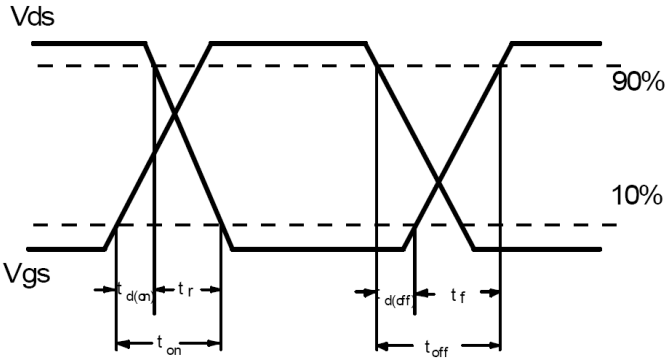
Gate charge test circuit:



Switching Time Test Circuit:



Switching Waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation P_D is based on max. junction temperature, using junction-to-case thermal resistance.

Typical electrical and thermal characteristics

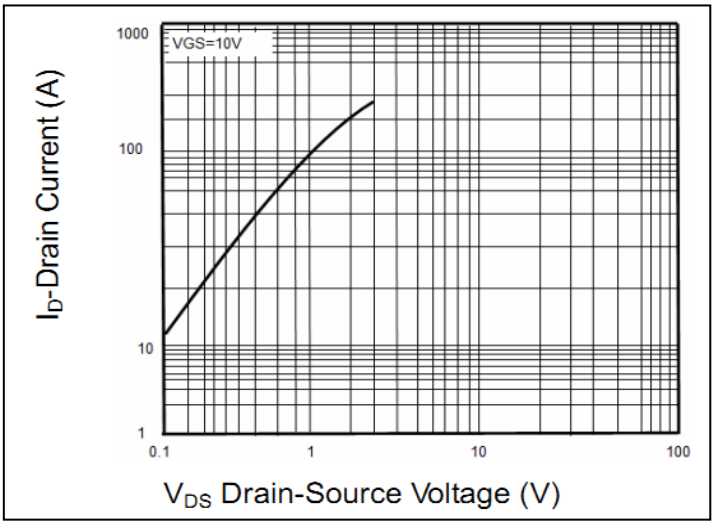


