

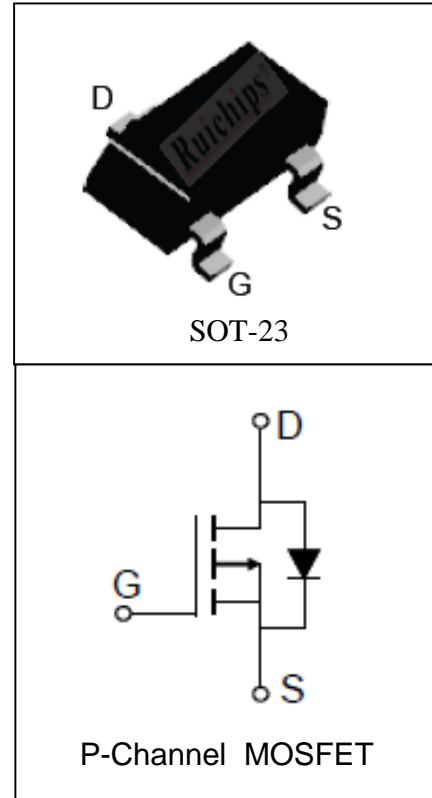
### Features

- -20V/-3A,  
 $R_{DS(ON)} = 80m\Omega$  (Typ.) @  $V_{GS} = -4.5V$   
 $R_{DS(ON)} = 110m\Omega$  (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

