

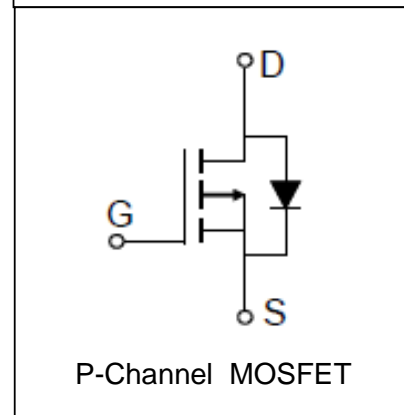
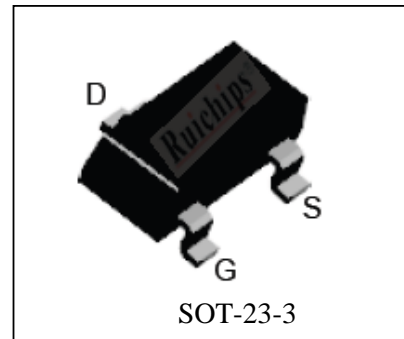
Features

- -20V/-4A,
 $R_{DS(ON)} = 40m\Omega$ (Typ.) @ $V_{GS} = -4.5V$
 $R_{DS(ON)} = 55m\Omega$ (Typ.) @ $V_{GS} = -2.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Available

