

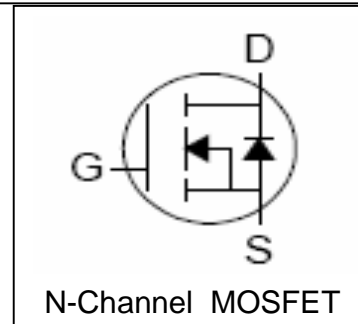
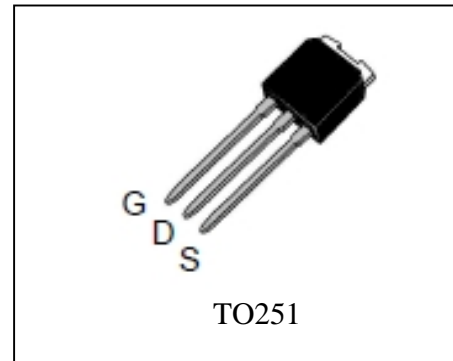
## Features

- 30V/53A,  
 $R_{DS(ON)} = 9m \text{ (tpy.)}@V_{GS}=10V$   
 $R_{DS(ON)} = 13m \text{ (tpy.)}@V_{GS}=4.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- Fast Switching and Fully Avalanche Rated
- Lead Free and Green Devices Available  
 (RoHS Compliant)

## Applications

- Power Management in Desktop Computer, Portable Equipment and DC/DC Converters.

