

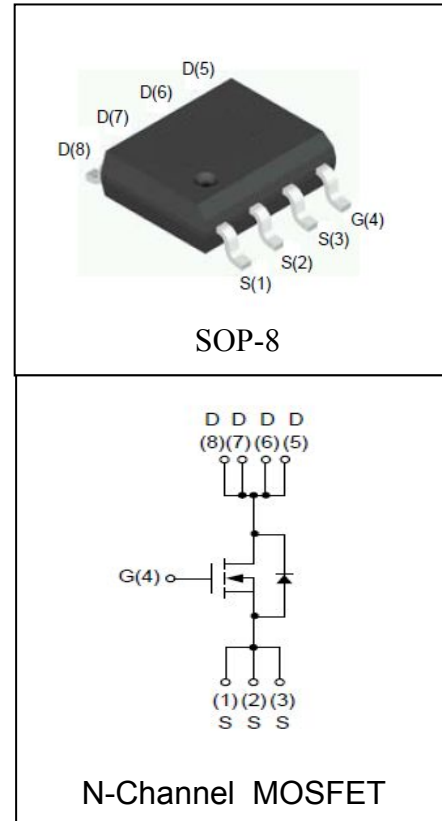
## Features

- 30V/12A,  
 $R_{DS(ON)} = 9.5m\Omega$  (Typ.) @  $V_{GS} = 10V$   
 $R_{DS(ON)} = 15m\Omega$  (Typ.) @  $V_{GS} = 4.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- 100% avalanche tested
- Lead Free and Green Available

## Applications

- Power Management in Notebook Computer, and DC-DC Converters in Networking Systems.

## Pin Description



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings</b> ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)				
$V_{DSS}$	Drain-Source Voltage	30	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 20$		
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
$I_S$	Diode Continuous Forward Current	$T_C = 25^\circ\text{C}$	12	A
<b>Mounted on Large Heat Sink</b>				
$I_{DP}$	300 $\mu\text{s}$ Pulse Drain Current Tested	$T_C = 25^\circ\text{C}$	48 <sup>①</sup>	A
$I_D$	Continuous Drain Current ( $V_{GS} = 10V$ )	$T_C = 25^\circ\text{C}$	12	A
		$T_C = 70^\circ\text{C}$	9.6	
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	2.5	W
		$T_C = 70^\circ\text{C}$	1.6	
$R_{\theta JA}$ <sup>②</sup>	Thermal Resistance-Junction to Ambient		50	$^\circ\text{C}/\text{W}$
<b>Drain-Source Avalanche Ratings</b>				
$E_{AS}$ <sup>③</sup>	Avalanche Energy, Single Pulsed		105	mJ