Applications

- Power Management
- Load Switch

Pin Description



Absolute Maximum Ratings

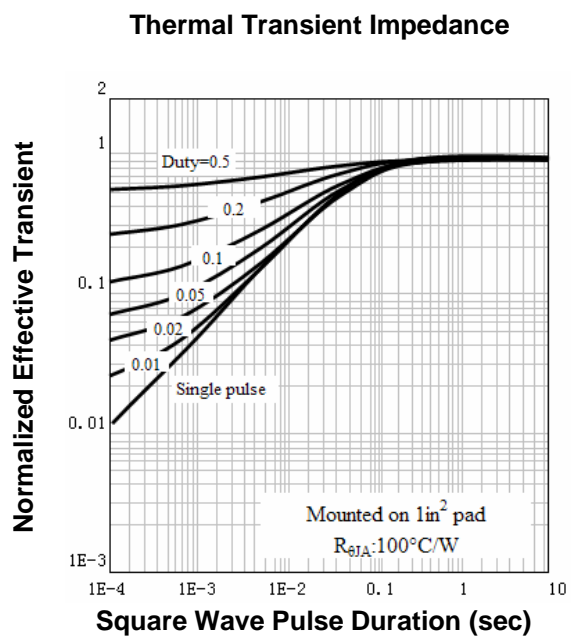
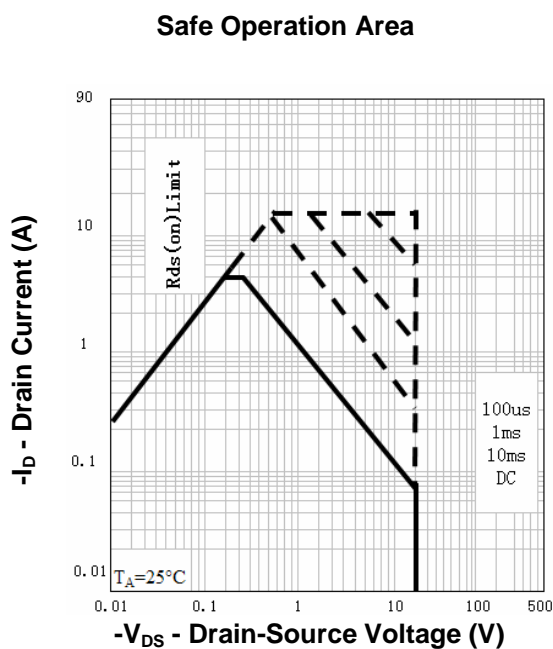
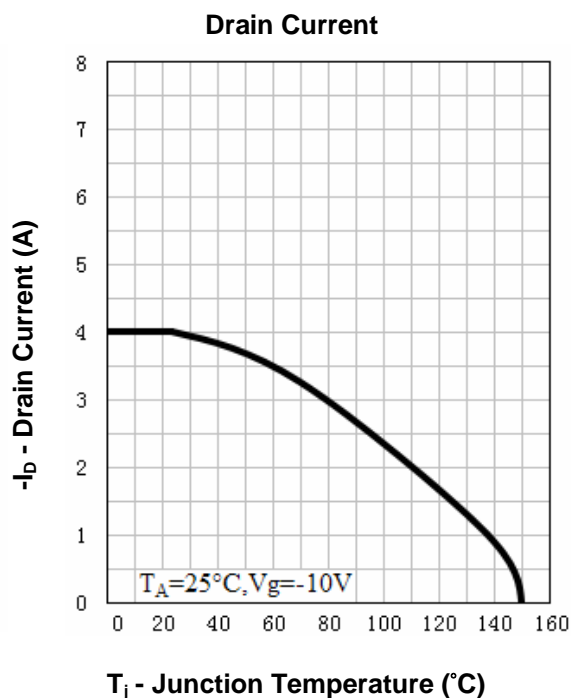
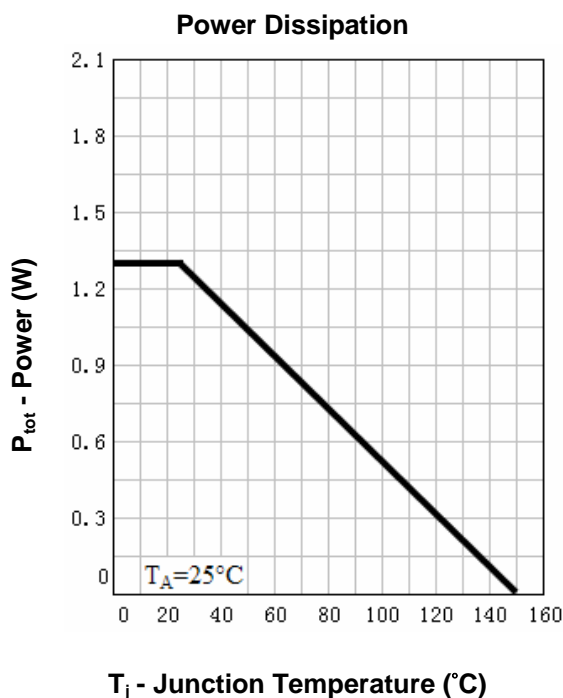
Symbol	Parameter	Rating	Unit	
Common Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage	-20	V	
V_{GSS}	Gate-Source Voltage	± 12		
T_J	Maximum Junction Temperature	150	$^\circ C$	
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$	
I_S	Diode Continuous Forward Current	$T_A = 25^\circ C$	-1.5	A
Mounted on Large Heat Sink				
I_{DP}	300 μs Pulse Drain Current Tested	$T_A = 25^\circ C$	-16 ^①	A
I_D	Continuous Drain Current	$T_A = 25^\circ C$	-4	A
		$T_A = 70^\circ C$	-3.2	
P_D	Maximum Power Dissipation	$T_A = 25^\circ C$	1.3	W
		$T_A = 70^\circ C$	0.8	
$R_{\theta JA}$ ^②	Thermal Resistance-Junction to Ambient		100	$^\circ C/W$

Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU20P4C			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			-1	μA
					-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-0.4	-0.7	-1.1	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 10V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(3)}$	Drain-Source On-state Resistance	$V_{GS}=-4.5V, I_{DS}=-4A$		40	60	$m\Omega$
		$V_{GS}=-2.5V, I_{DS}=-3A$		55	100	$m\Omega$
Diode Characteristics						
$V_{SD}^{(3)}$	Diode Forward Voltage	$I_{SD}=-1A, V_{GS}=0V$			-1	V
t_{rr}	Reverse Recovery Time	$I_{SD}=-4A, dI_{SD}/dt=100A/\mu s$		15		ns
Q_{rr}	Reverse Recovery Charge			8		nC
Dynamic Characteristics ⁽⁴⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		7.5		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-10V,$ Frequency=1.0MHz		585		pF
C_{oss}	Output Capacitance			95		
C_{rss}	Reverse Transfer Capacitance			50		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-10V, R_L=2.5\Omega,$ $I_{DS}=-4A, V_{GEN}=-4.5V,$ $R_G=6\Omega$		8		ns
t_r	Turn-on Rise Time			11		
$t_{d(OFF)}$	Turn-off Delay Time			30		
t_f	Turn-off Fall Time			10		
Gate Charge Characteristics ⁽⁴⁾						
Q_g	Total Gate Charge	$V_{DS}=-16V, V_{GS}=-4.5V,$ $I_{DS}=-4A$		9	13	nC
Q_{gs}	Gate-Source Charge			1.8		
Q_{gd}	Gate-Drain Charge			2.9		