Figure 1: Typical Output Characteristics

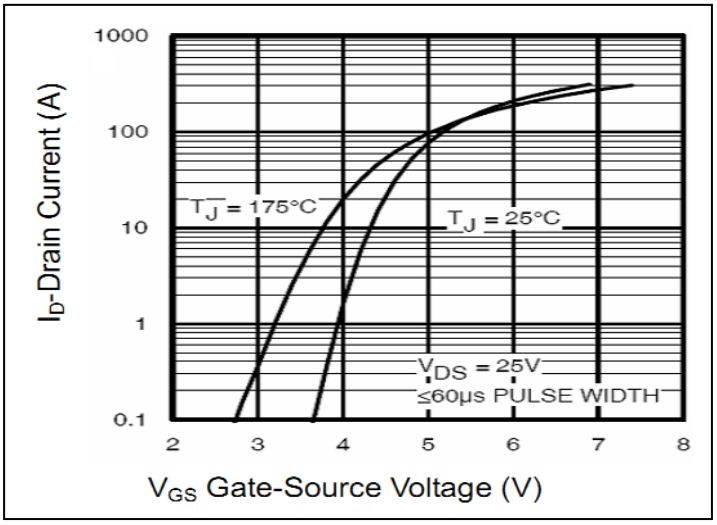


Figure 2:Typical Transfer Characteristics

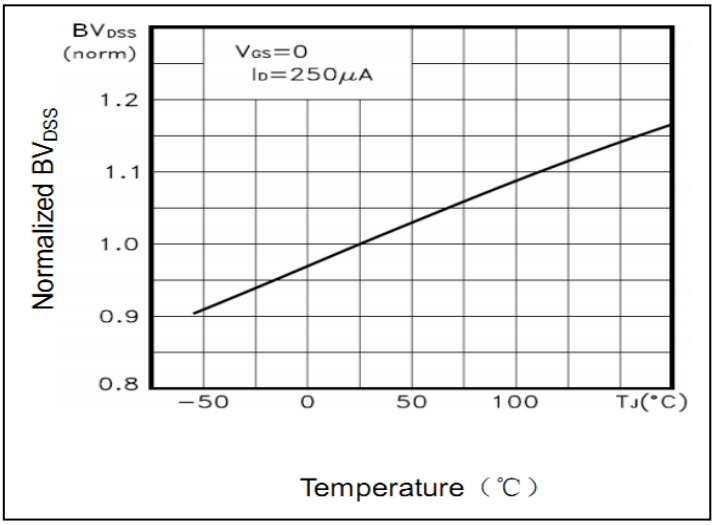


Figure 3: BVdss-Junction Temperature

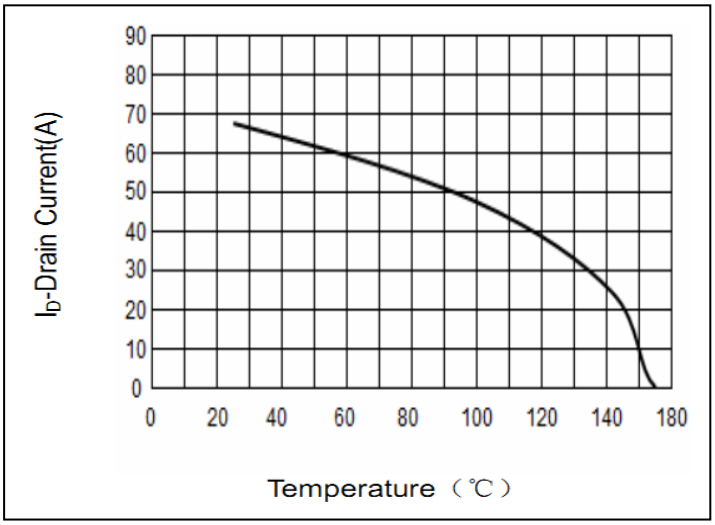


Figure 4: ID-Junction Temperature

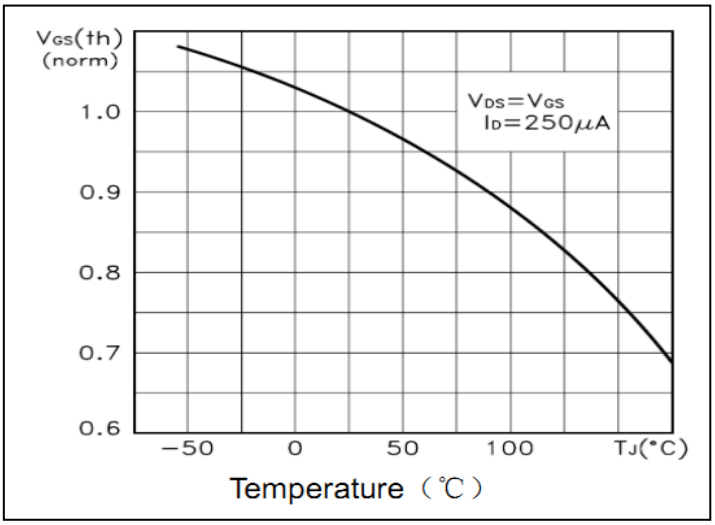


Figure 5: VGS(th)-Junction Temperature