## Pin Description



## Absolute Maximum Ratings

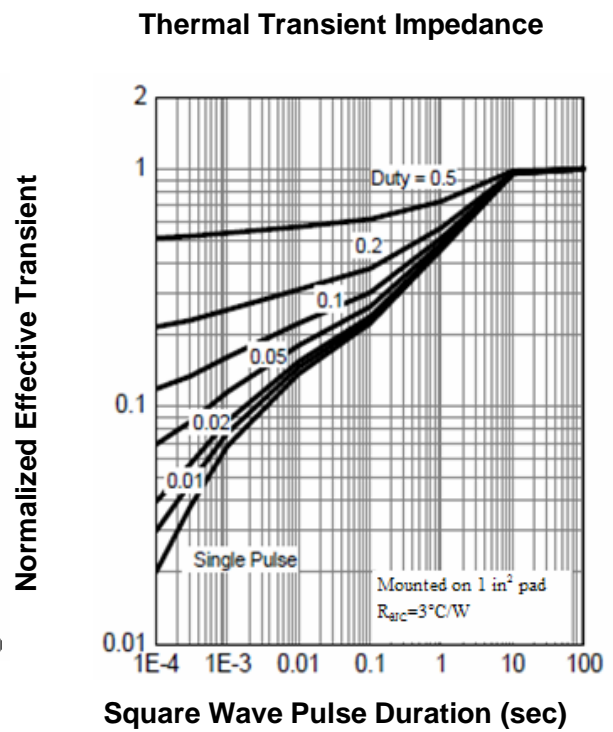
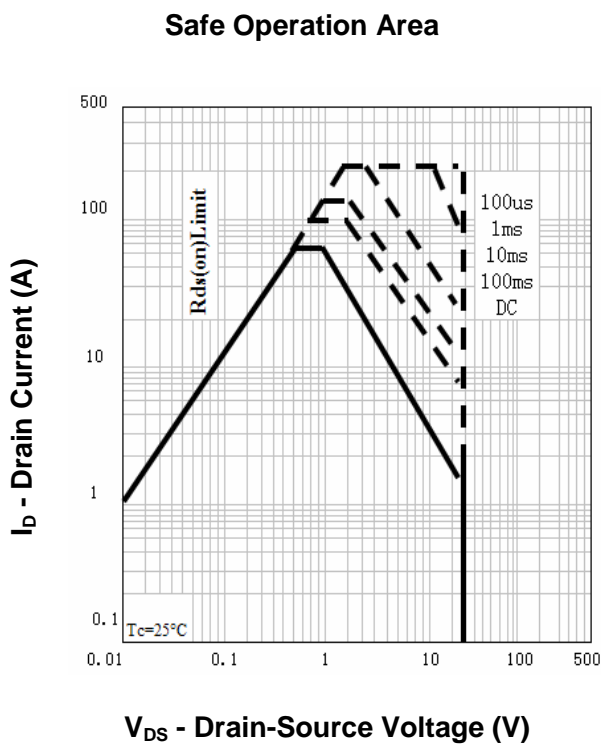
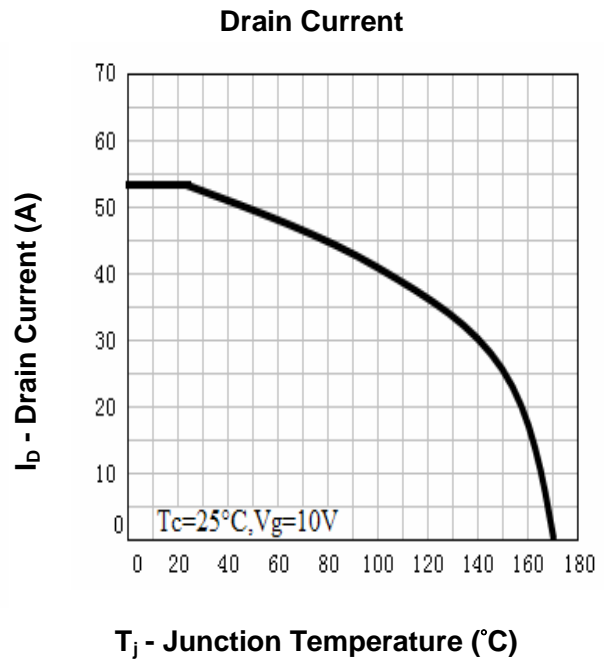
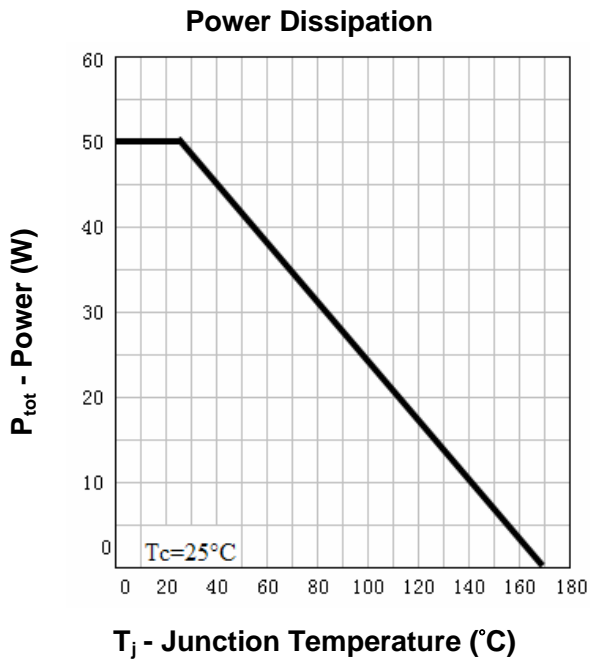
Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_C=25^\circ\text{C}$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	
$T_J$	Maximum Junction Temperature	175	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 53	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}$	300 $\mu\text{s}$ Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 212 <sup>①</sup>	A
$I_D$	Continuous Drain Current	$T_C=25^\circ\text{C}$ 53 <sup>②</sup>	A
		$T_C=100^\circ\text{C}$ 41	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 50	W
		$T_C=100^\circ\text{C}$ 25	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3	$^\circ\text{C/W}$
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}$ <sup>③</sup>	Avalanche Energy, Single Pulsed	110	mJ

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

Symbol	Parameter	Test Condition	RU3060K			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$ $T_J=85^\circ\text{C}$			1	$\mu A$
					30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.5	2	2.7	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}^{(4)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=30A$		9	12	$m\Omega$
		$V_{GS}=4.5V, I_{DS}=25A$		13	17	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^{(4)}$	Diode Forward Voltage	$I_{SD}=30A, V_{GS}=0V$			1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=30A, di_{SD}/dt=100A/\mu s$		24		ns
$Q_{rr}$	Reverse Recovery Charge			16		nC
<b>Dynamic Characteristics</b> <sup>(5)</sup>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		1.2		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=20V,$ Frequency=1.0MHz		780		pF
$C_{oss}$	Output Capacitance			190		
$C_{rss}$	Reverse Transfer Capacitance			70		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=20V, R_L=15\Omega,$ $I_{DS}=30A, V_{GEN}=10V,$ $R_G=6\Omega$		6		ns
$t_r$	Turn-on Rise Time			8		
$t_{d(OFF)}$	Turn-off Delay Time			20		
$t_f$	Turn-off Fall Time			4		
<b>Gate Charge Characteristics</b> <sup>(5)</sup>						
$Q_g$	Total Gate Charge	$V_{DS}=20V, V_{GS}=10V,$ $I_{DS}=30A$		15	20	nC
$Q_{gs}$	Gate-Source Charge			2.5		
$Q_{gd}$	Gate-Drain Charge			4		