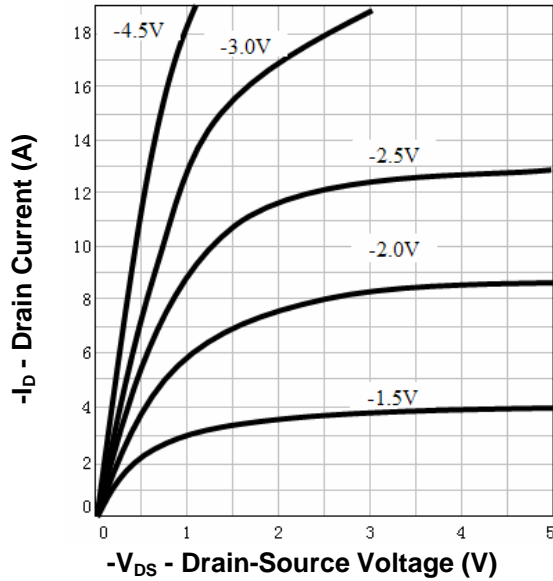
- Notes: ① Pulse width limited by safe operating area.
 ② When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 ③ Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 ④ Guaranteed by design, not subject to production testing.

Typical Characteristics

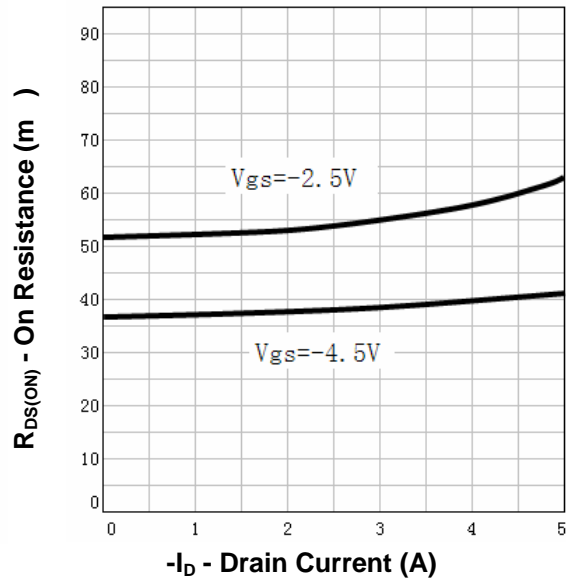


Typical Characteristics

