Ruichips®

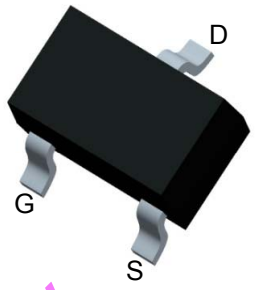
RU20P7C

P-Channel Advanced Power MOSFET

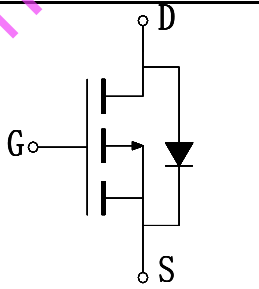
Features

- -20V/-5A,
  $R_{DS\ (ON)}$ =20mΩ(Typ.)@V_{GS}=-4.5V
  $R_{DS\ (ON)}$ =30mΩ(Typ.)@V_{GS}=-2.5V
- Low On-Resistance
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description



SOT23-3



P-Channel MOSFET

Applications

- Load Switch
- Power Management
- Battery Protection

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		-20	V
V_{GSS}	Gate-Source Voltage		±16	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_A=25°C	-1	A
Mounted on Large Heat Sink				
I_{DP} ①	300μs Pulse Drain Current Tested	T_A=25°C	-20	A
I_D ②	Continuous Drain Current(V_{GS}=-4.5V)	T_A=25°C	-5	A
		T_A=70°C	-4	
P_D	Maximum Power Dissipation	T_A=25°C	1.3	W
		T_A=70°C	0.8	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		-	°C/W
$R_{\theta JA}$ ③	Thermal Resistance-Junction to Ambient		100	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ④	Avalanche Energy, Single Pulsed		-	mJ

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU20P7C			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=-250μA	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V			-1	μA
		T_J=125°C			-30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250μA	-0.4	-0.7	-1.1	V
I_{GSS}	Gate Leakage Current	V_{GS}=±16V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ ⑤	Drain-Source On-state Resistance	V_{GS}=-4.5V, I_{DS}=-5A		20	28	mΩ
		V_{GS}=-2.5V, I_{DS}=-4A		30	38	mΩ
Diode Characteristics						
V_{SD} ⑤	Diode Forward Voltage	I_{SD}=-1A, V_{GS}=0V			-1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=-5A, dI_{SD}/dt=100A/μs		17		ns
Q_{rr}	Reverse Recovery Charge			23		nC
Dynamic Characteristics ⑥						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		0.9		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-10V, Frequency=1.0MHz		640		pF
C_{oss}	Output Capacitance			135		
C_{rss}	Reverse Transfer Capacitance			65		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-10V, R_L=3.8Ω, I_{DS}=-5A, V_{GEN}=-4.5V, R_G=6Ω		9		ns
t_r	Turn-on Rise Time			16		
$t_{d(OFF)}$	Turn-off Delay Time			45		
t_f	Turn-off Fall Time			21		
Gate Charge Characteristics ⑥						
Q_g	Total Gate Charge	V_{DS}=-16V, V_{GS}=-10V, I_{DS}=-5A		10		nC
Q_{gs}	Gate-Source Charge			2		
Q_{gd}	Gate-Drain Charge			3		

Notes:
①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature.
③When mounted on 1 inch square copper board, t≤10sec. The value in any given application depends on the user's specific board design.
④Limited by $T_{Jmax.}$ Starting T_J = 25°C.
⑤Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑥Guaranteed by design, not subject to production testing.

Ordering and Marking Information

Device	Marking①	Package	Packaging	Quantity	Reel Size	Tape width
RU20P7C	TXYWW	SOT23-3	Tape&Reel	3000	7''	8mm

