

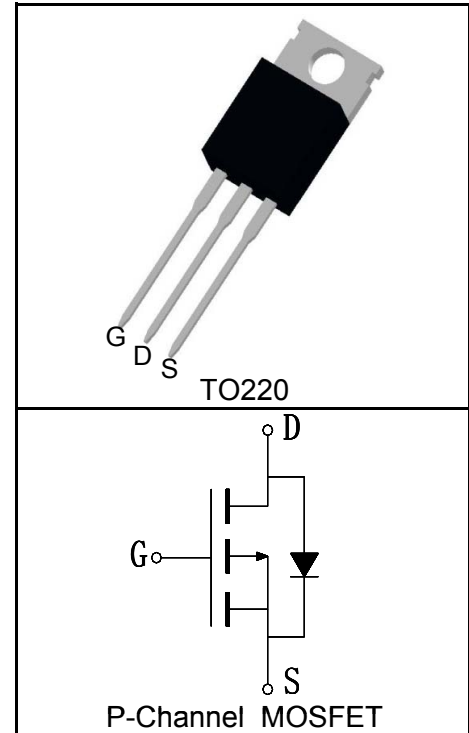
### Features

- -100V/-55A,  
 $R_{DS(ON)} = 40m\Omega(Typ.)@V_{GS} = -10V$
- Low On-Resistance
- Super High Dense Cell Design
- Fast Switching and Fully Avalanche Rated
- 100% avalanche tested
- 175°C Operating Temperature
- Lead Free and Green Devices Available (RoHS Compliant)

### Applications

- Inverters

### Pin Description



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_C = 25^\circ\text{C}$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	-100	V
$V_{GSS}$	Gate-Source Voltage	$\pm 25$	
$T_J$	Maximum Junction Temperature	175	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C = 25^\circ\text{C}$ -55	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}^{(1)}$	300 $\mu\text{s}$ Pulse Drain Current Tested	$T_C = 25^\circ\text{C}$ -220	A
$I_D^{(2)}$	Continuous Drain Current ( $V_{GS} = -10V$ )	$T_C = 25^\circ\text{C}$ -55	A
		$T_C = 100^\circ\text{C}$ -39	
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$ 176	W
		$T_C = 100^\circ\text{C}$ 88	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.85	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C/W}$
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}^{(3)}$	Avalanche Energy, Single Pulsed	400	mJ