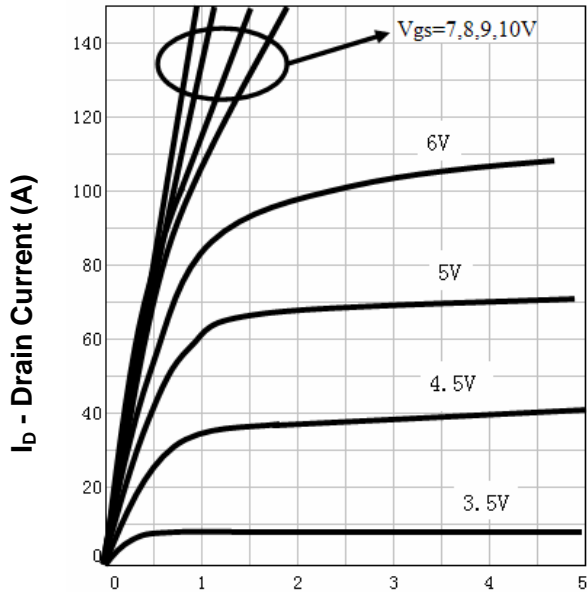
- Notes: ① Pulse width limited by safe operating area.  
 ② Calculated continuous current based on maximum allowable junction temperature. Current limited by bond wire.  
 ③ Limited by  $T_{Jmax}, I_{AS}=21A, V_{DD}=20V, R_G=50\Omega$ , Starting  $T_J=25^\circ\text{C}$ .  
 ④ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .  
 ⑤ Guaranteed by design, not subject to production testing.

**Typical Characteristics**



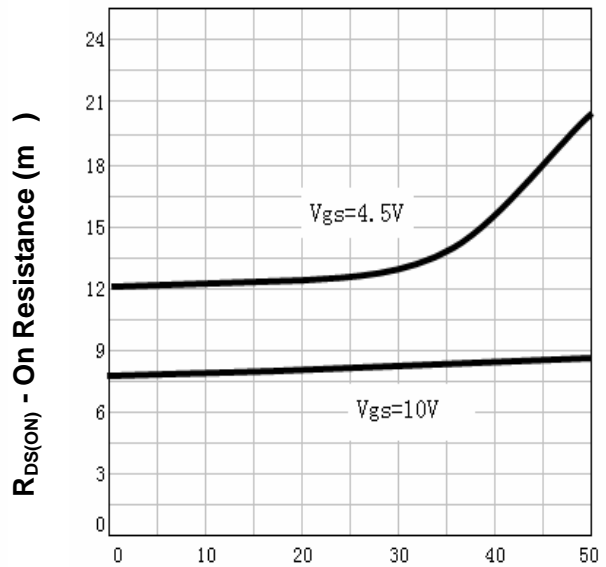
**Typical Characteristics**

**Output Characteristics**



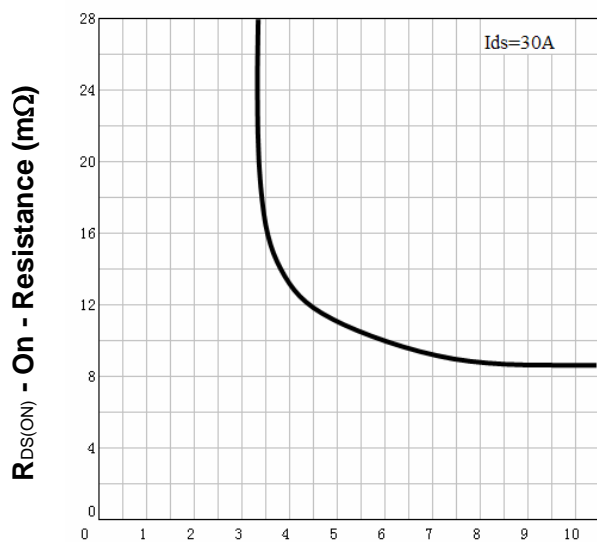
**$V_{DS}$  - Drain-Source Voltage (V)**