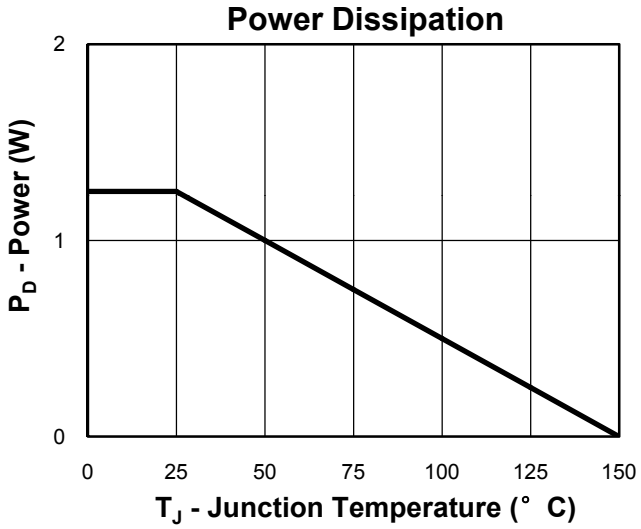
① The following characters could be different and means:

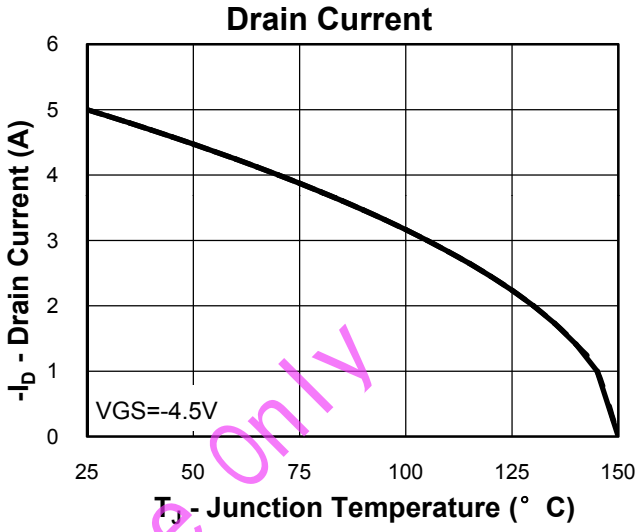
X =Assembly site code

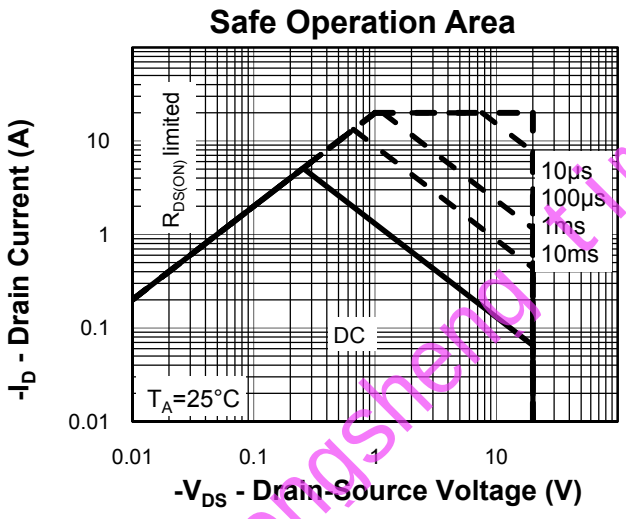
Y =Year

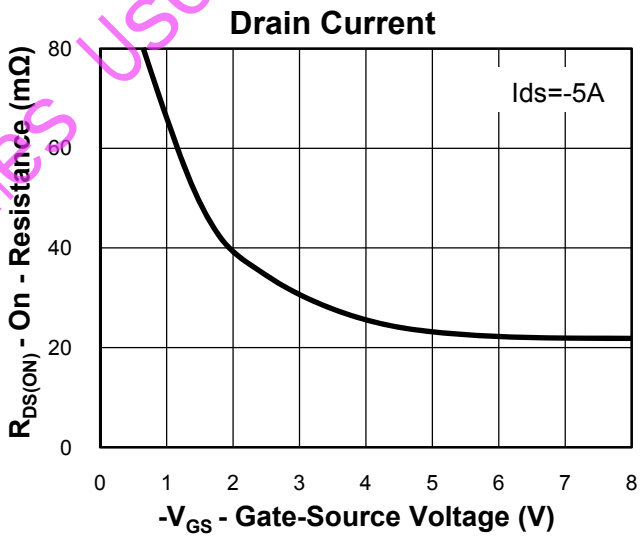
WW =Work Week

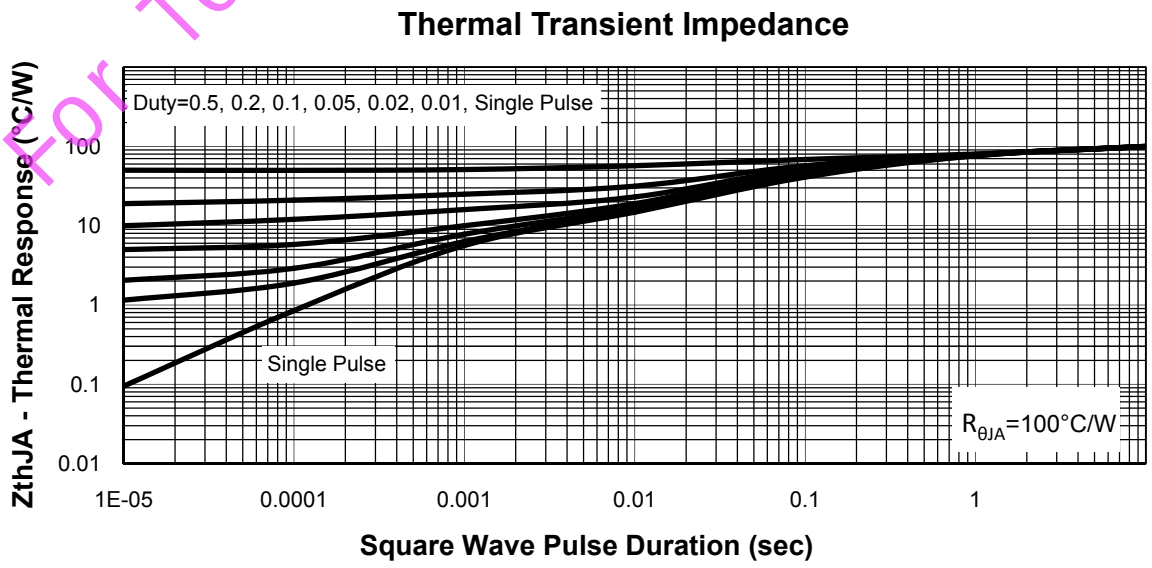
Typical Characteristics





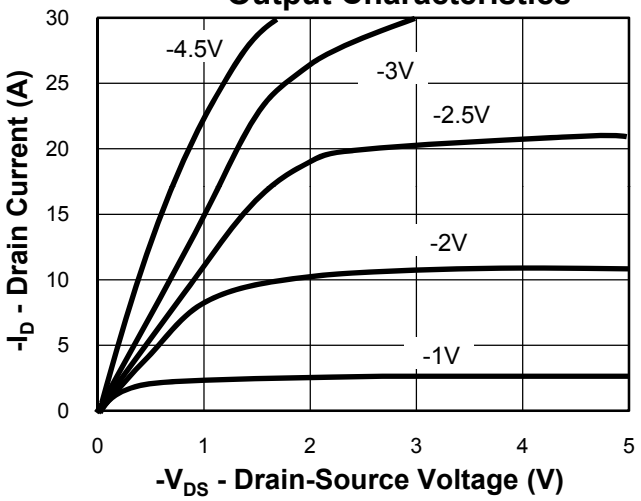




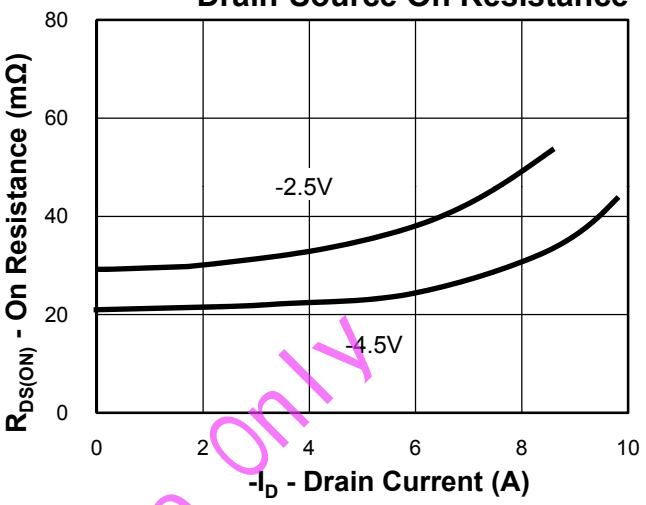