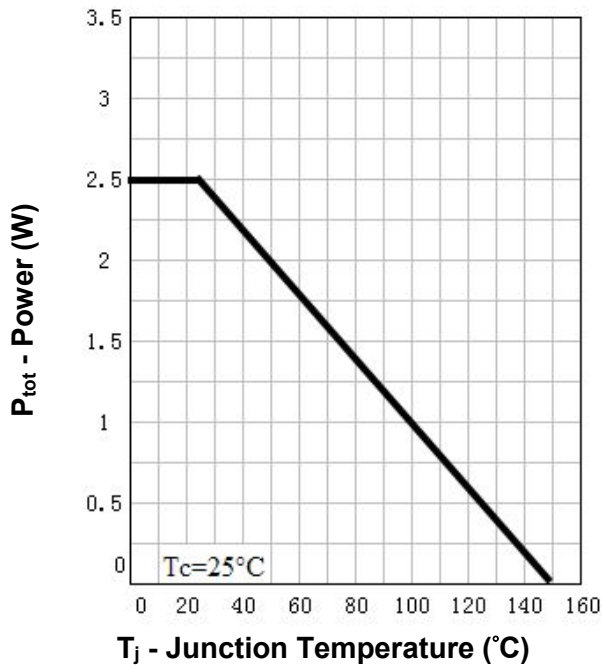
**Electrical Characteristics** ( $T_A=25^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU3020H			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 30	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.0		2.5	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	$V_{GS}=10V, I_{DS}=10A$		9.5	15	$m\Omega$
		$V_{GS}=4.5V, I_{DS}=8A$		15	21	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^{(4)}$	Diode Forward Voltage	$I_{SD}=12A, V_{GS}=0V$			1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=12A, di_{SD}/dt=100A/\mu s$		20		ns
$Q_{rr}$	Reverse Recovery Charge			12		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	$V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz		980		pF
$C_{oss}$	Output Capacitance			160		
$C_{rss}$	Reverse Transfer Capacitance			120		
$t_{d(ON)}$	Turn-on Delay Time		$V_{DD}=15V, R_L=30\Omega,$ $I_{DS}=12A, V_{GEN}=10V,$ $R_G=6\Omega$		12	
$t_r$	Turn-on Rise Time			19		
$t_{d(OFF)}$	Turn-off Delay Time			34		
$t_f$	Turn-off Fall Time			16		
<b>Gate Charge Characteristics</b> <sup>(5)</sup>						
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=12A$		19	25	nC
$Q_{gs}$	Gate-Source Charge			3		
$Q_{gd}$	Gate-Drain Charge			7		

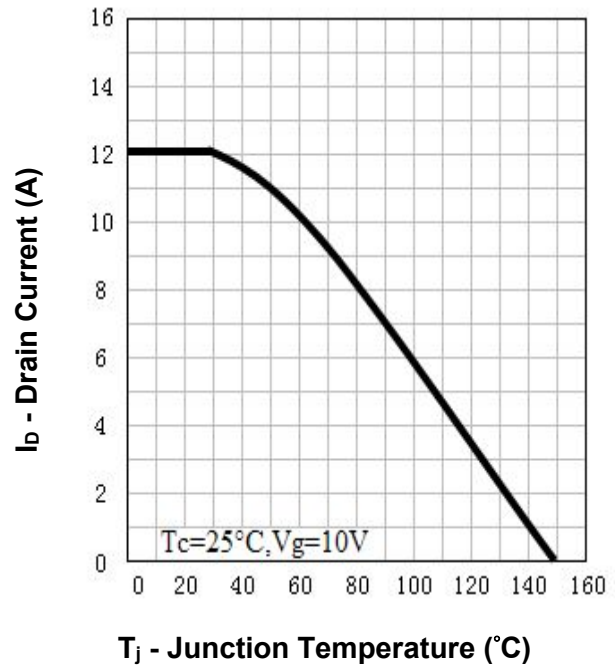
- Notes: ①Pulse width limited by safe operating area.  
 ②When mounted on 1 inch square copper board,  $t \leq 10\text{sec}$ .  
 ③Limited by  $T_{Jmax}, I_{AS}=20A, V_{DD}=48V, R_G=50\Omega$ , Starting  $T_J=25^\circ\text{C}$ .  
 ④Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .  
 ⑤Guaranteed by design, not subject to production testing.