**Drain-Source On Resistance**



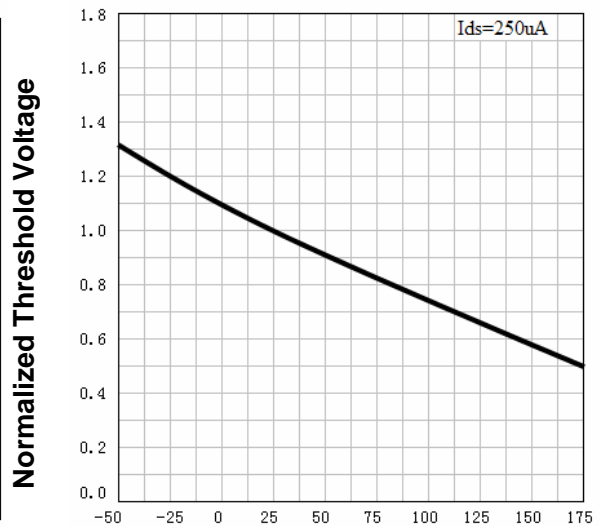
**$I_D$  - Drain Current (A)**

**Drain-Source On Resistance**



**$V_{GS}$  - Gate-Source Voltage (V)**

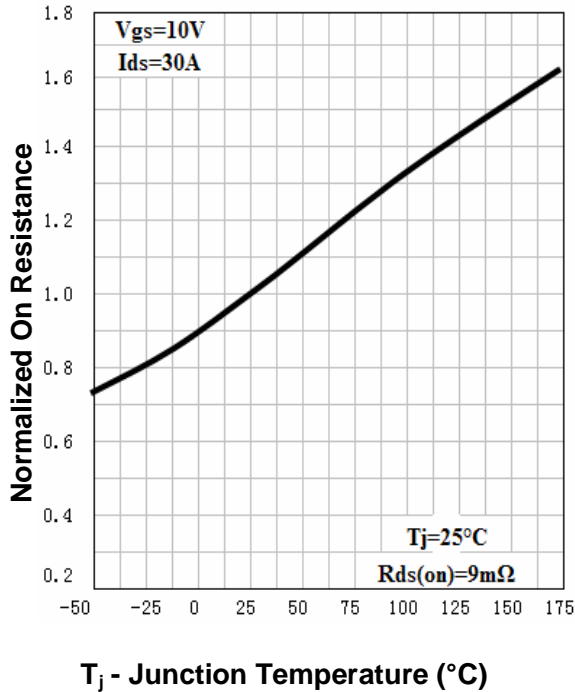
**Gate Threshold Voltage**



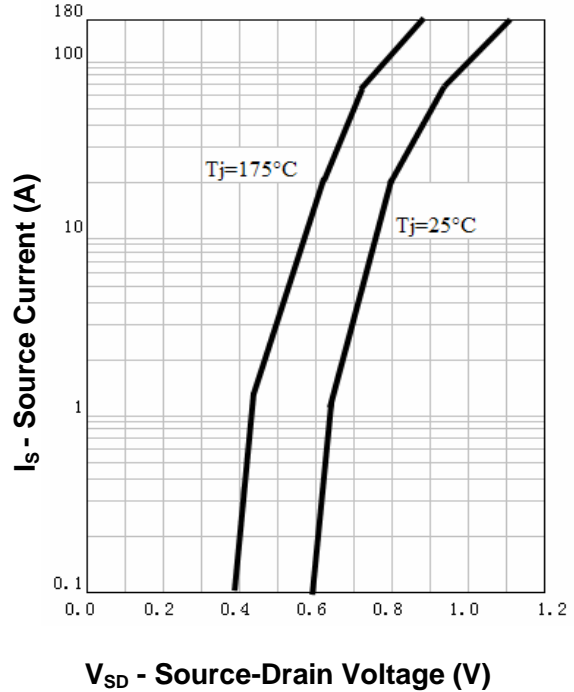
**$T_j$  - Junction Temperature (°C)**

**Typical Characteristics**

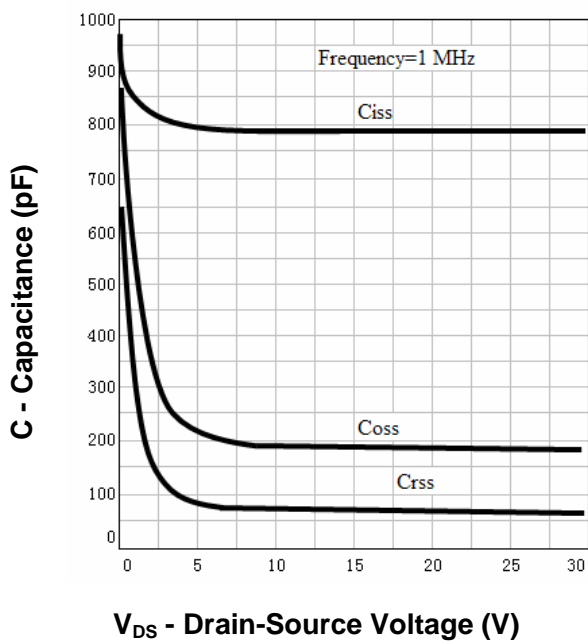
**Drain-Source On Resistance**



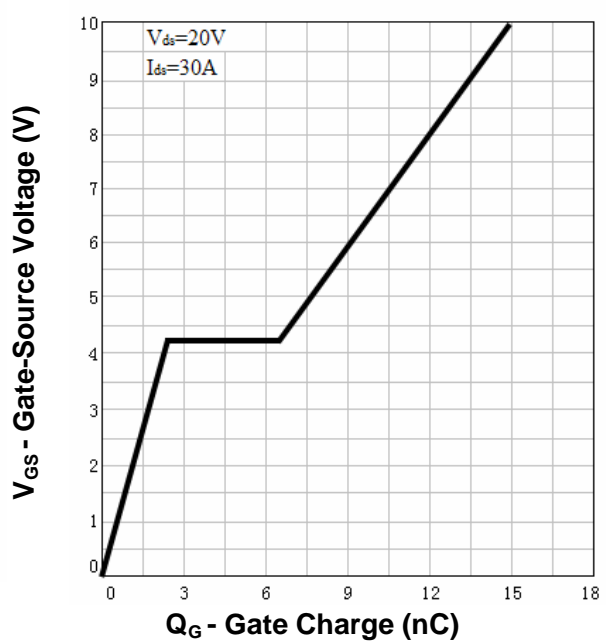