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

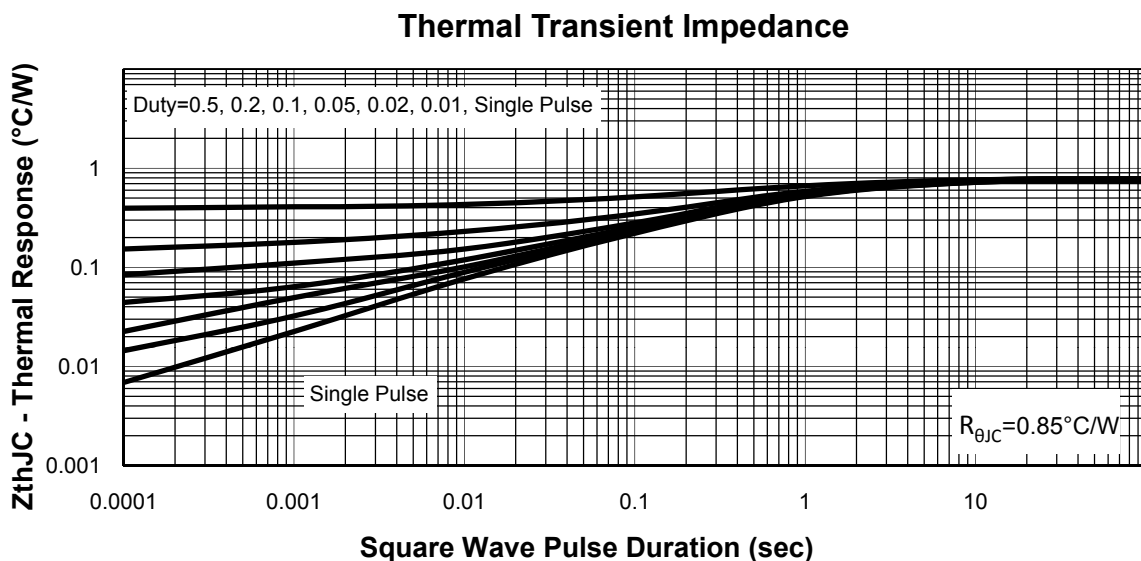
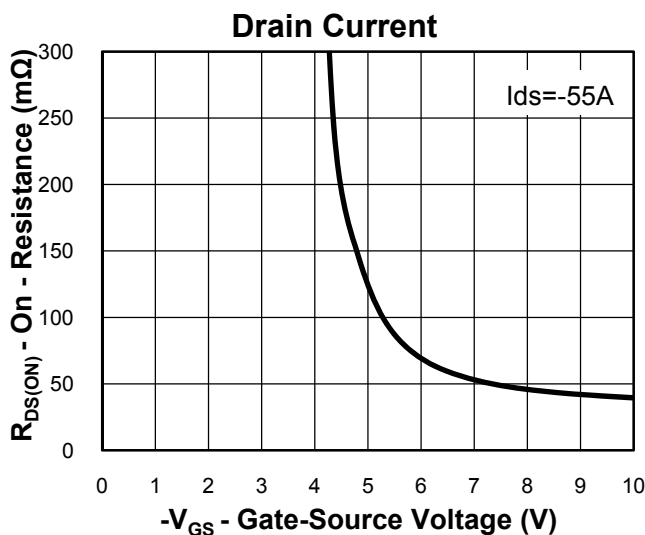
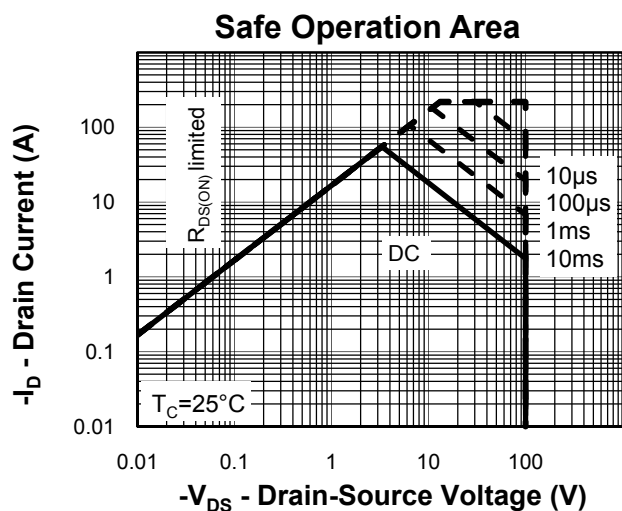
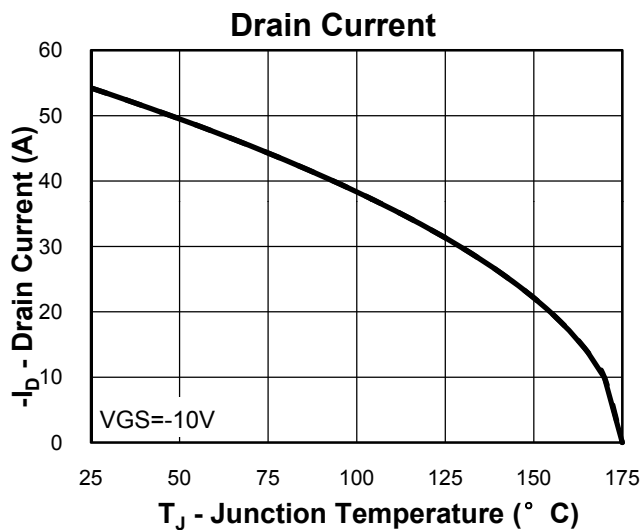
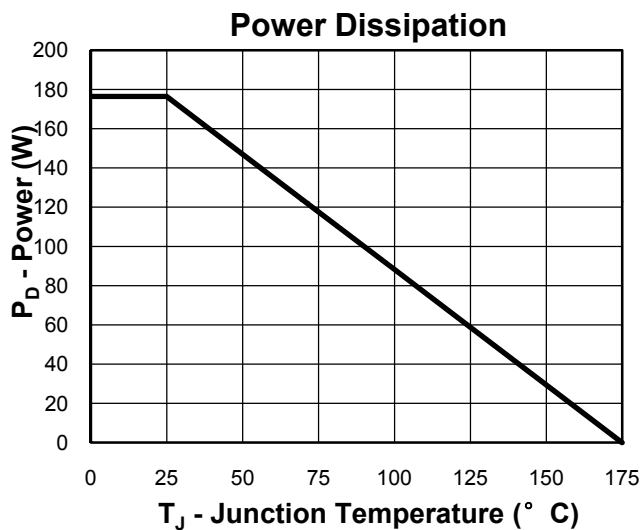
Symbol	Parameter	Test Condition	RU1HP55R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA	-100			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V			-1	μA
		T <sub>J</sub> =125°C			-30	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA	-2		-4	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V			±100	nA
R <sub>DS(ON)</sub> <sup>④</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =-10V, I <sub>DS</sub> =-55A		40	50	mΩ
Diode Characteristics						
V <sub>SD</sub> <sup>④</sup>	Diode Forward Voltage	I <sub>SD</sub> =-55A, V <sub>GS</sub> =0V			-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =-55A, dI <sub>SD</sub> /dt=100A/μs		150		ns
Q <sub>rr</sub>	Reverse Recovery Charge			500		nC
Dynamic Characteristics <sup>⑤</sup>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz		1.5		Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-50V, Frequency=1.0MHz		3600		pF
C <sub>oss</sub>	Output Capacitance			535		
C <sub>rss</sub>	Reverse Transfer Capacitance			210		
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =-50V, I <sub>DS</sub> =-55A, V <sub>GEN</sub> =-10V, R <sub>G</sub> =6Ω		25		ns
t <sub>r</sub>	Turn-on Rise Time			87		
t <sub>d(OFF)</sub>	Turn-off Delay Time			139		
t <sub>f</sub>	Turn-off Fall Time			38		
Gate Charge Characteristics <sup>⑤</sup>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-80V, V <sub>GS</sub> =-10V, I <sub>DS</sub> =-55A		155		nC
Q <sub>gs</sub>	Gate-Source Charge			31		
Q <sub>gd</sub>	Gate-Drain Charge			48		