**Typical Characteristics**

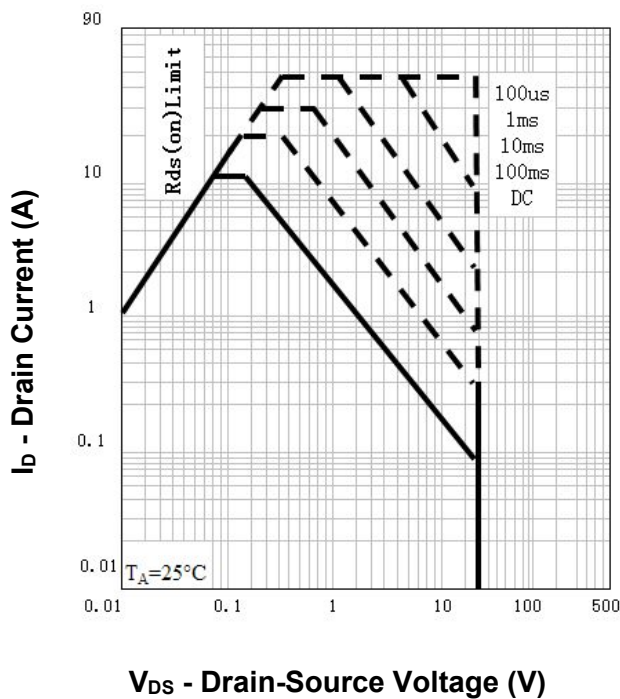
**Power Dissipation**



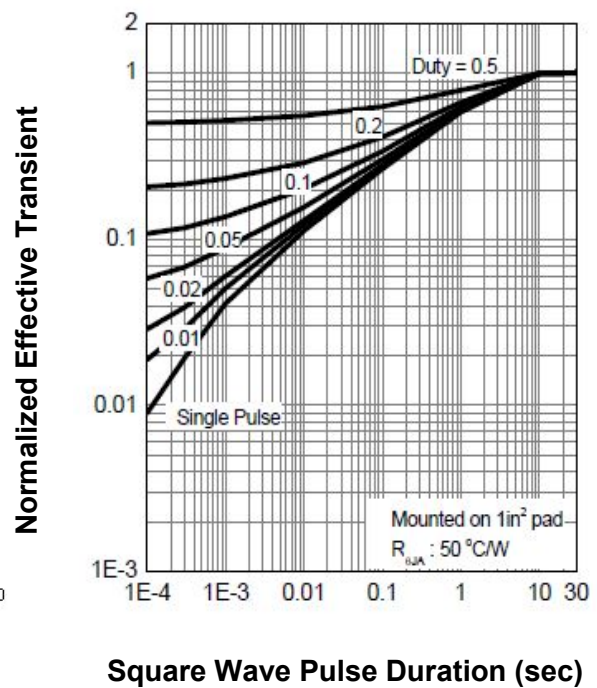
**Drain Current**



**Safe Operation Area**

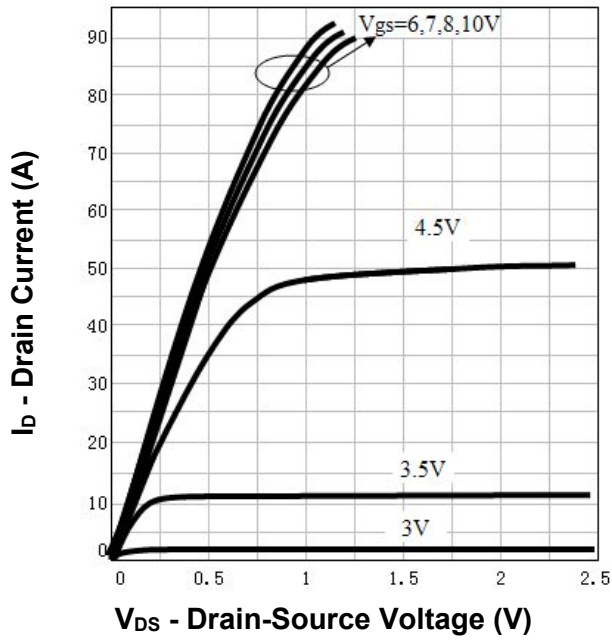