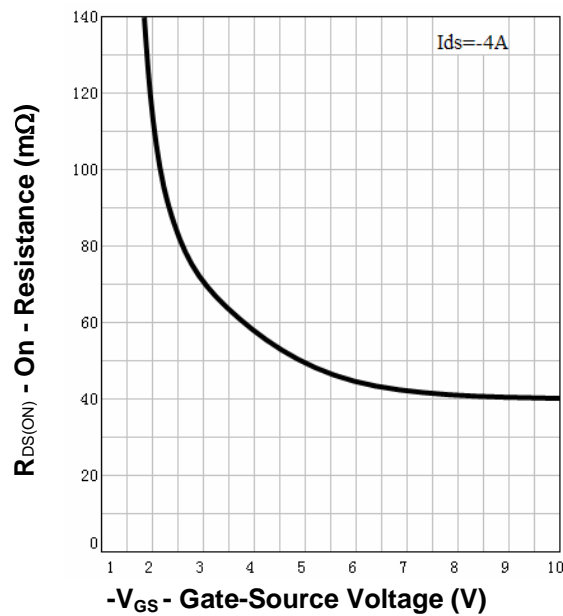
Output Characteristics



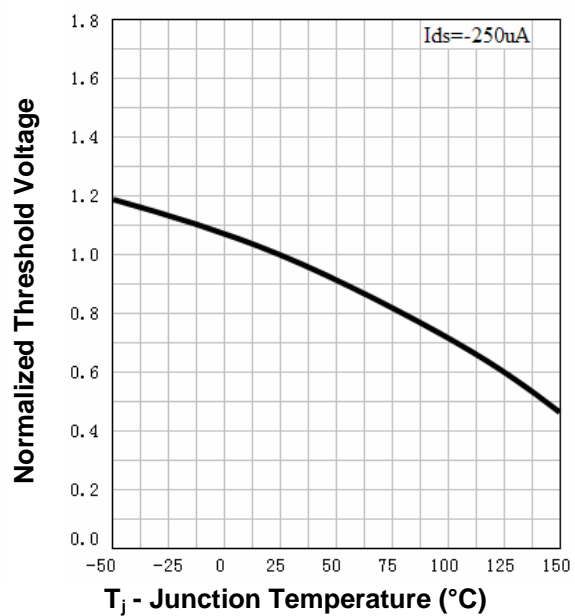
Drain-Source On Resistance



Drain-Source On Resistance

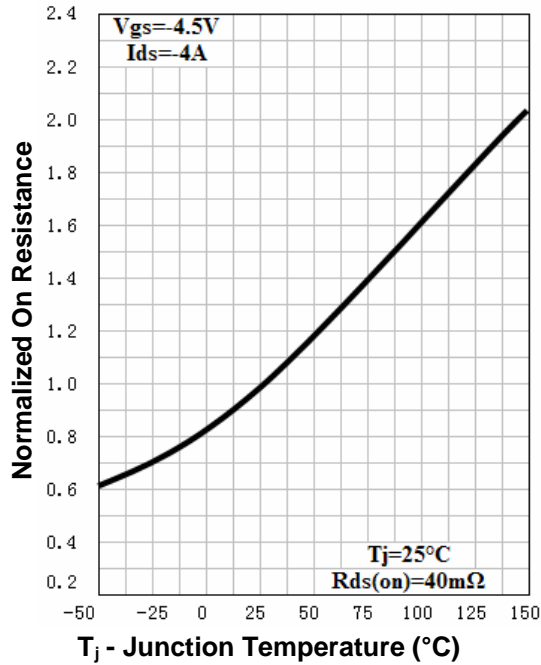


Gate Threshold Voltage

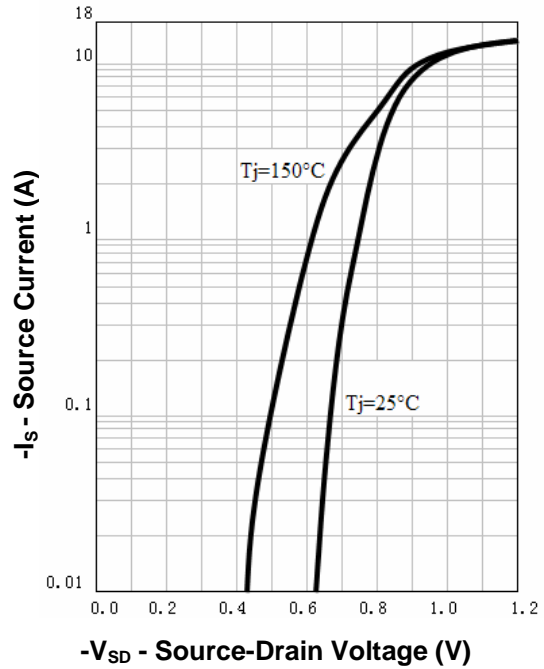


Typical Characteristics

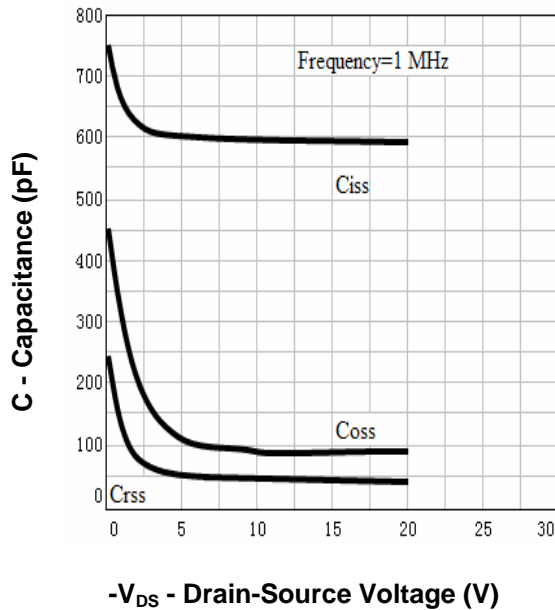
Drain-Source On Resistance