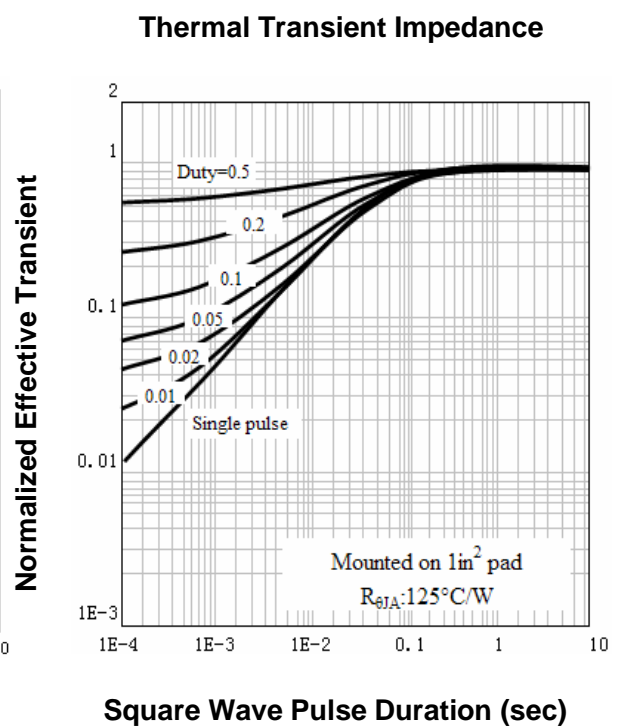
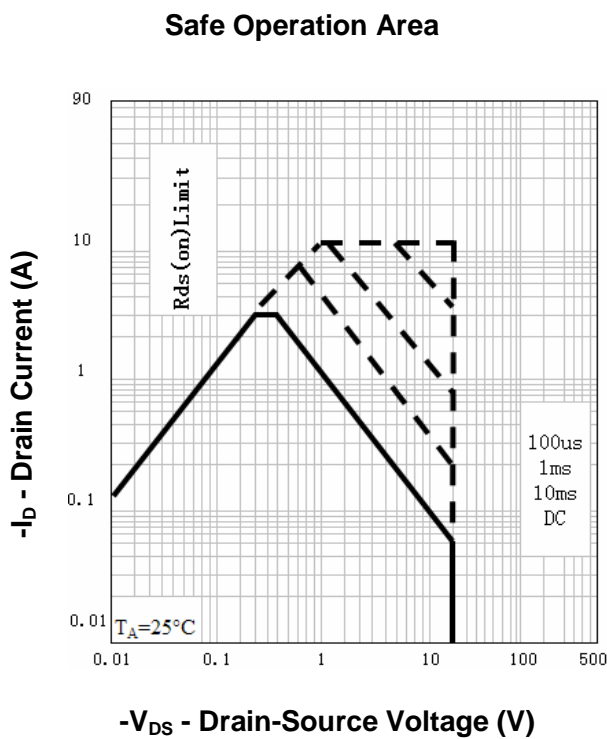
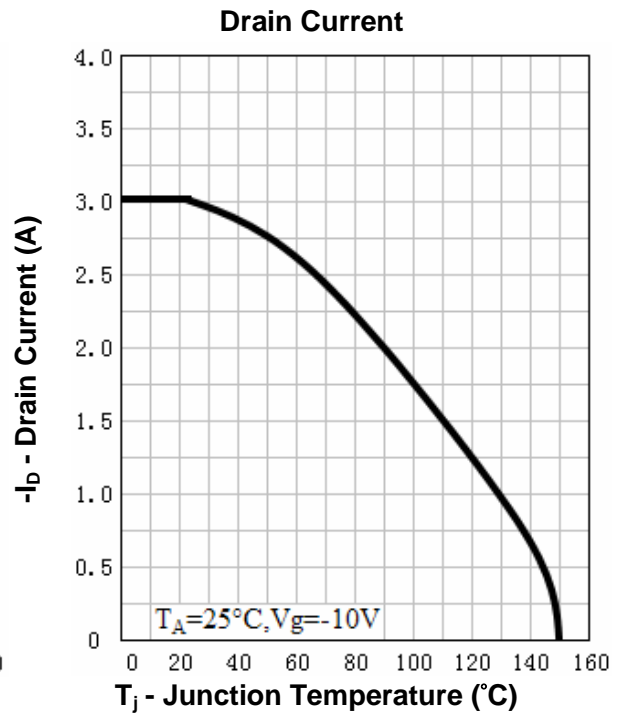
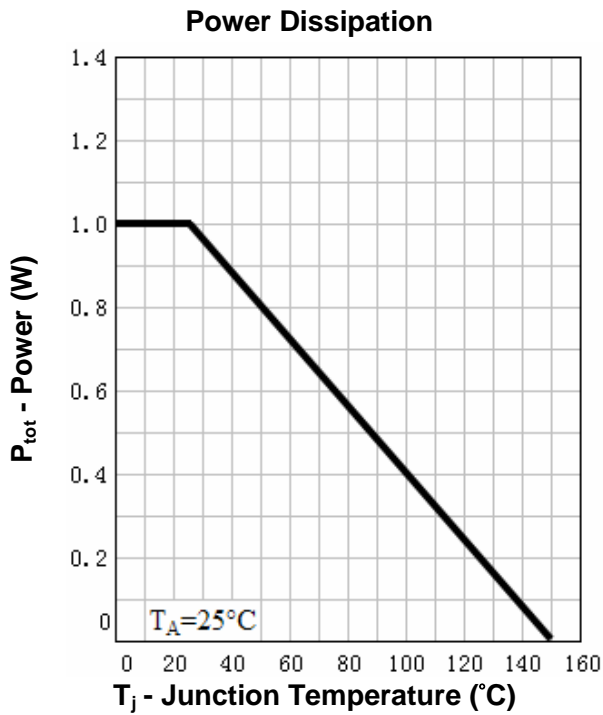
Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_A = 25^\circ C$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	-20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 12$	
$T_J$	Maximum Junction Temperature	150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$I_S$	Diode Continuous Forward Current	$T_A = 25^\circ C$ -1.2	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}$	300 $\mu s$ Pulse Drain Current Tested	$T_A = 25^\circ C$ -12 <sup>①</sup>	A
$I_D$	Continuous Drain Current ( $V_{GS} = -4.5V$ )	$T_A = 25^\circ C$ -3	A
		$T_A = 70^\circ C$ -2.3	
$P_D$	Maximum Power Dissipation	$T_A = 25^\circ C$ 1	W
		$T_A = 70^\circ C$ 0.64	
$R_{\theta JA}$ <sup>②</sup>	Thermal Resistance-Junction to Ambient	125	$^\circ C/W$

