

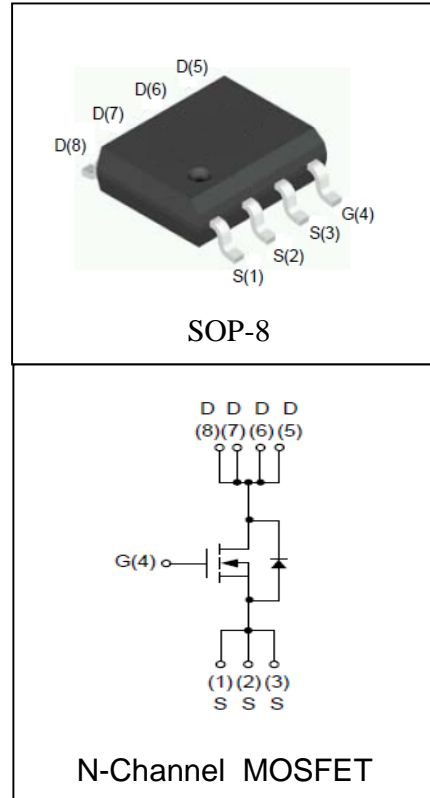
Features

- 20V/13A,
 $R_{DS(ON)} = 13m\Omega$ (Typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 16m\Omega$ (Typ.) @ $V_{GS} = 4.5V$
 $R_{DS(ON)} = 22m\Omega$ (Typ.) @ $V_{GS} = 2.5V$
- Super High Dense Cell Design
- Low On-Resistance
- Reliable and Rugged
- Lead Free and Green Available