Typical Characteristics

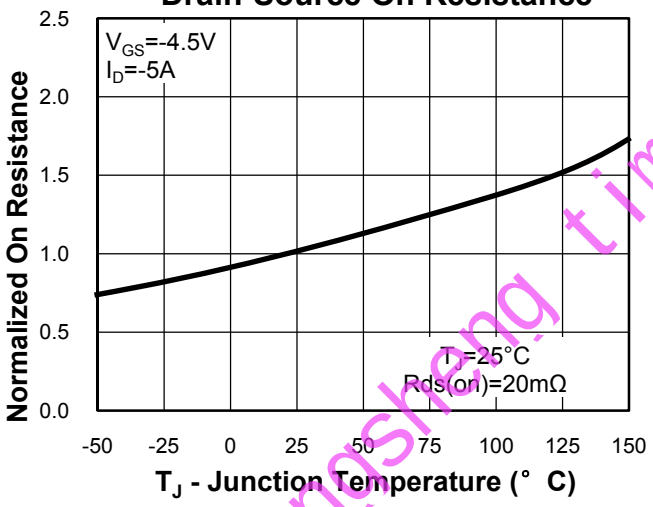
Output Characteristics



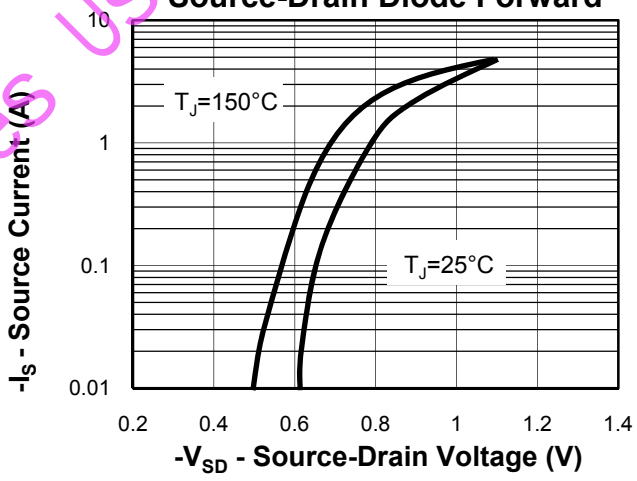
Drain-Source On Resistance



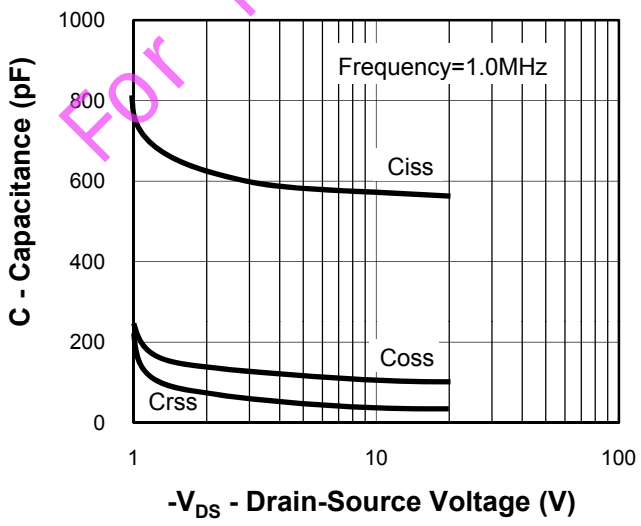
Drain-Source On Resistance



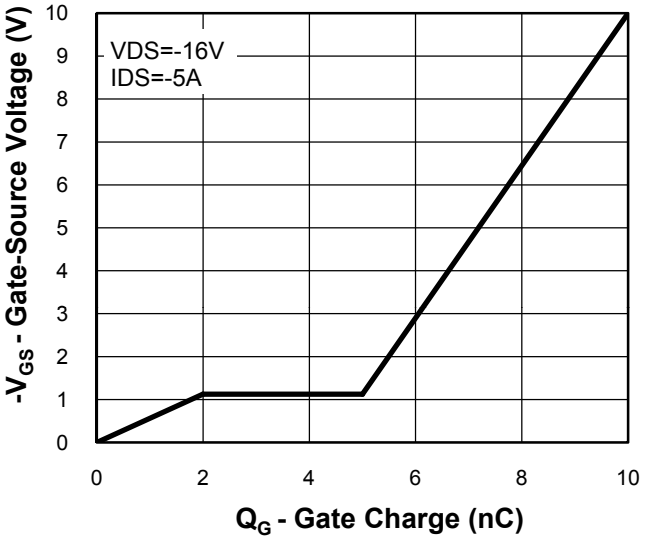
Source-Drain Diode Forward



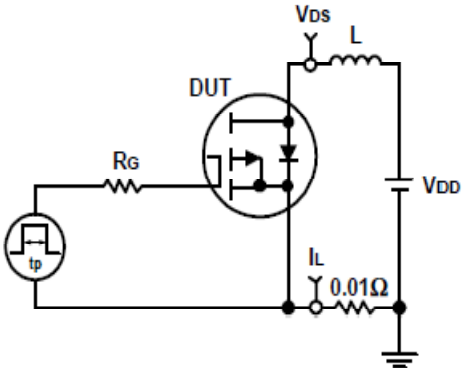
Capacitance

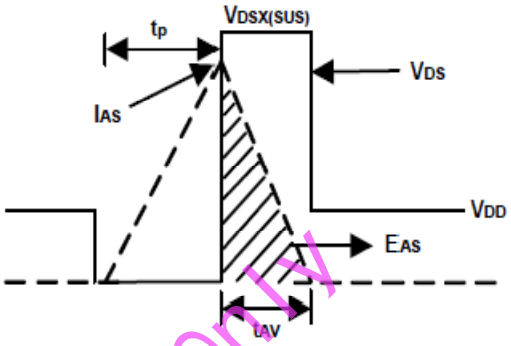


Gate Charge