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

Symbol	Parameter	Test Condition	RU20P3B			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	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	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-0.5	-	-1	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}^{(3)}$	Drain-Source On-state Resistance	$V_{GS}=-4.5V, I_{DS}=-3A$		80	100	m $\Omega$
		$V_{GS}=-2.5V, I_{DS}=-2A$		110	150	m $\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^{(3)}$	Diode Forward Voltage	$I_{SD}=-1A, V_{GS}=0V$			-1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=-3A, di_{SD}/dt=100A/\mu s$		13		ns
$Q_{rr}$	Reverse Recovery Charge			6		nC
<b>Dynamic Characteristics</b> <sup>(4)</sup>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		2		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-10V,$ Frequency=1.0MHz		480		pF
$C_{oss}$	Output Capacitance			120		
$C_{rss}$	Reverse Transfer Capacitance			40		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=-10V, R_L=3\Omega,$ $I_{DS}=-3A, V_{GEN}=-4.5V,$ $R_G=6\Omega$		8		ns
$t_r$	Turn-on Rise Time			13		
$t_{d(OFF)}$	Turn-off Delay Time			25		
$t_f$	Turn-off Fall Time			12		
<b>Gate Charge Characteristics</b> <sup>(4)</sup>						
$Q_g$	Total Gate Charge	$V_{DS}=-16V, V_{GS}=-4.5V,$ $I_{DS}=-3A$		7		nC
$Q_{gs}$	Gate-Source Charge			1.5		
$Q_{gd}$	Gate-Drain Charge			2.5		

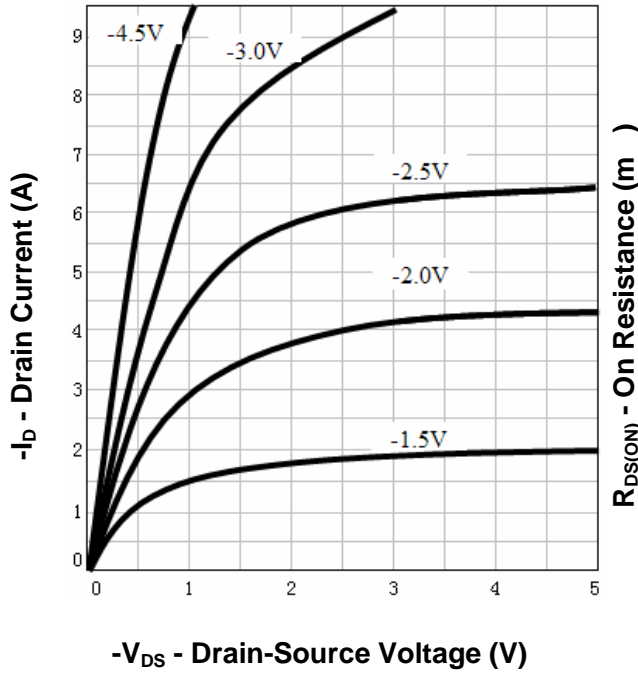
- Notes: ① Pulse width limited by safe operating area.  
 ② When mounted on 1 inch square copper board,  $t \leq 10\text{sec}$ . The value in any given application depends on the user's specific board design.  
 ③ Pulse test ; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .  
 ④ Guaranteed by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