Applications

- DC/DC Converters

Pin Description



Absolute Maximum Ratings

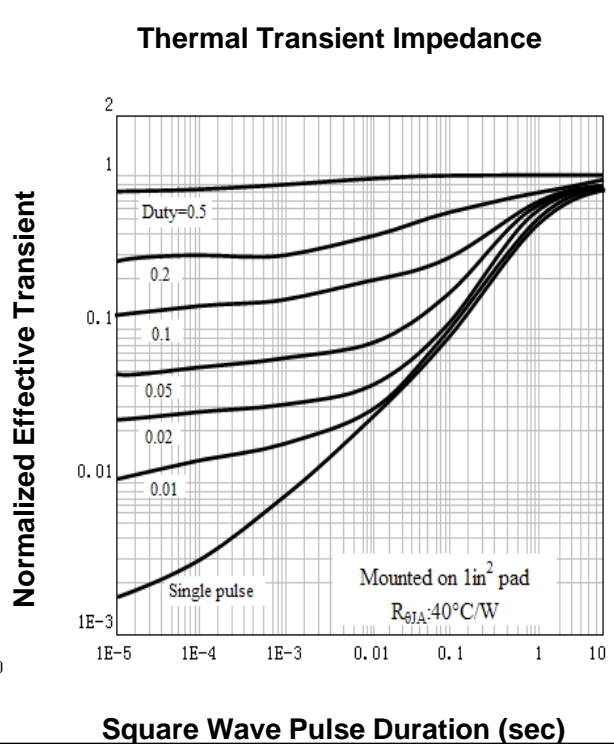
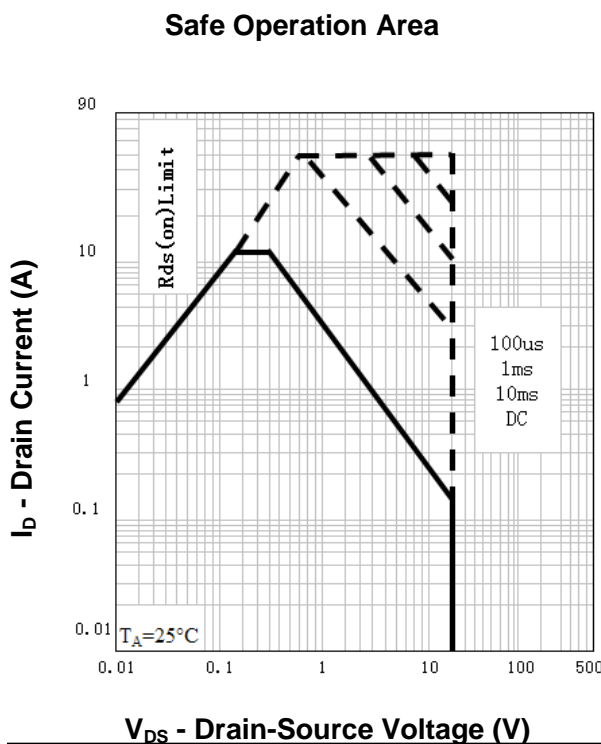
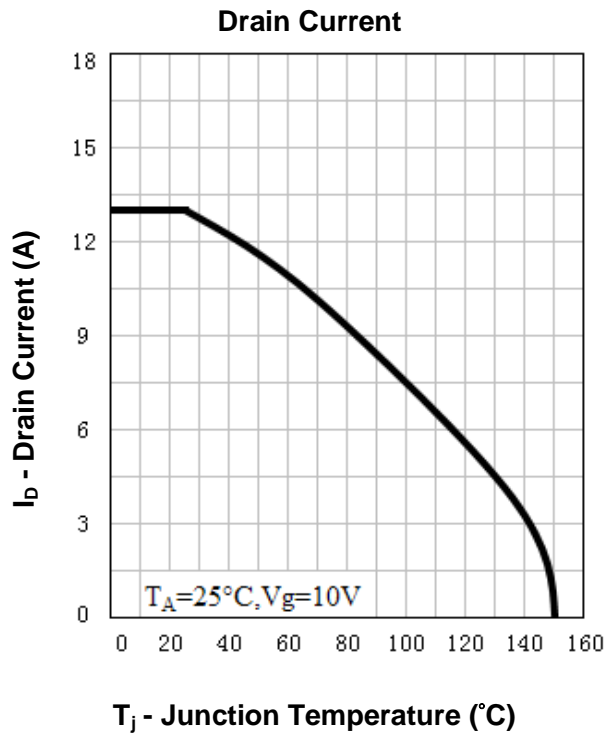
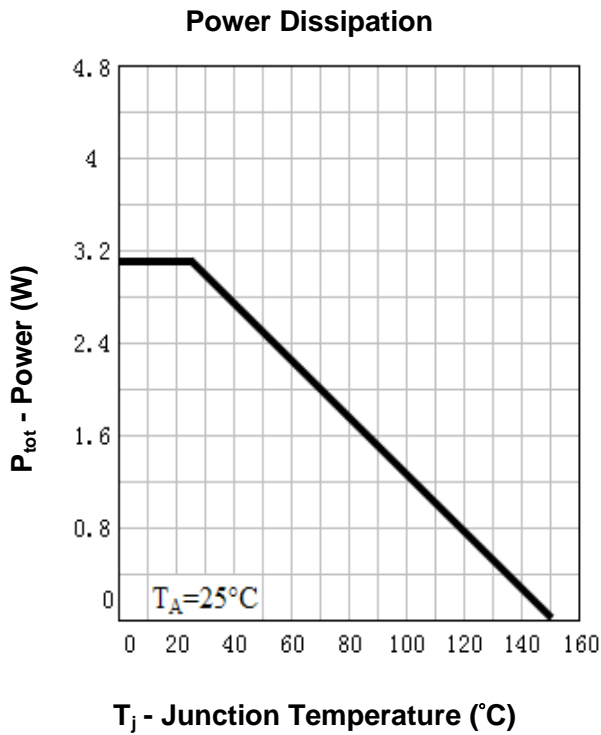
Symbol	Parameter	Rating	Unit
Common Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	20	V
V_{GSS}	Gate-Source Voltage	± 12	
T_J	Maximum Junction Temperature	150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
I_S	Diode Continuous Forward Current	$T_A = 25^\circ C$ 4.5	A
Mounted on Large Heat Sink			
I_{DP}	300 μs Pulse Drain Current Tested	$T_A = 25^\circ C$ 50 ^①	A
I_D	Continuous Drain Current ($V_{GS} = 10V$)	$T_A = 25^\circ C$ 13	A
		$T_A = 70^\circ C$ 10	
P_D	Maximum Power Dissipation	$T_A = 25^\circ C$ 3.1	W
		$T_A = 70^\circ C$ 2	
$R_{\theta JA}$ ^②	Thermal Resistance-Junction to Ambient	40	$^\circ C/W$