**Thermal Transient Impedance**

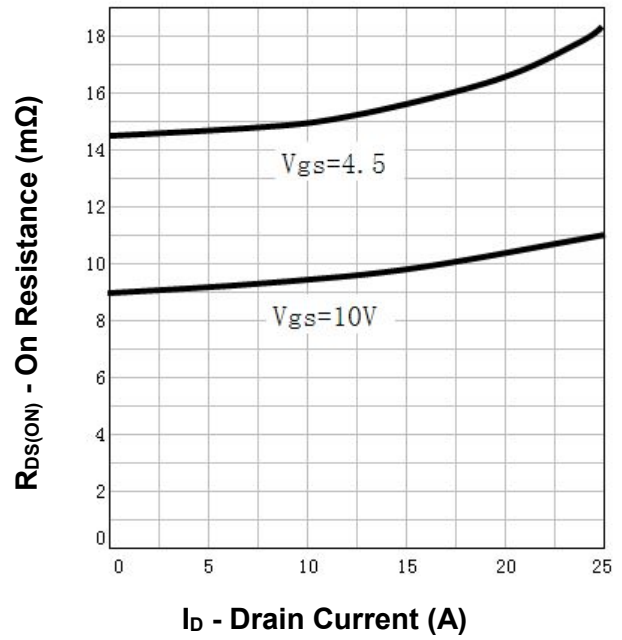


**Typical Characteristics**

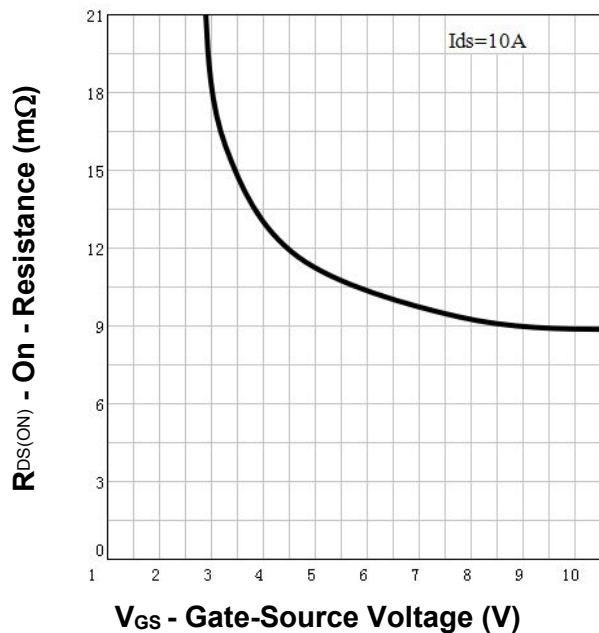
**Output Characteristics**



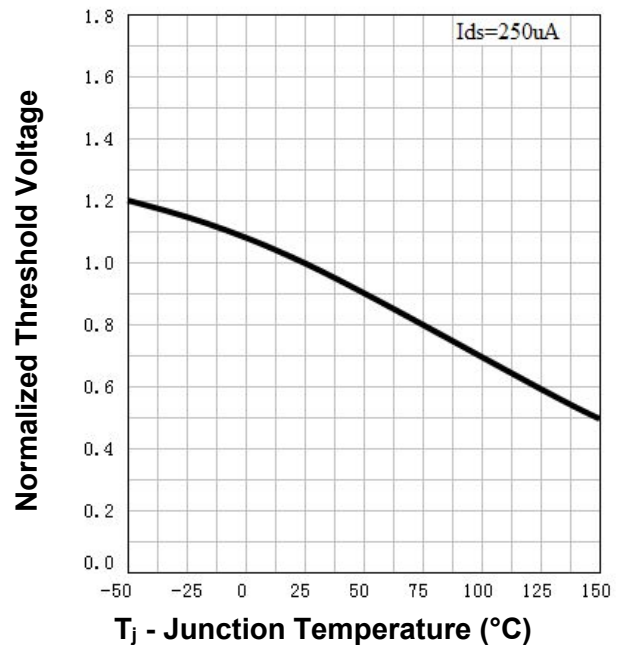
**Drain-Source On Resistance**



**Drain-Source On Resistance**