**Typical Characteristics**

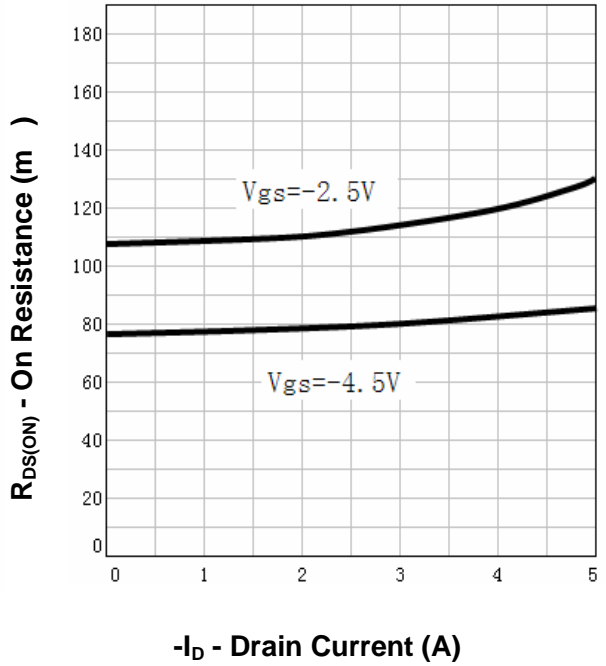


**Typical Characteristics**

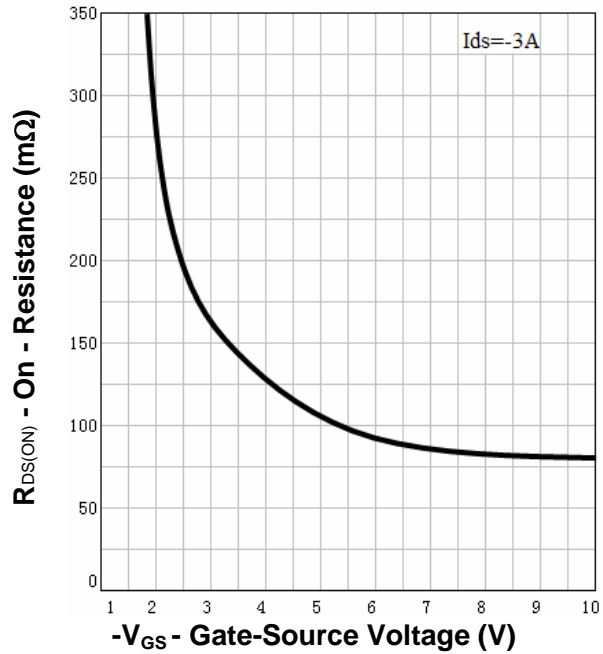
**Output Characteristics**



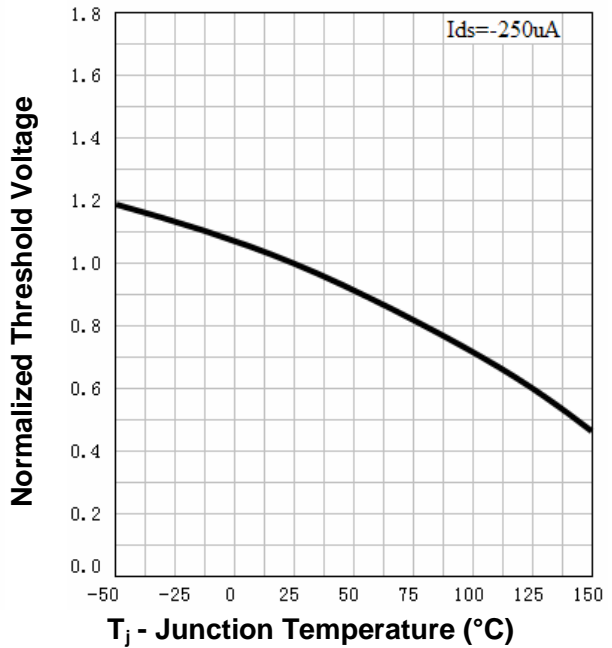
**Drain-Source On Resistance**



**Drain-Source