- Notes:
- ① Pulse width limited by safe operating area.
  - ② Calculated continuous current based on maximum allowable junction temperature.
  - ③ Limited by  $T_{Jmax}, I_{AS}=-40A, V_{DD}=-60V, R_G=50\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .
  - ④ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  - ⑤ Guaranteed by design, not subject to production testing.

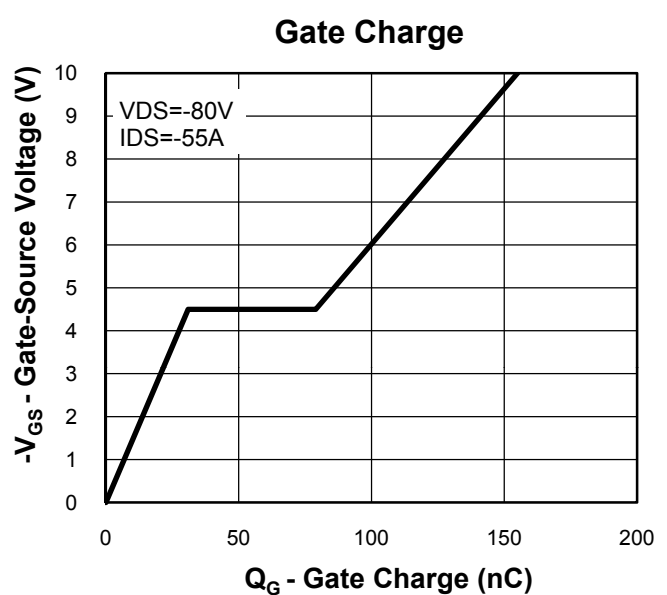
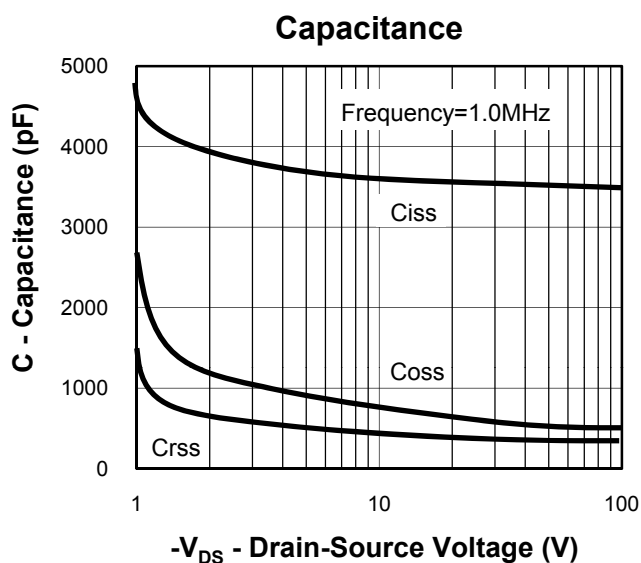
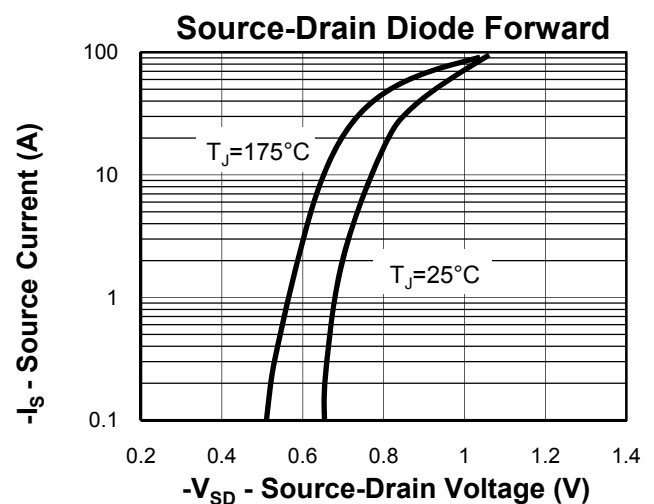
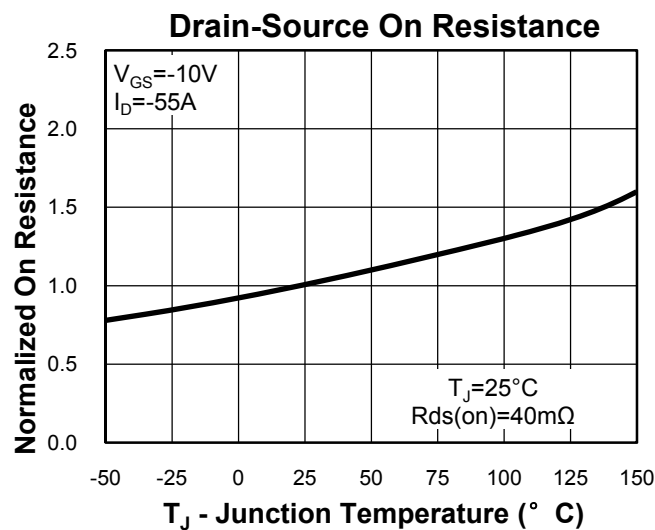
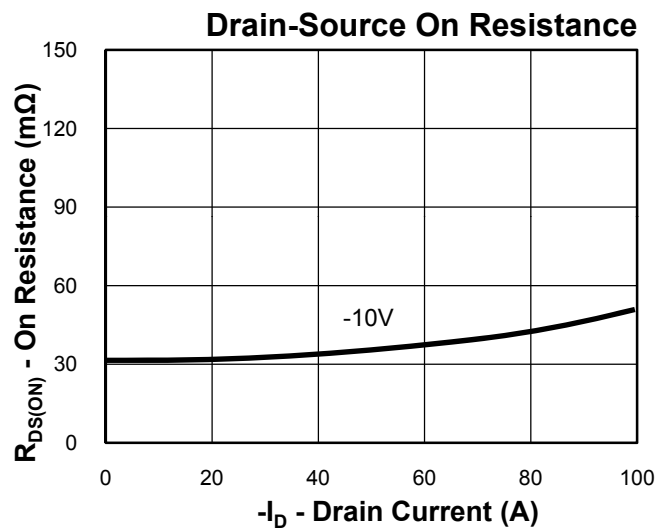
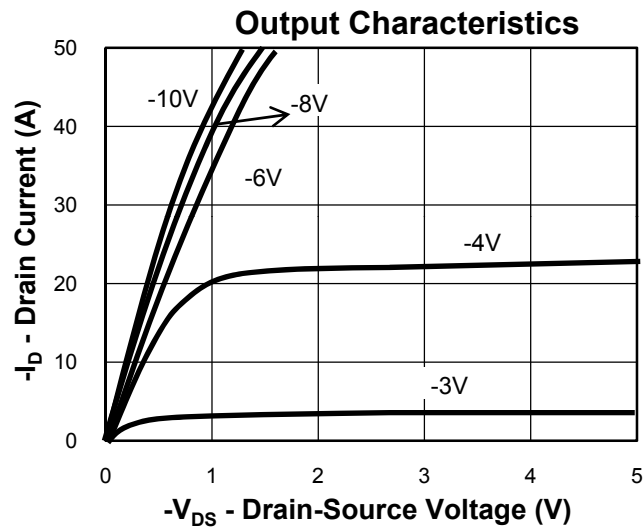
**Ordering and Marking Information**