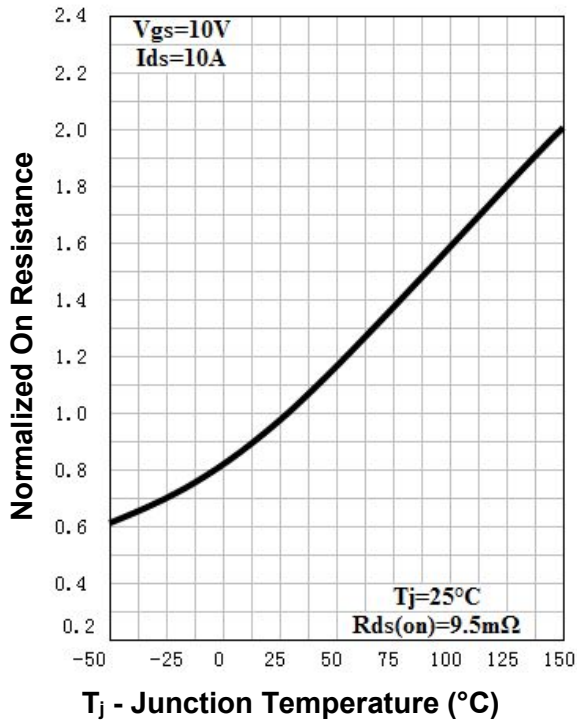


**Gate Threshold Voltage**

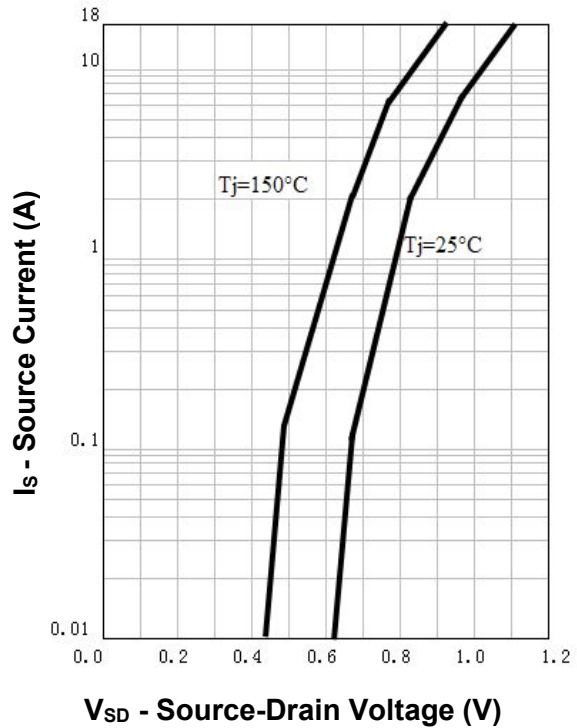


**Typical Characteristics**

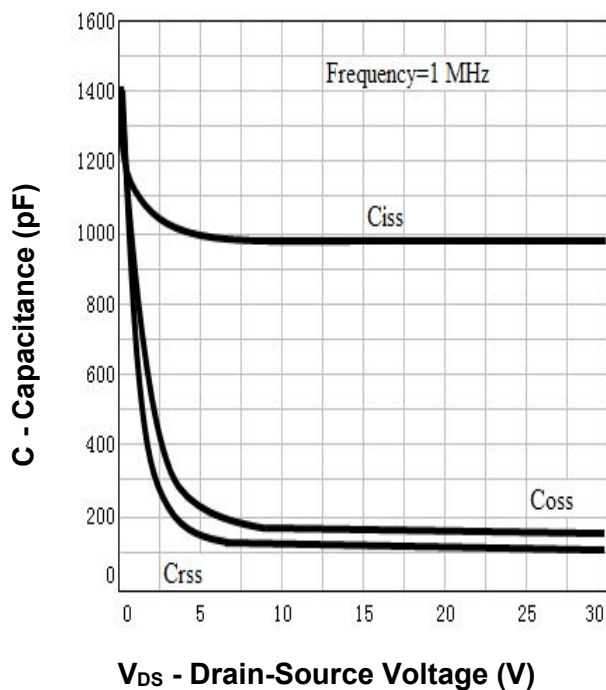
**Drain-Source On Resistance**



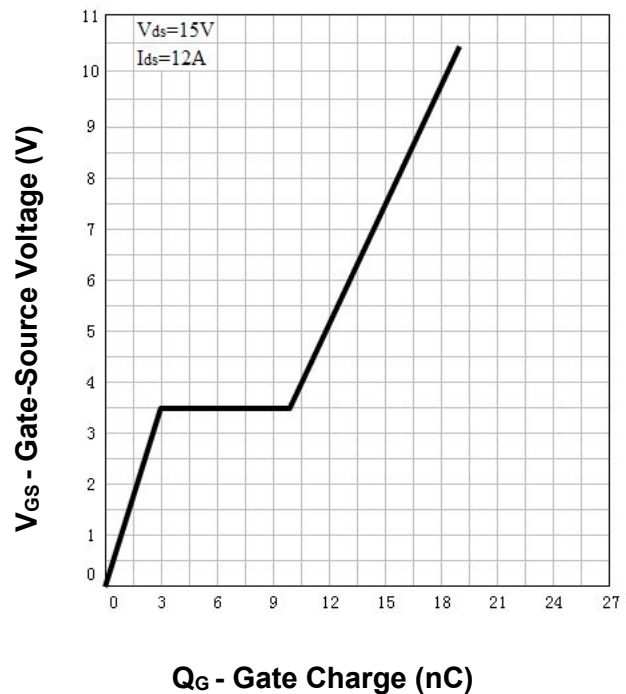