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

Symbol	Parameter	Test Condition	RU2013H			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 30	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	0.5	0.8	1.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(3)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=10A$		13	16	$m\Omega$
		$V_{GS}=4.5V, I_{DS}=8A$		16	20	$m\Omega$
		$V_{GS}=2.5V, I_{DS}=6A$		22	26	$m\Omega$
Diode Characteristics						
$V_{SD}^{(3)}$	Diode Forward Voltage	$I_{SD}=1A, V_{GS}=0V$			1	V
t_{rr}	Reverse Recovery Time	$I_{SD}=10A, dI_{SD}/dt=100A/\mu s$		9		ns
Q_{rr}	Reverse Recovery Charge			12		nC
Dynamic Characteristics ⁽⁴⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		1.2		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=10V,$ Frequency=1.0MHz		580		pF
C_{oss}	Output Capacitance			124		
C_{riss}	Reverse Transfer Capacitance			65		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=10V, R_L=1\Omega,$ $I_{DS}=10A, V_{GEN}=10V,$ $R_G=6\Omega$		4		ns
t_r	Turn-on Rise Time			11		
$t_{d(OFF)}$	Turn-off Delay Time			19		
t_f	Turn-off Fall Time			8		
Gate Charge Characteristics ⁽⁴⁾						
Q_g	Total Gate Charge	$V_{DS}=16V, V_{GS}=4.5V,$ $I_{DS}=10A$		9	12	nC
Q_{gs}	Gate-Source Charge			2.1		
Q_{gd}	Gate-Drain Charge			3		

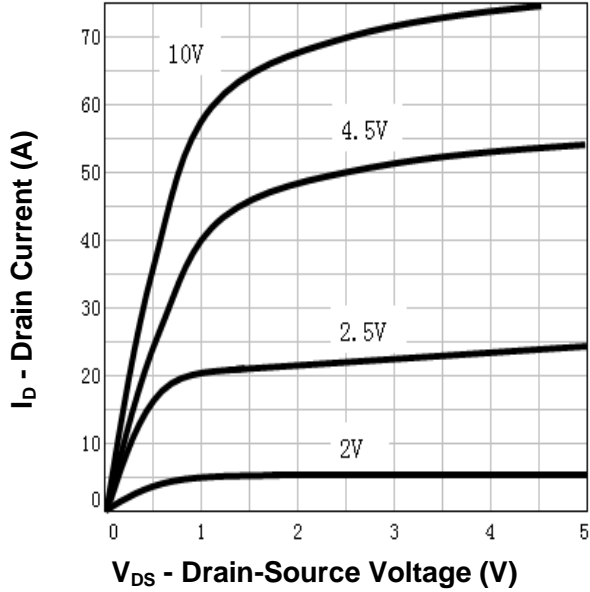
- Notes: ① Pulse width limited by safe operating area.
 ② When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
 ③ Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 ④ Guaranteed by design, not subject to production testing.