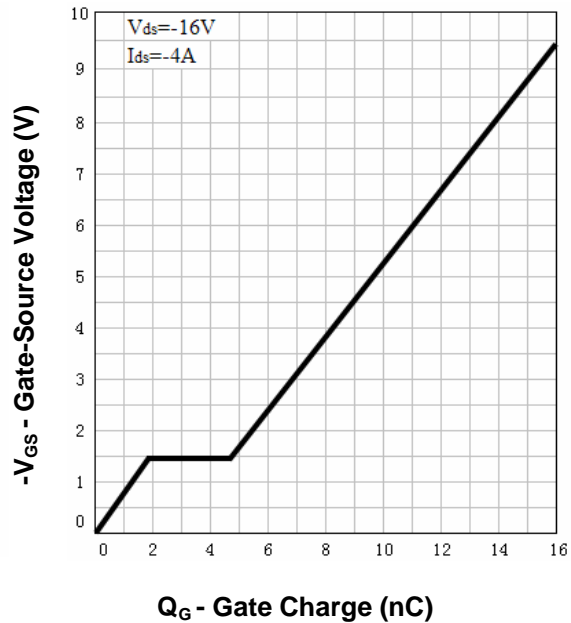
Source-Drain Diode Forward



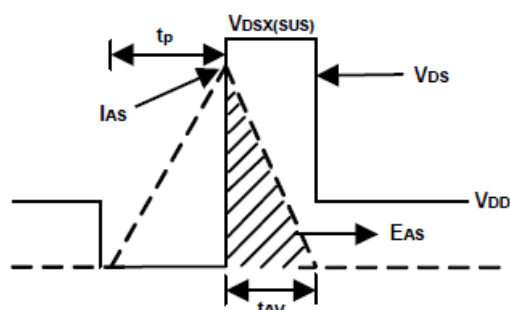
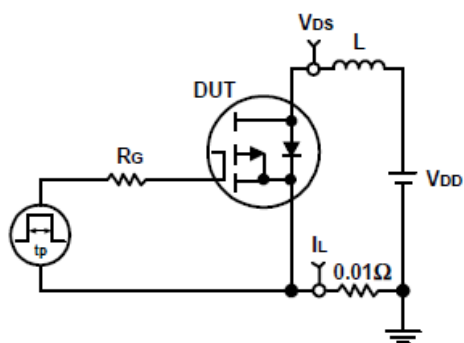
Capacitance



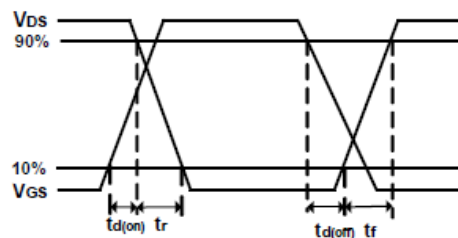
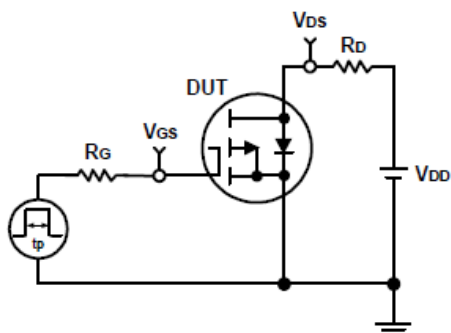
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Ordering and Marking Information**RU20P4****Package (Available)**