**Source-Drain Diode Forward**



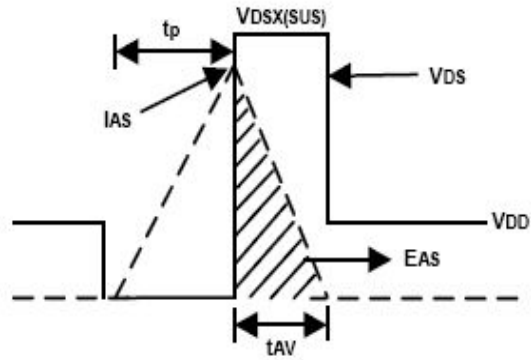
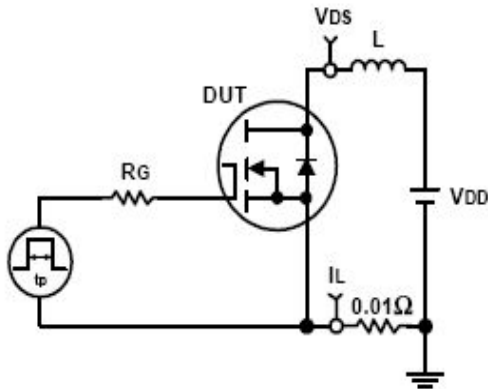
**Capacitance**



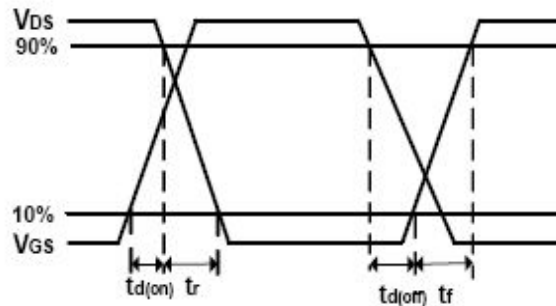
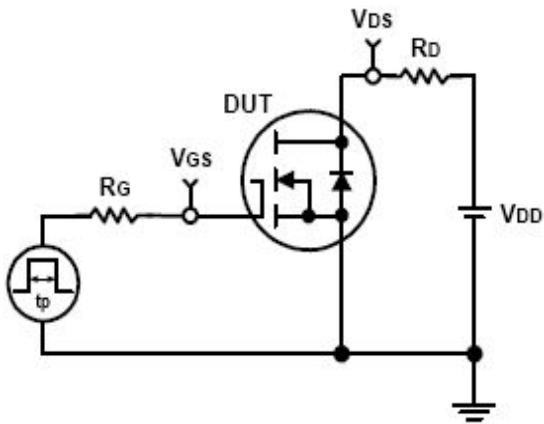
**Gate Charge**



### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms

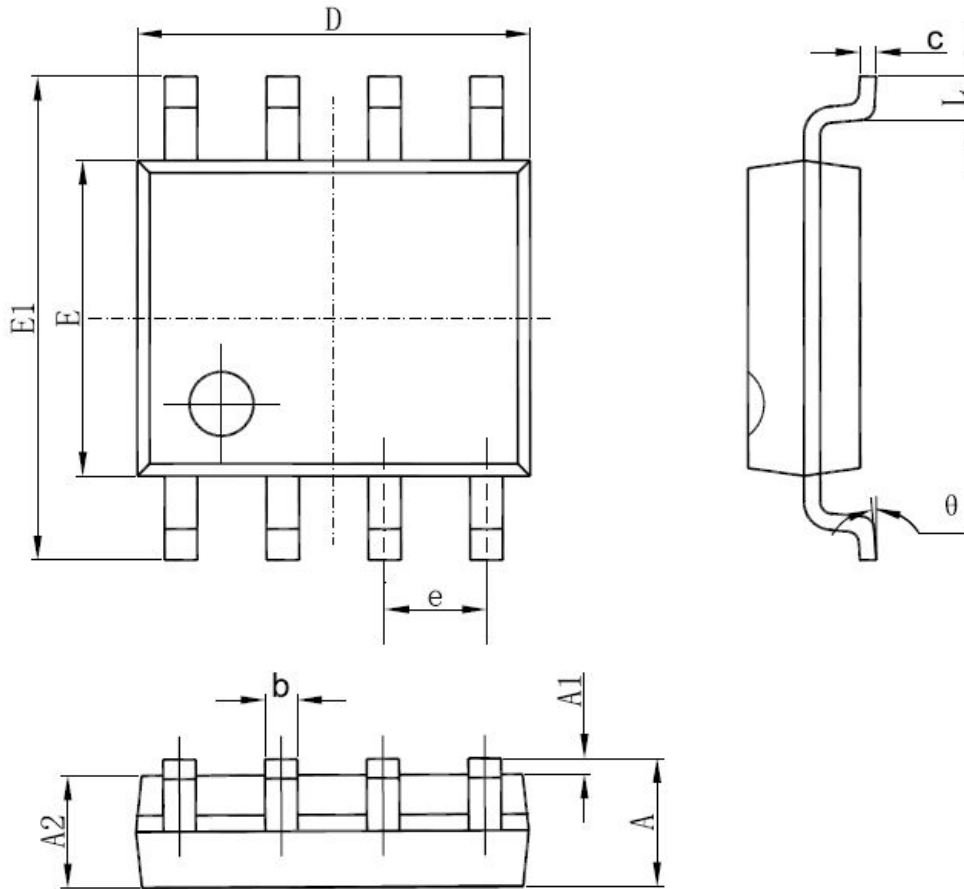


**Ordering and Marking Information**

<b>Device</b>	<b>Marking</b>	<b>Package</b>	<b>Packaging</b>	<b>Quantity</b>	<b>Reel Size</b>	<b>Tape width</b>
RU3020H	RU3020H	SOP-8	Tape&Reel	2500	13''	12mm

**Package Information**

**SOP-8**



SYMBOL	MM		INCH		SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069	E	3.800	4.000	0.150	0.157
A1	0.100	0.250	0.004	0.010	E1	5.800	6.200	0.228	0.244
A2	1.350	1.550	0.053	0.061	e	1.270 (BSC)		0.050 (BSC)	
b	0.330	0.510	0.013	0.020	L	0.400	1.270	0.016	0.050
c	0.170	0.250	0.006	0.010	θ	0°	8°	0°	8°
D	4.700	5.100	0.185	0.200					

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



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