On Resistance**

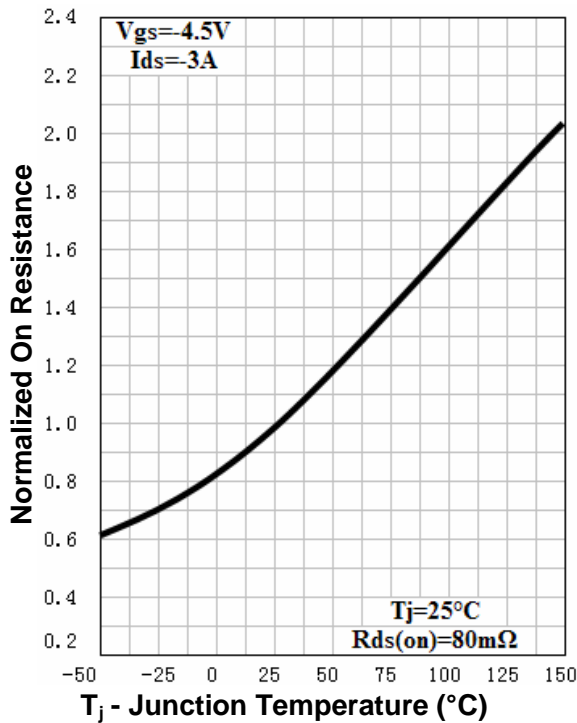


**Gate Threshold Voltage**

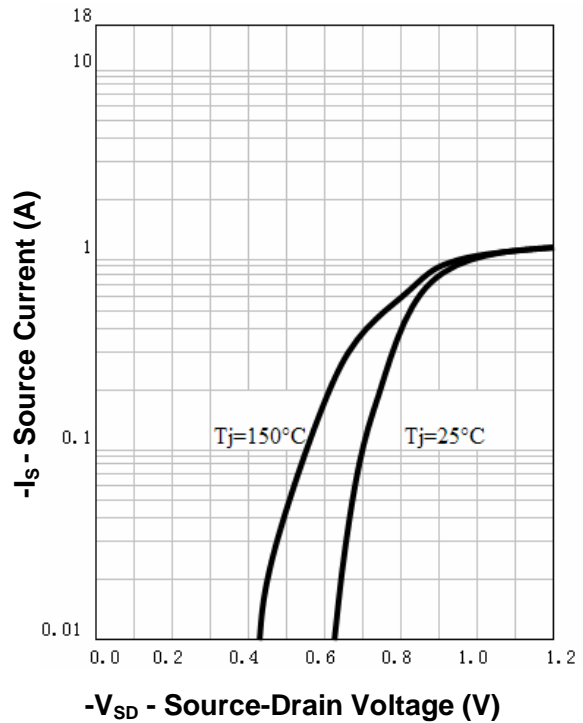


**Typical Characteristics**

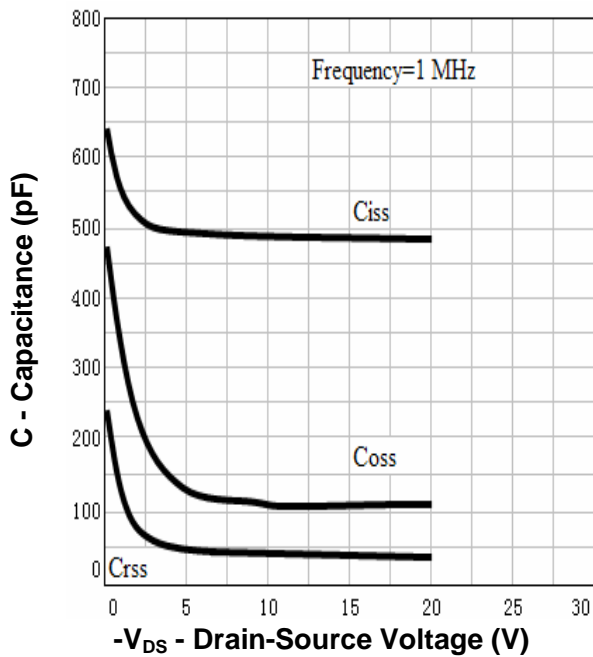
**Drain-Source On Resistance**



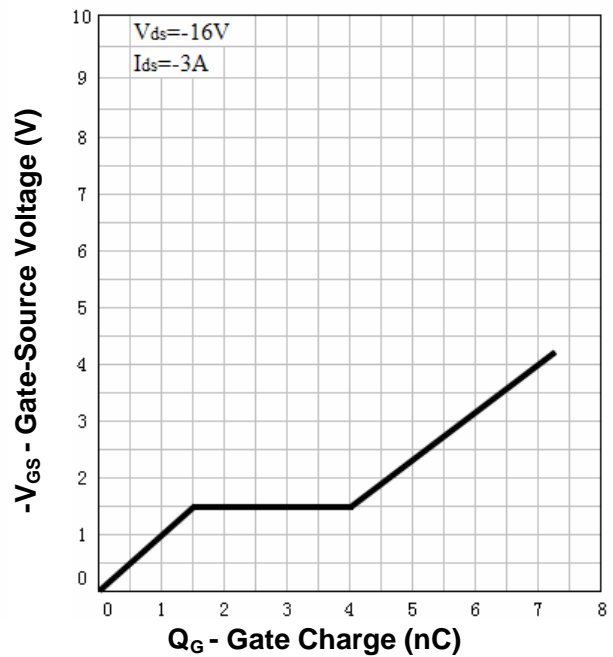
