

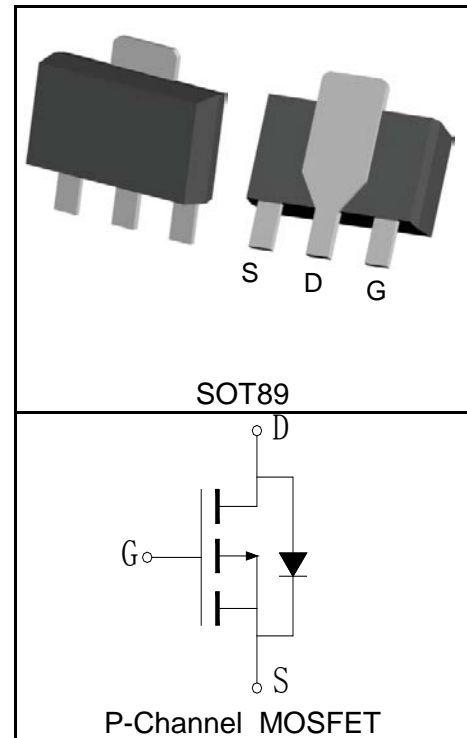
Features

- -20V/-5A,
 $R_{DS(ON)} = 50m\Omega(Typ.)@V_{GS}=-4.5V$
 $R_{DS(ON)} = 65m\Omega(Typ.)@V_{GS}=-3V$
- Low On-Resistance
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- Load Switch
- Power Management

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	$T_A=25^\circ C$ -1.2	A
Mounted on Large Heat Sink			
$I_{DP}^{①}$	300 μs Pulse Drain Current Tested	$T_A=25^\circ C$ -20	A
$I_D^{②}$	Continuous Drain Current($V_{GS}=-4.5V$)	$T_A=25^\circ C$ -5	A
		$T_A=70^\circ C$ -3.9	
P_D	Maximum Power Dissipation	$T_A=25^\circ C$ 1.25	W
		$T_A=70^\circ C$ 0.8	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	10	$^\circ C/W$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	100	$^\circ C/W$
Drain-Source Avalanche Ratings			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	56	mJ