C : SOT-23-3

Operating Temperature Range

C : -55 to 150 °C

Assembly Material

G : Green & Lead Free

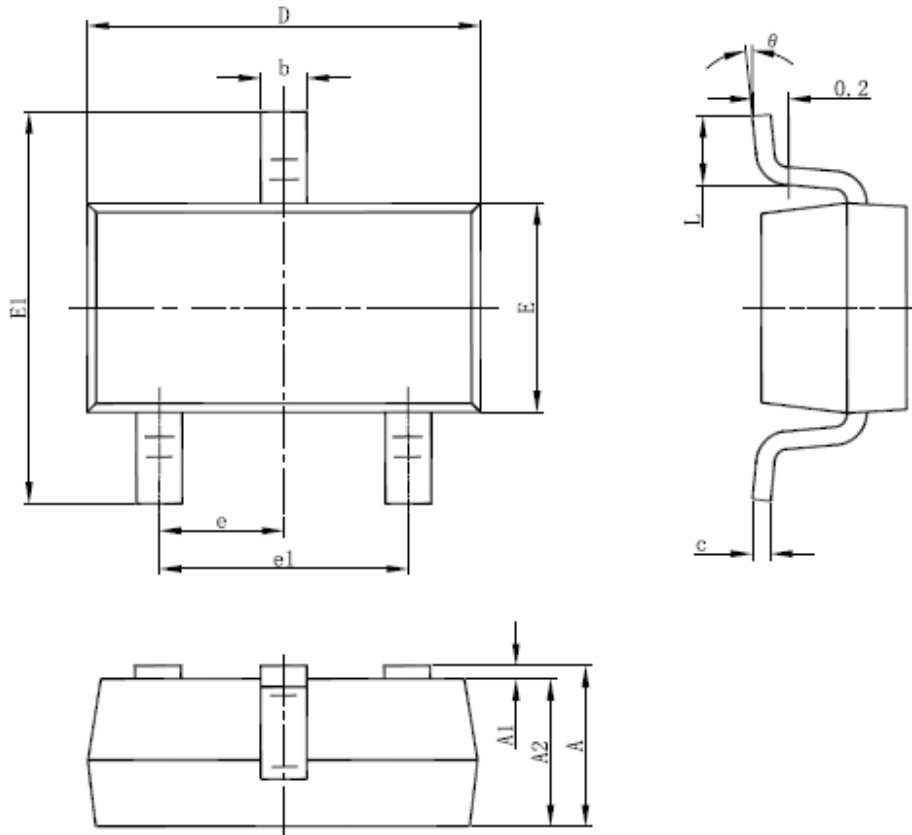
Packaging

T : TUBE

TR : Tape & Reel

Package Information

SOT-23-3



SYMBOL	MM		INCH		SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049	E	1.500	1.700	0.059	0.067
A1	0.0000	0.100	0.000	0.004	E1	2.650	2.950	0.104	0.116
A2	1.050	1.150	0.041	0.045	e	0.950(BSC)		0.037(BSC)	
b	0.300	0.500	0.012	0.020	e1	1.800	2.000	0.071	0.079
c	0.100	0.200	0.004	0.008	L	0.300	0.600	0.012	0.024
D	2.820	3.020	0.111	0.119	θ	0°	8°	0°	8°

ALL DIMENSIONS REFER TO JEDEC STANDARD
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS

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.com

HR Contact:

HR@ruichips.com

Legal Contact:

Legal@ruichips.com

Shen Zhen RUICHIPS Semiconductor CO., LTD

Room 501, the 5floor An Tong Industrial Building,
NO.207 Mei Hua Road Fu Tian Area Shen Zhen City, CHINA

TEL: (86-755) 8311-5334

FAX: (86-755) 8311-4278

E-mail: Sales-SZ@ruichips.com