Typical Characteristics

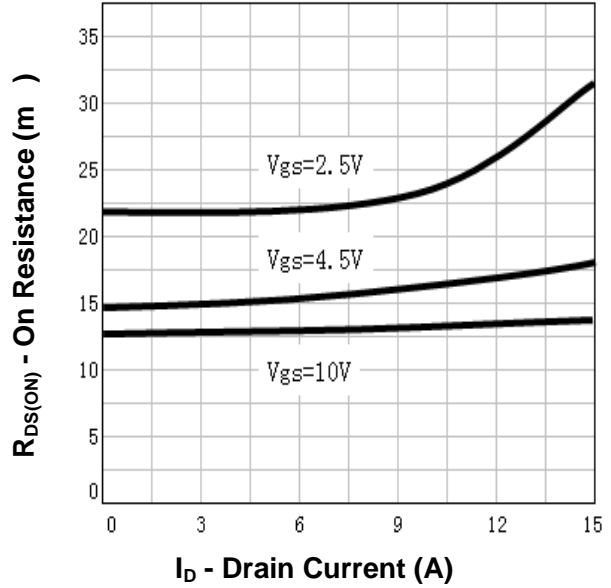


Typical Characteristics

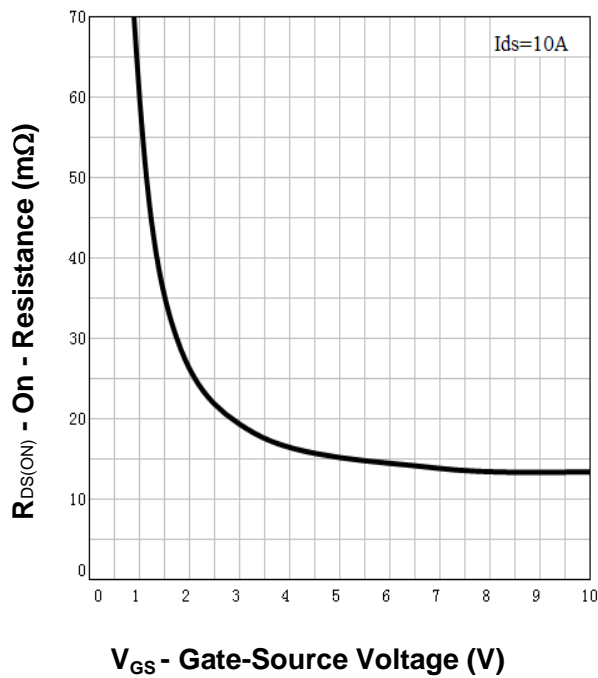
Output Characteristics



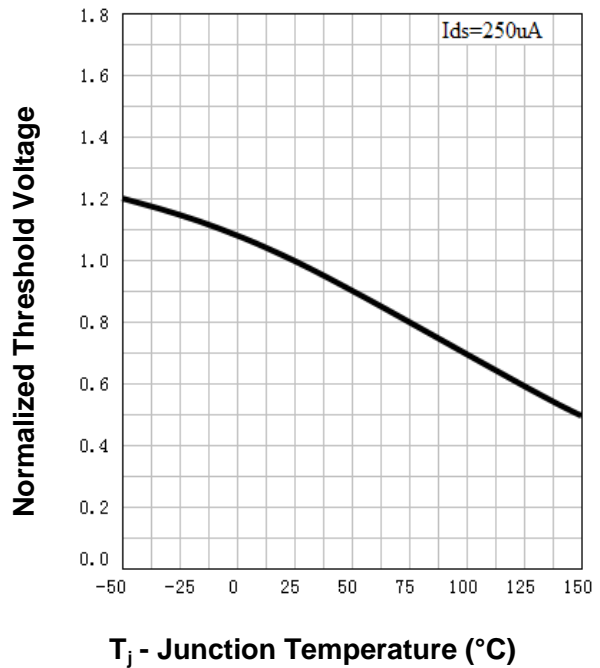
Drain-Source On Resistance



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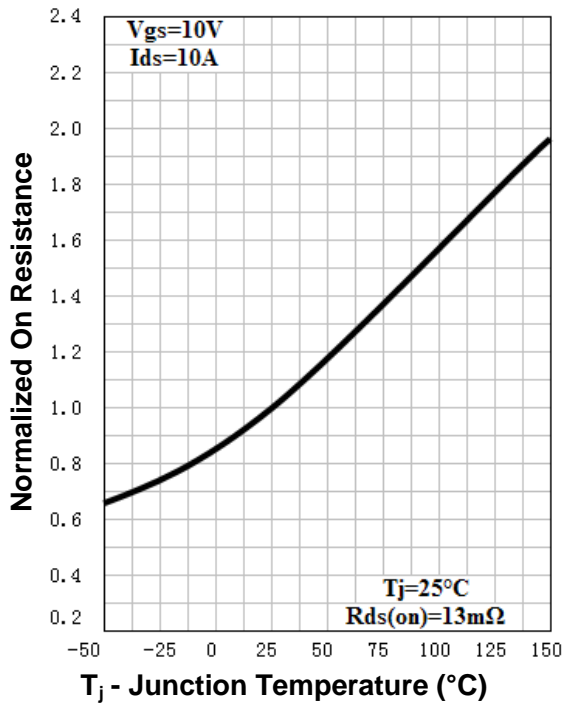