**Source-Drain Diode Forward**



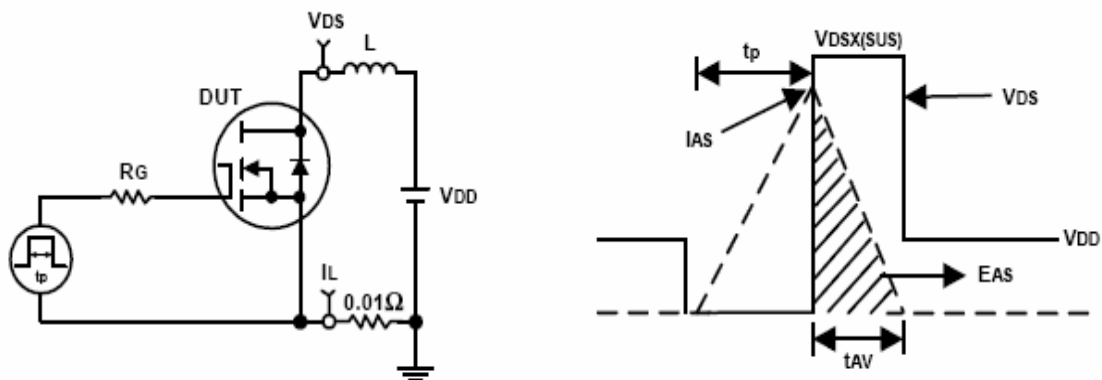
**Capacitance**



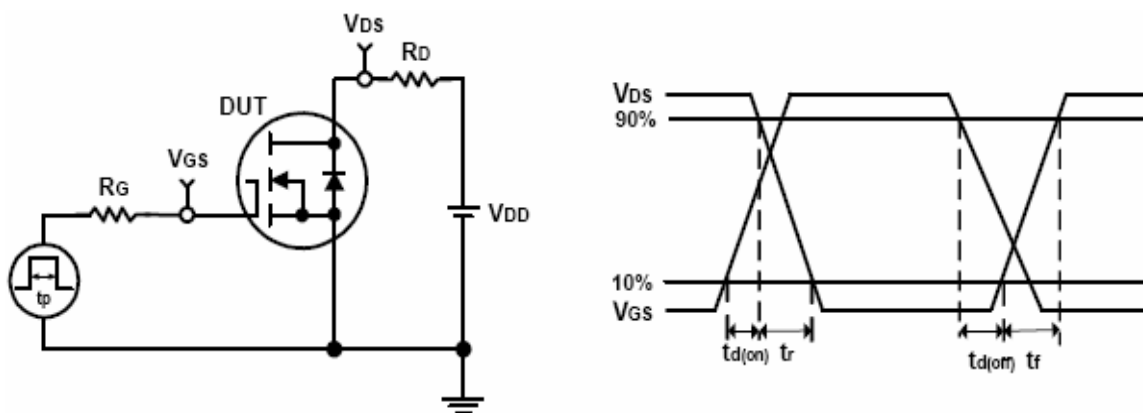
**Gate Charge**



### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms

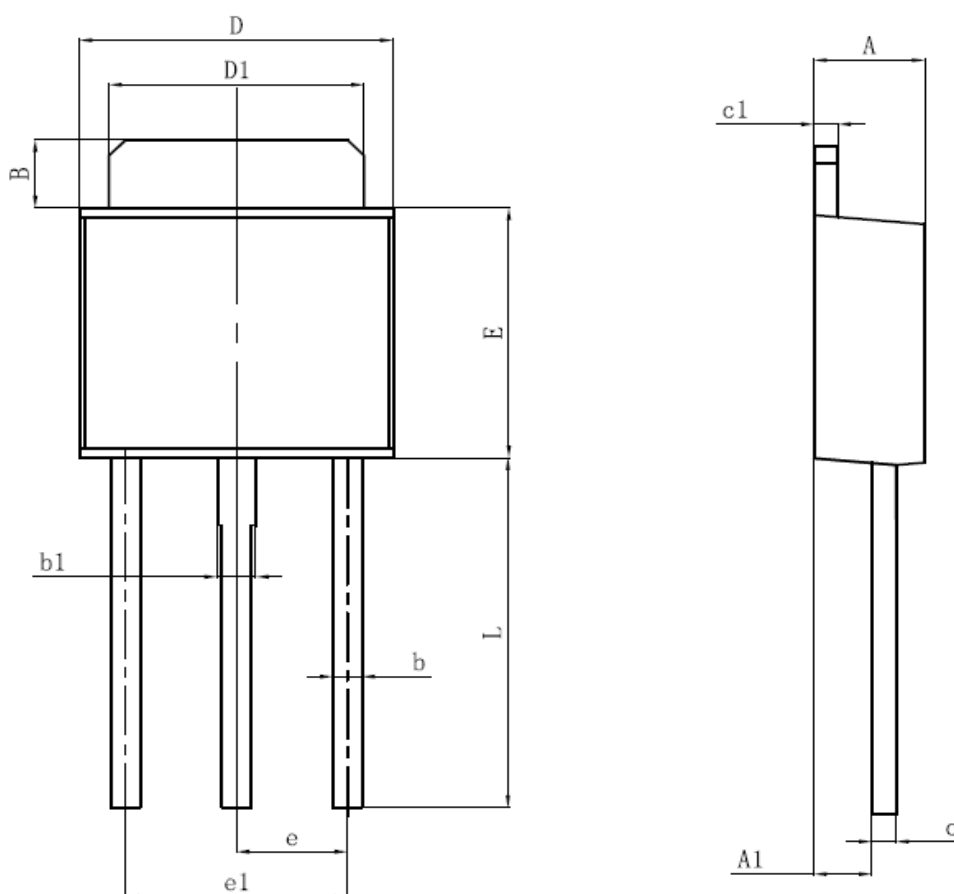


**Ordering and Marking Information**

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU3060K	RU3060K	TO-251	Tube	80	-	-

**Package Information**

**TO251**



SYMBOL	MM		INCH		SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	2.200	2.4	0.087	0.094	D	6.350	6.650	0.250	0.262
A1	1.050	1.350	0.042	0.054	D1	5.200	5.400	0.205	0.213
B	1.350	1.650	0.053	0.065	E	5.400	5.700	0.213	0.224
b	0.500	0.700	0.020	0.028	e	2.300 TYP		0.091 TYP	
b1	0.700	0.900	0.028	0.035	e1	4.500	4.700	0.177	0.185
c	0.430	0.580	0.017	0.023	L	7.500	7.900	0.295	0.311
c1	0.430	0.580	0.017	0.023					

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



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