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU1HP55R	RU1HP55R	TO220	Tube	50	-	-

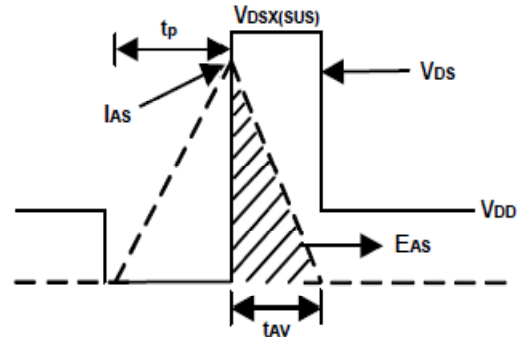
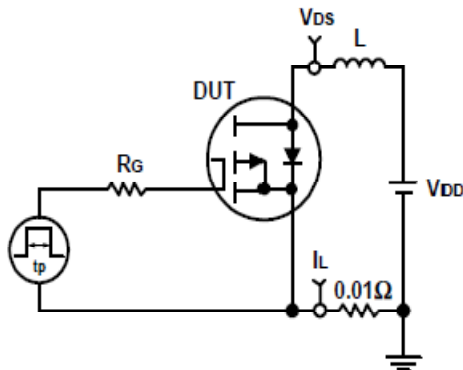
## Typical Characteristics



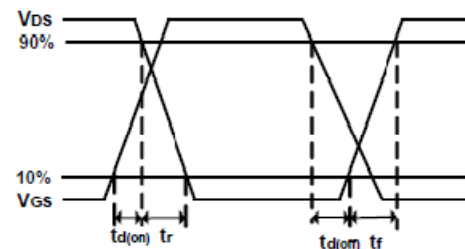
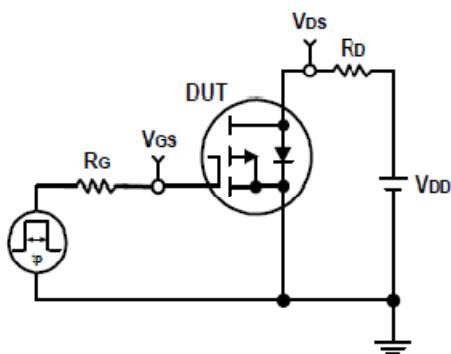
## Typical Characteristics