Gate Threshold Voltage

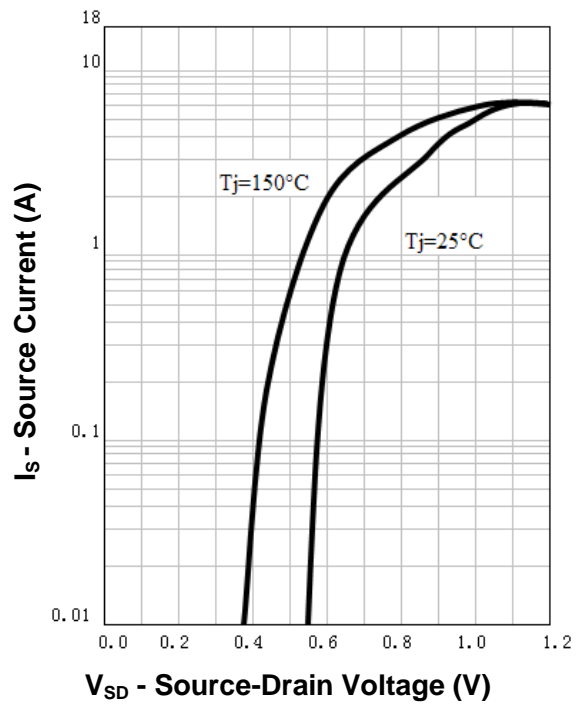


Typical Characteristics

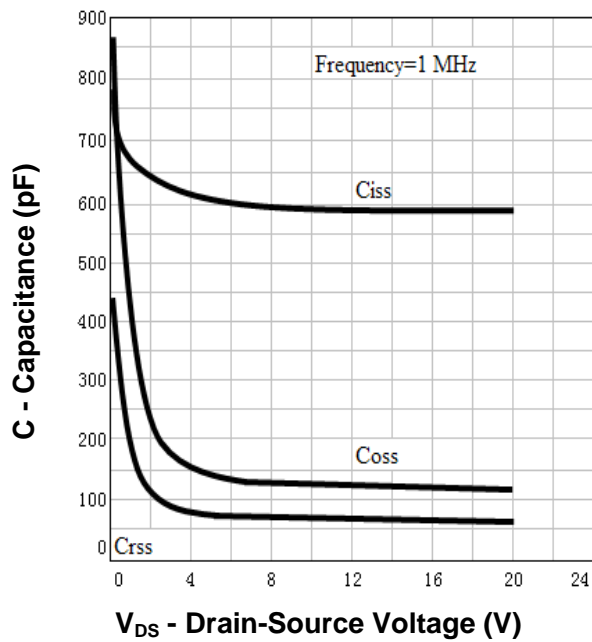
Drain-Source On Resistance



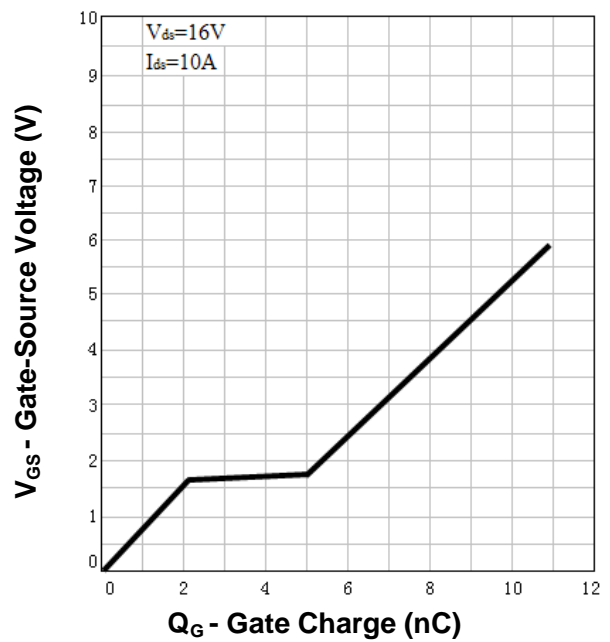
Source-Drain Diode Forward



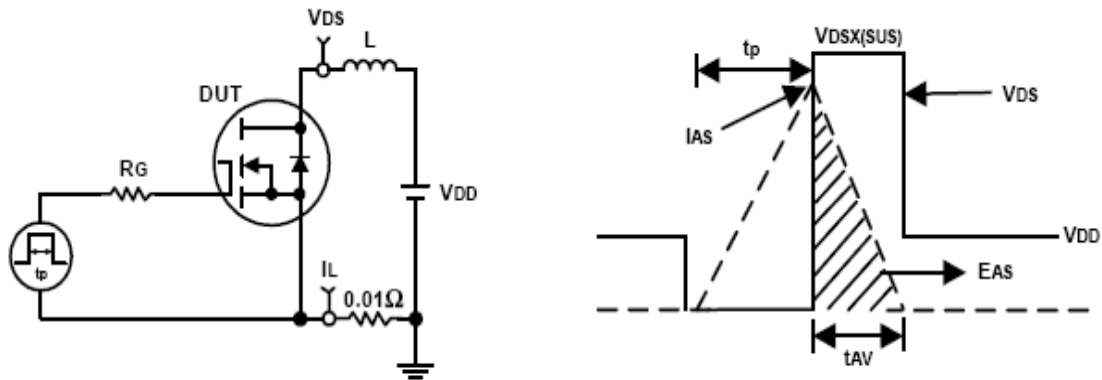
Capacitance



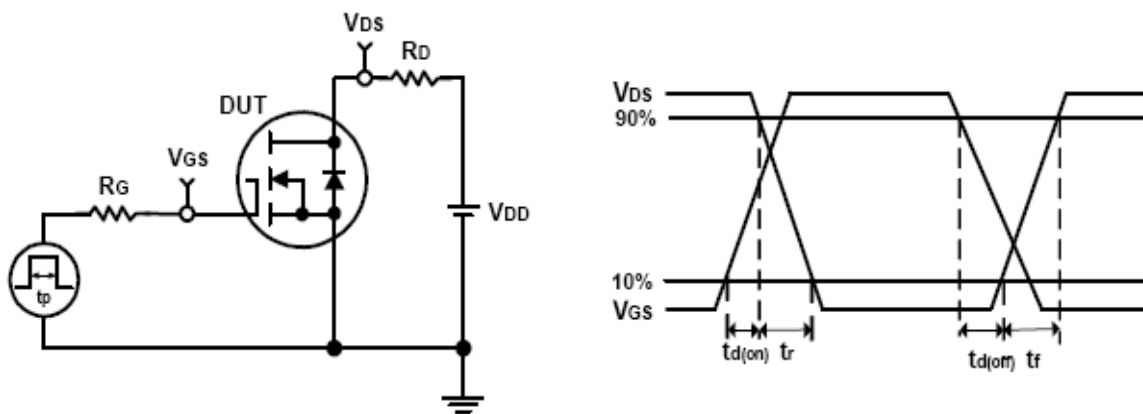