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

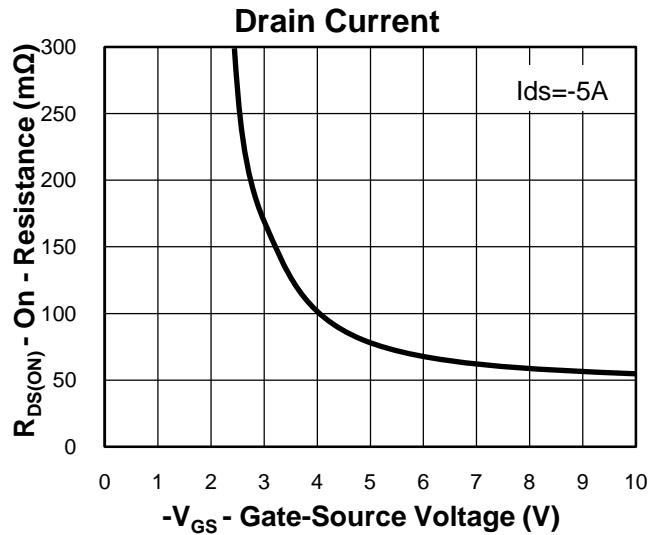
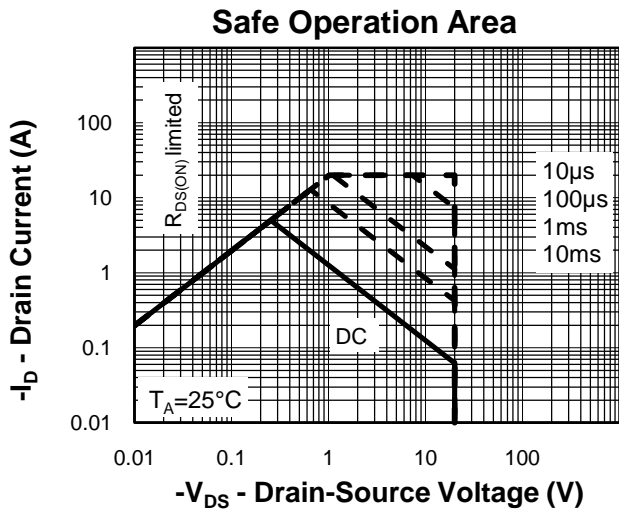
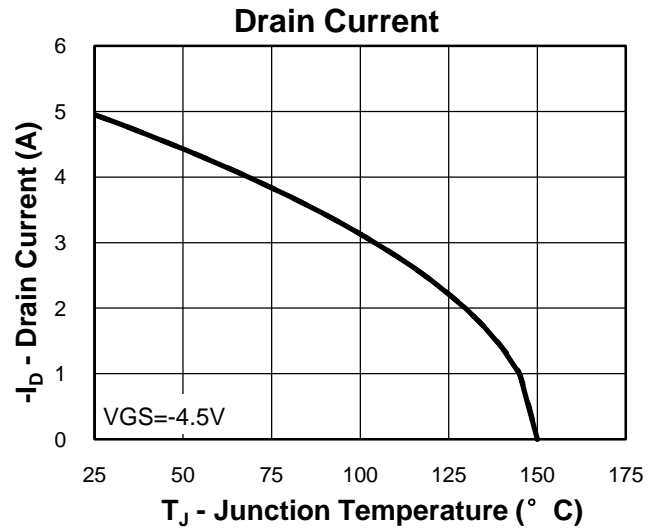
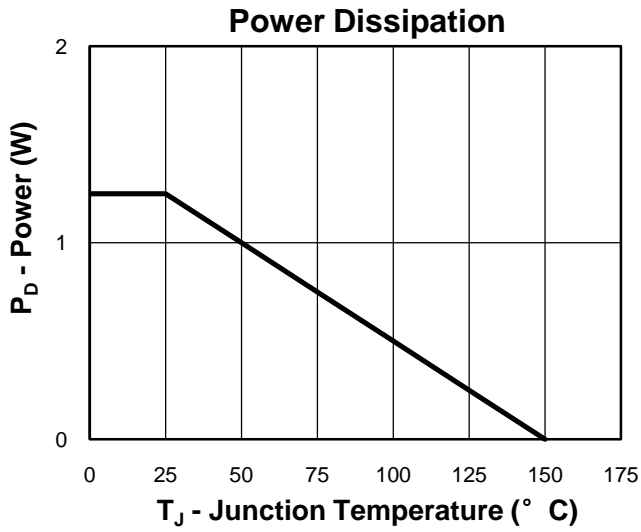
Symbol	Parameter	Test Condition	RU20P5E			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=-250\mu A$	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-16V, V_{GS}=0V$			-1	μA
		$T_J=125^\circ C$			-30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-0.5		-1.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=-4.5V, I_{DS}=-5A$		50	60	$m\Omega$
		$V_{GS}=-3V, I_{DS}=-4A$		65	80	$m\Omega$
Diode Characteristics						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=-5A, V_{GS}=0V$			-1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=-5A, di_{SD}/dt=100A/\mu s$		11		ns
Q_{rr}	Reverse Recovery Charge			6		nC
Dynamic Characteristics⁽⁶⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1.1		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=-10V, Frequency=1.0MHz$		545		pF
C_{oss}	Output Capacitance			90		
C_{riss}	Reverse Transfer Capacitance			45		
$t_{d(ON)}$	Turn-on Delay Time			6		
t_r	Turn-on Rise Time	$V_{DD}=-10V, I_{DS}=-5A, V_{GEN}=-4.5V, R_G=6\Omega$		12		
$t_{d(OFF)}$	Turn-off Delay Time			25		
t_f	Turn-off Fall Time			14		
Gate Charge Characteristics⁽⁶⁾						
Q_g	Total Gate Charge	$V_{DS}=-16V, V_{GS}=-4.5V, I_{DS}=-5A$		6.8		nC
Q_{gs}	Gate-Source Charge			1.4		
Q_{gd}	Gate-Drain Charge			2.3		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ 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.
 - ④ Limited by $T_{Jmax}, I_{AS} = -15A, V_{DD} = -16V, R_G = 50\Omega$, Starting $T_J = 25^\circ C$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

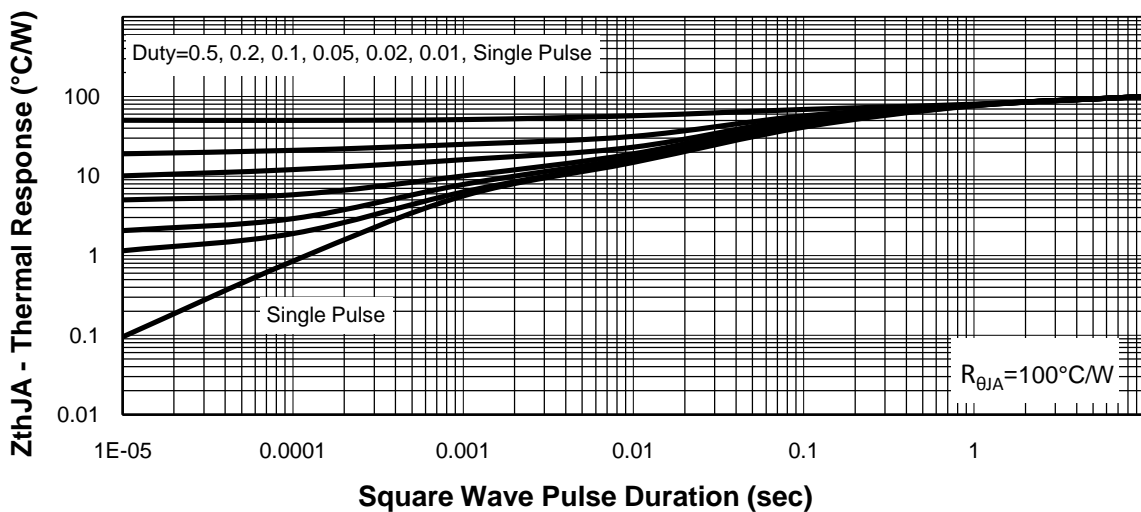
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU20P5E	RU20P5E	SOT89	Tape&Reel	1000	7"	12mm