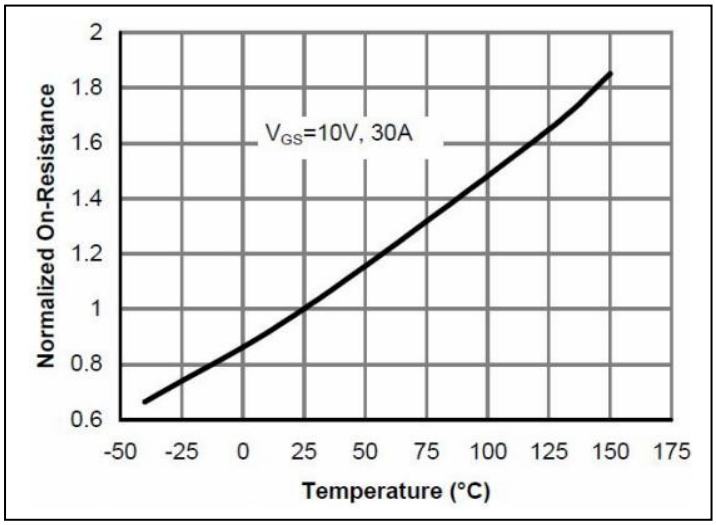


Figure 6: Rdson-Junction Temperature

Typical electrical and thermal characteristics

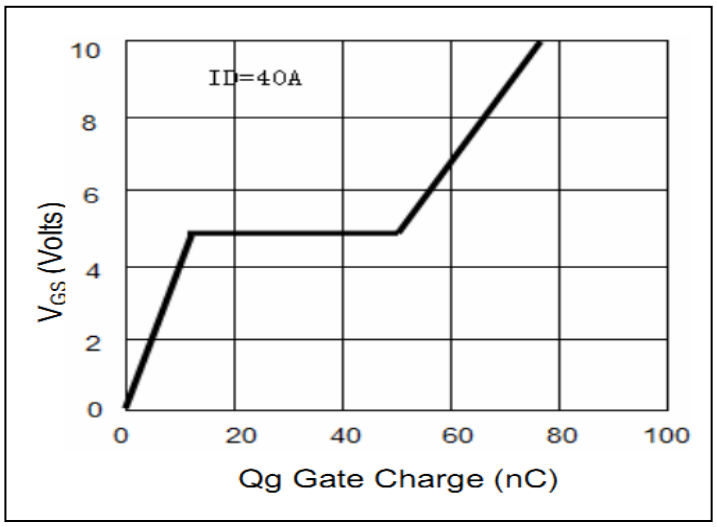


Figure 7: Gate Charge

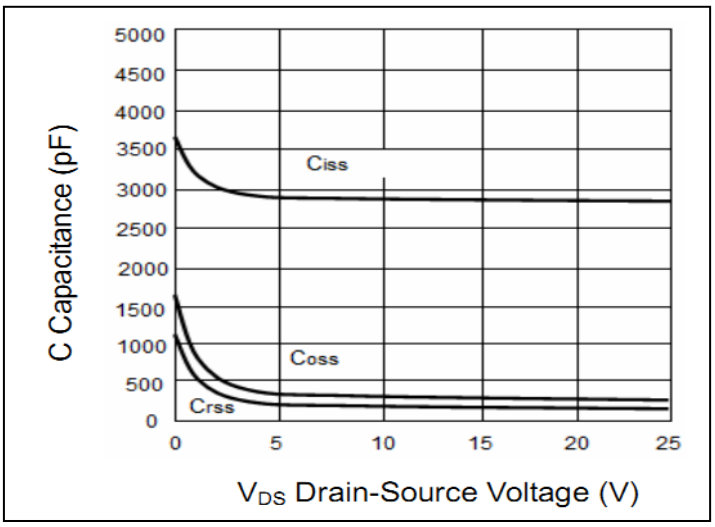


Figure 8: Capacitance

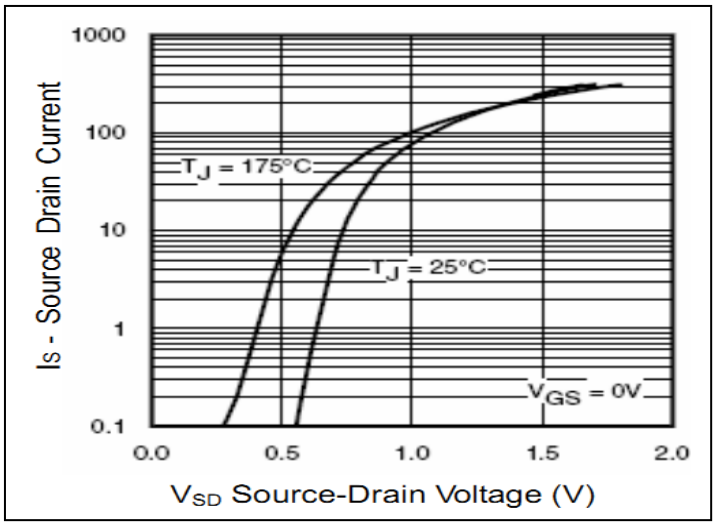


Figure 9:Source-Drain Diode Forward