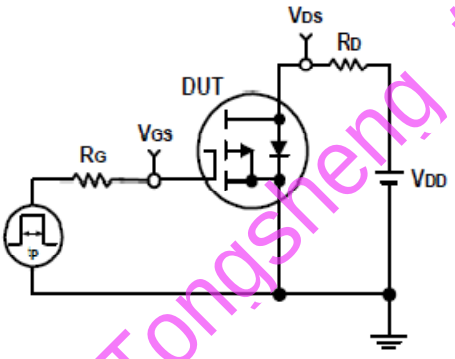


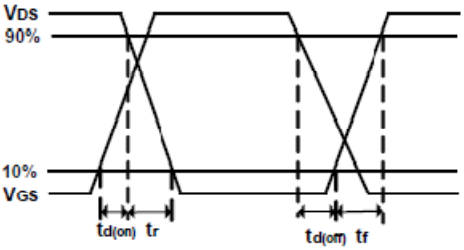
Avalanche Test Circuit and Waveforms





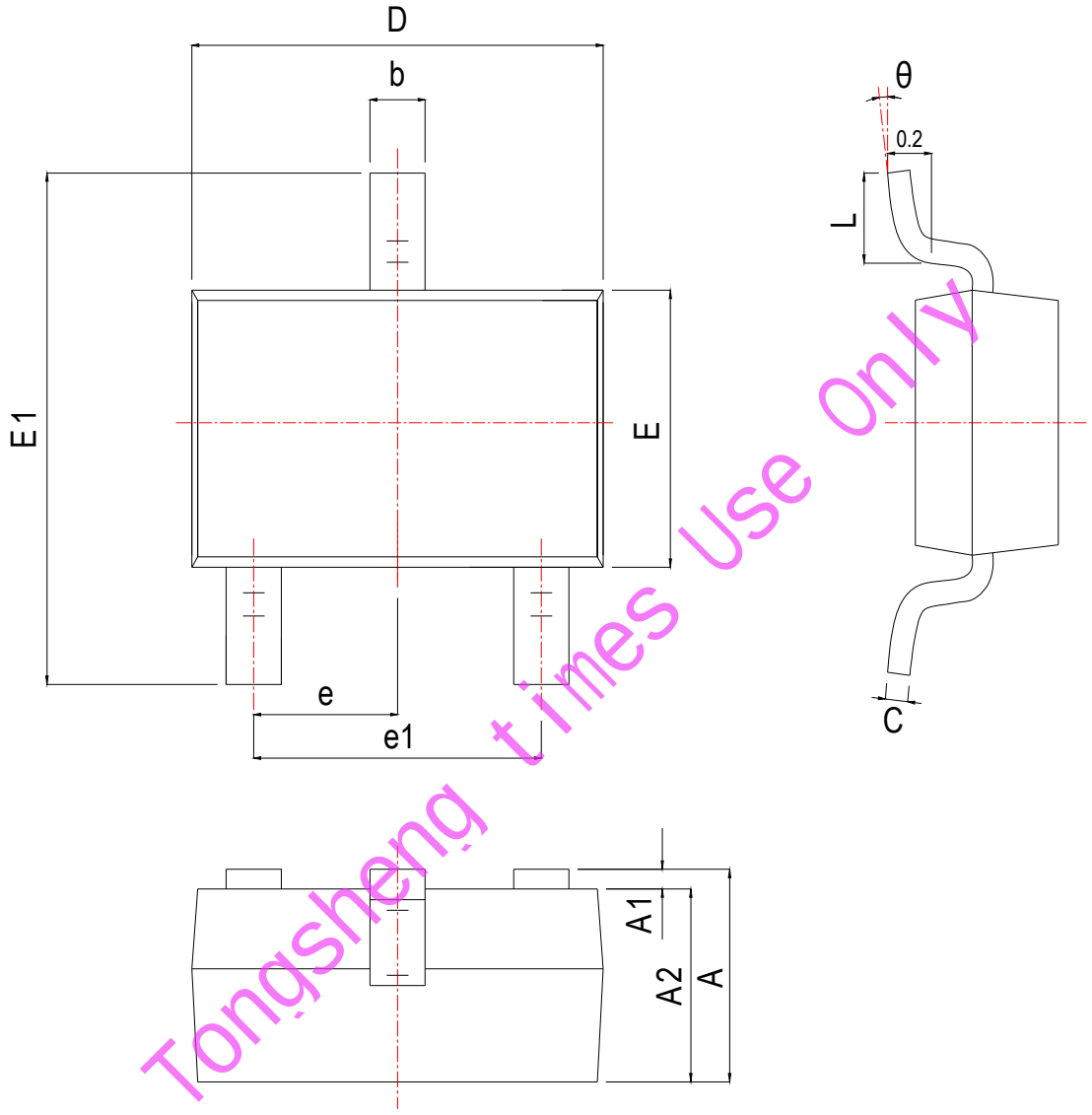
Switching Time Test Circuit and Waveforms





Package Information

SOT23-3



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.050	1.150	1.250	0.041	0.045	0.049
A1	0.000	0.050	0.100	0.000	0.002	0.004
A2	1.050	1.100	1.150	0.041	0.043	0.045
b	0.300	0.400	0.500	0.012	0.016	0.020
c	0.100	0.150	0.200	0.004	0.006	0.008
D	2.820	2.920	3.020	0.111	0.115	0.119
E	1.500	1.600	1.700	0.059	0.063	0.067
E1	2.650	2.800	2.950	0.104	0.110	0.116
e	0.950 BSC			0.037 BSC		
e1	1.800	1.900	2.000	0.071	0.075	0.079
L	0.300	0.450	0.600	0.012	0.018	0.024
θ	0°	4°	8°	0°	4°	8°

Customer Service

Worldwide Sales and Service:
Sales@ruichips.com

Technical Support:
Technical@ruichips.com

Investor Relations Contacts:
Investor@ruichips.com

Marcom Contact:
Marcom@ruichips.com

Editorial Contact:
Editorial@ruichips.comm

HR Contact:
HR@ruichips.com

Legal Contact:
Legal@ruichips.com

Shen Zhen RUICHIPS Semiconductor CO., LTD
4th Floor, Block 8, Changyuan New Material Port, Keyuan Middle Road, Science & Industry Park,
Nanshan District, Shenzhen, CHINA

TEL: (86-755) 8311-5334
FAX: (86-755) 8311-4278
E-mail: Sales-SZ@ruichips.com