## Avalanche Test Circuit and Waveforms

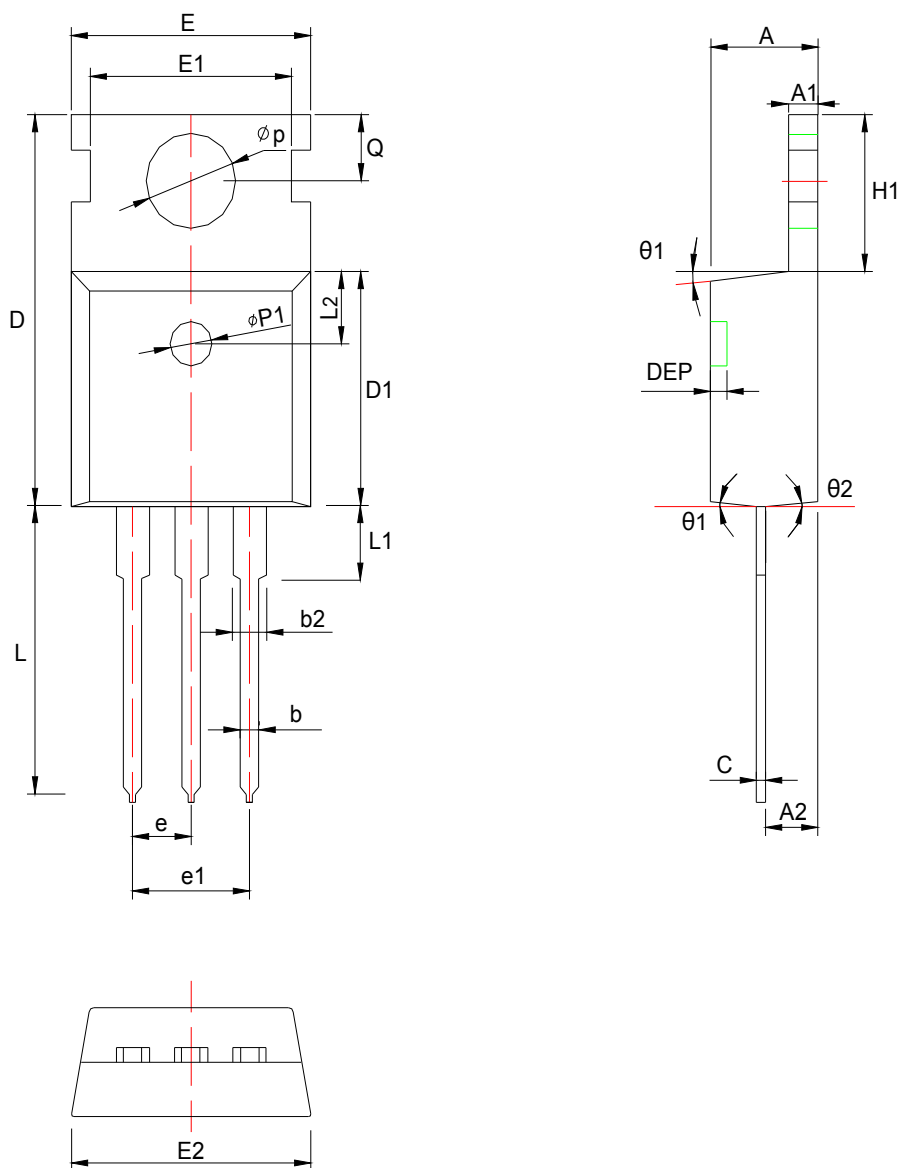


## Switching Time Test Circuit and Waveforms



**Package Information**

**TO220**



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.55	4.70	0.173	0.179	0.185	Φp1	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.20	1.30	1.40	0.047	0.051	0.055	e	2.54 BSC			0.10 BSC		
A2	2.23	2.38	2.53	0.088	0.094	0.100	e1	5.08 BSC			0.20 BSC		
b	0.75	0.80	0.85	0.030	0.031	0.033	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.17	1.28	1.39	0.046	0.050	0.055	L	12.70	13.18	13.65	0.500	0.519	0.537
c	0.40	0.50	0.60	0.016	0.020	0.024	L1	*	*	3.95	*	*	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50 REF			0.098 REF		
D1	8.96	9.21	9.46	0.353	0.363	0.372	Φp	3.50	3.60	3.70	0.138	0.142	0.146
DEP	0.05	0.13	0.20	0.002	0.005	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.66	9.97	10.28	0.380	0.393	0.405	θ1	5°	7°	9°	5°	7°	9°
E1	*	8.70	*	*	0.343	*	θ2	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.402							

---

## 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**

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