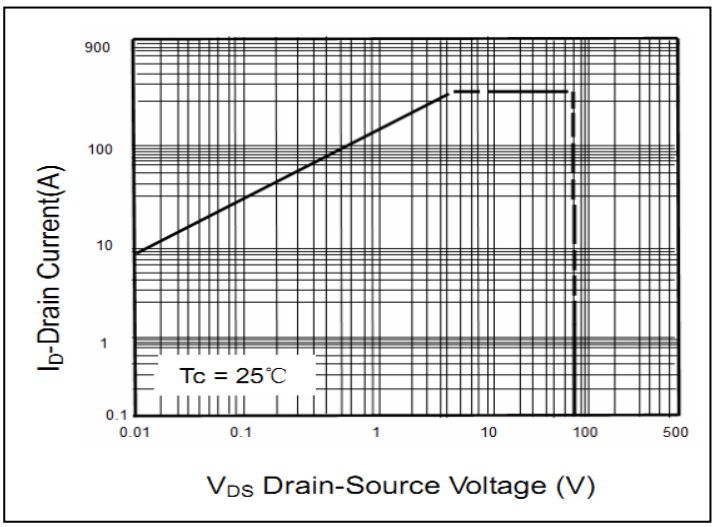


Figure10: Safe Operation Area

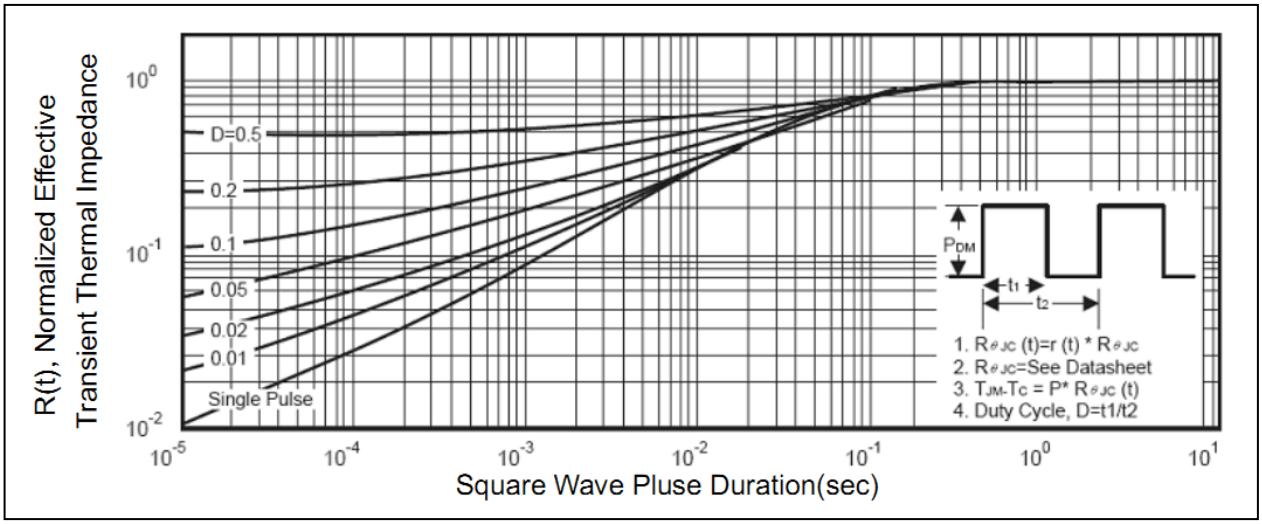
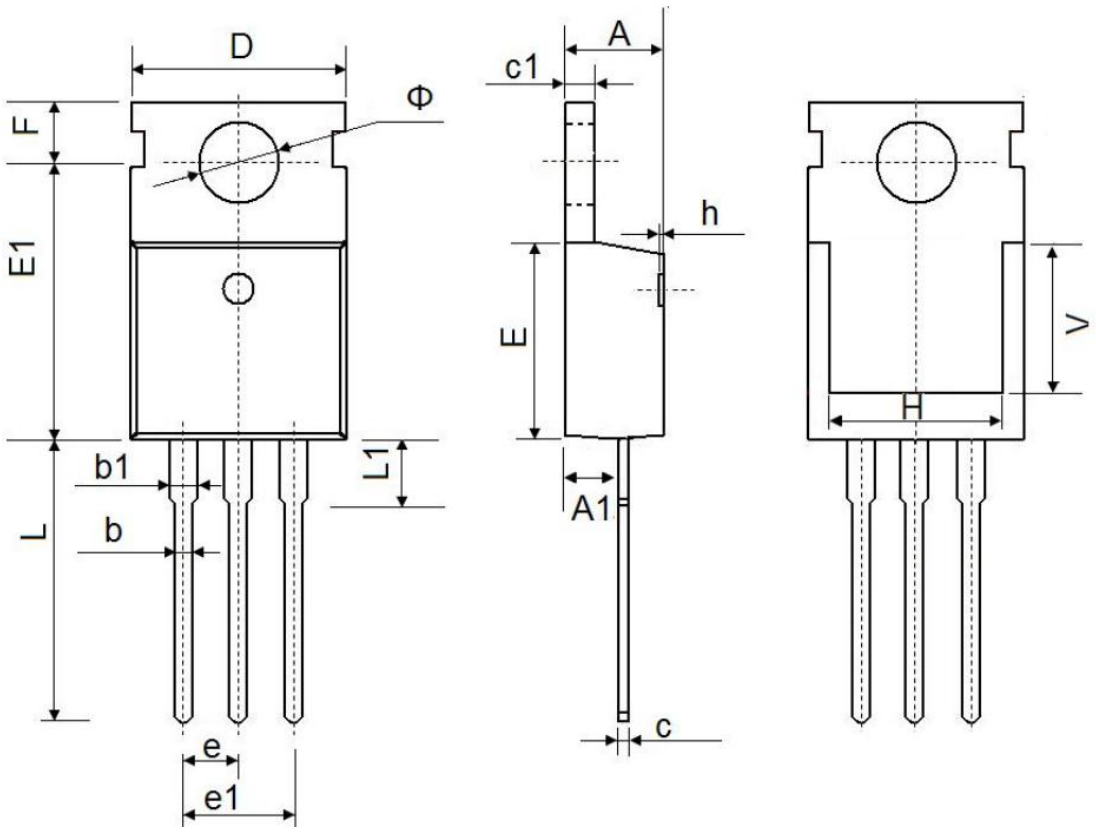


Figure 11: Normalized Maximum Transient Thermal Impedance

Mechanical Data：



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
c	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157

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Customer Service

Worldwide Sales and Service:

Sales@silikron.com

Technical Support:

Technical@silikron.com

Suzhou Silikron Semiconductor Corp.

501 , NW-20,Nanopolis, 99th Jinjihu Avenue ,Industrial Park ,Suzhou ,P.R, CHINA

TEL: (86-512) 62560688

FAX: (86-512) 62560688-8092

E-mail: Sales@silikron.com