**Source-Drain Diode Forward**



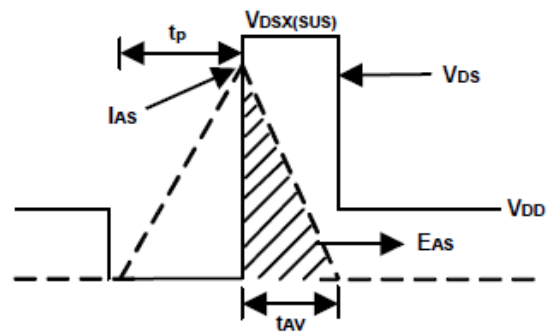
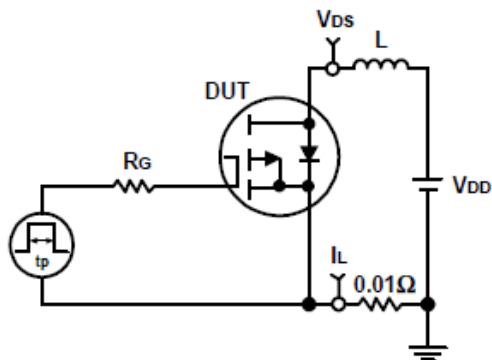
**Capacitance**



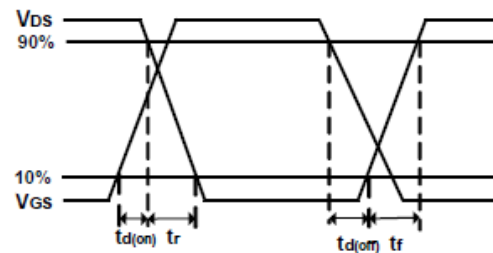
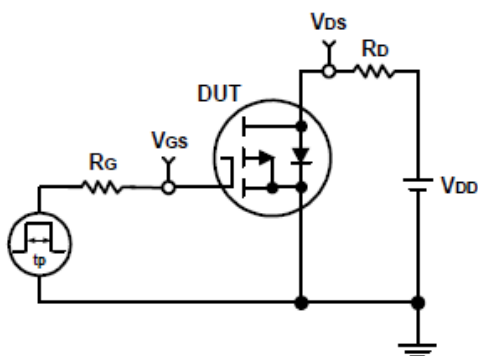
**Gate Charge**



### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms



## Ordering and Marking Information

Device <sup>②</sup>	Marking <sup>①</sup>	Package	Packaging	Quantity	Reel Size	Tape width
RU20P3B	8XYWW	SOT-23	Tape&Reel	3000	7''	8mm
RU20P3B-G	8XYWW	SOT-23	Tape&Reel	3000	7''	8mm

① The following characters could be different and means:

X =Assembly site code

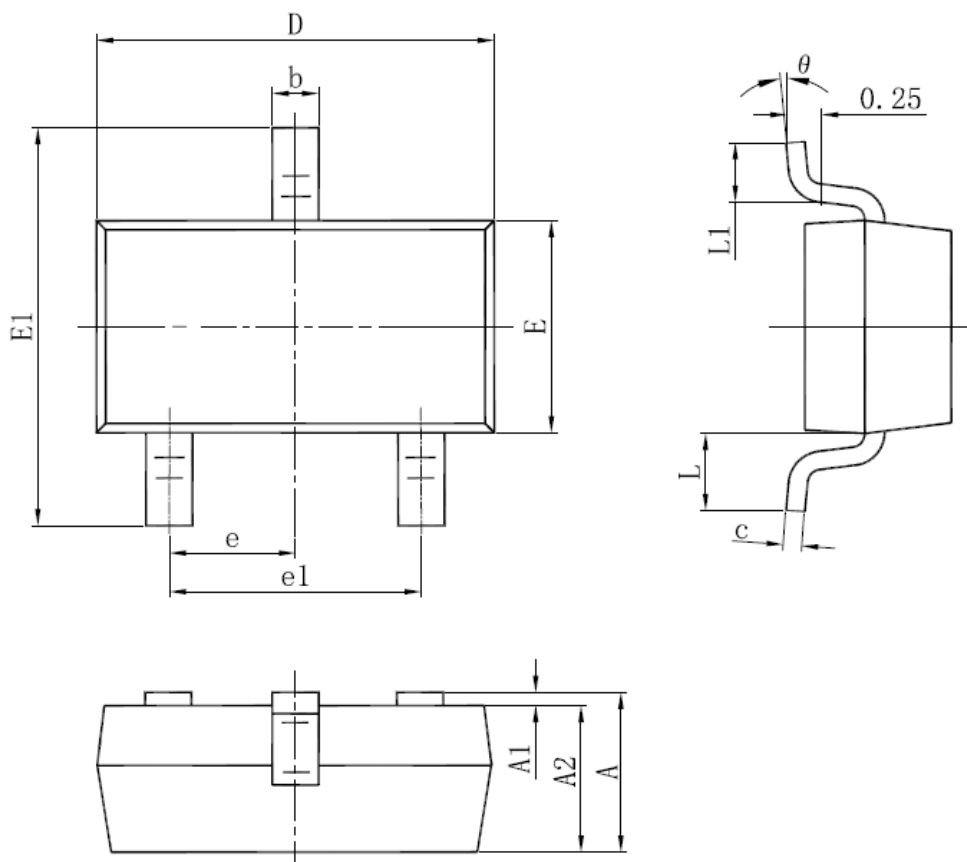
Y =Year

WW =Work Week

② Device end with -G means Green Product

**Package Information**

**SOT-23**



SYMBOL	MM		INCH		SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	0.900	1.150	0.035	0.045	E1	2.250	2.550	0.089	0.100
A1	0.000	0.100	0.000	0.004	e	0.950 TYP.		0.037 TYP.	
A2	0.900	1.050	0.035	0.041	e1	1.800	2.000	0.071	0.079
b	0.300	0.500	0.012	0.020	L	0.550 REF.		0.022 REF.	
c	0.080	0.150	0.003	0.006	L1	0.300	0.500	0.012	0.020
D	2.800	3.000	0.110	0.118	$\theta$	0°	8°	0°	8°
E	1.200	1.400	0.047	0.055					

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



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