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

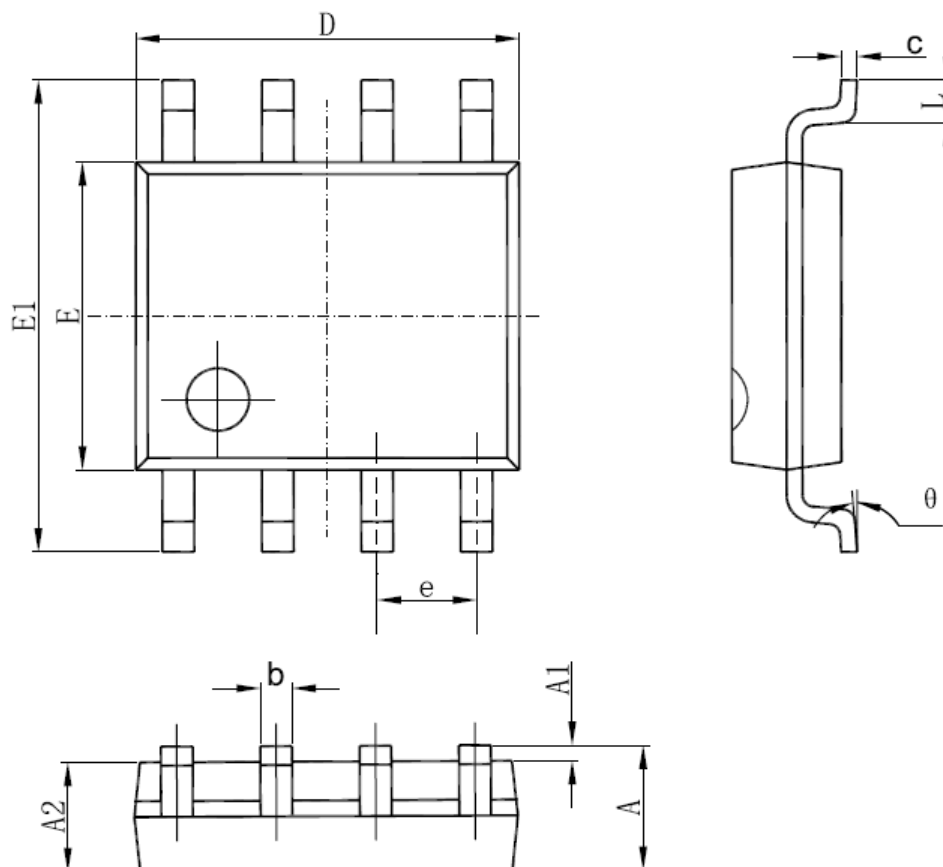


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU2013H	RU2013H	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	theta	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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