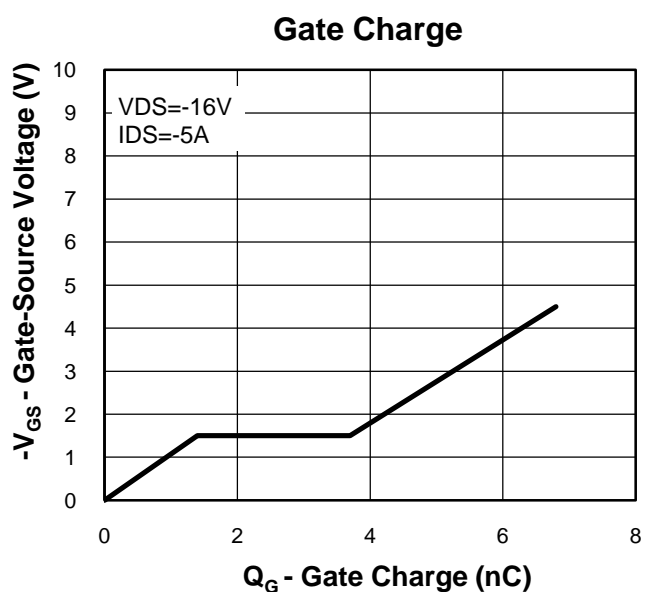
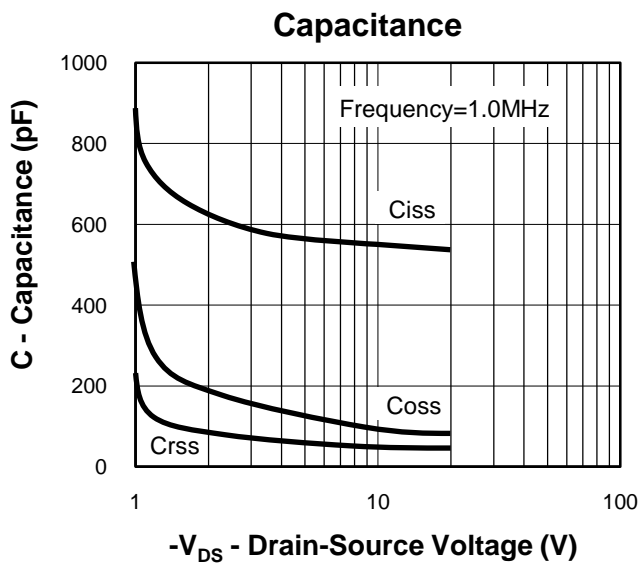
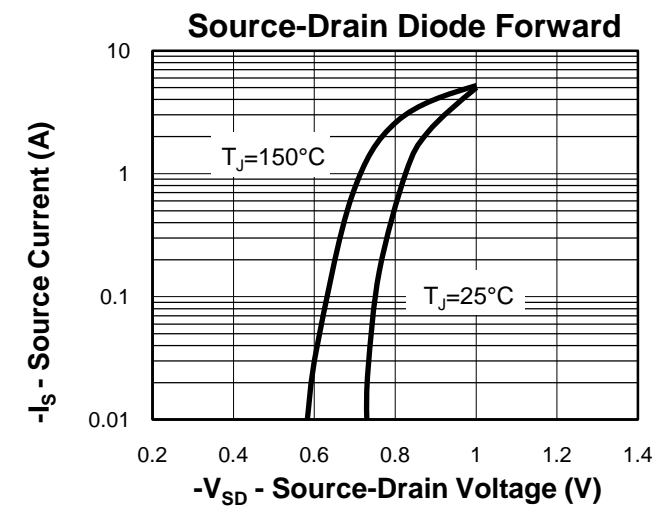
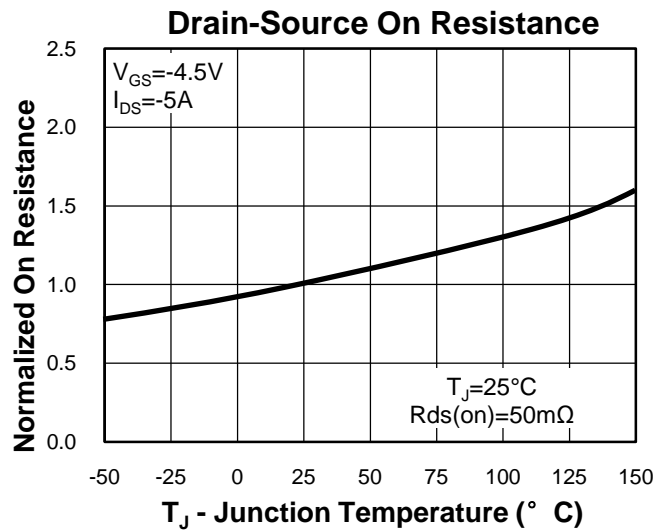
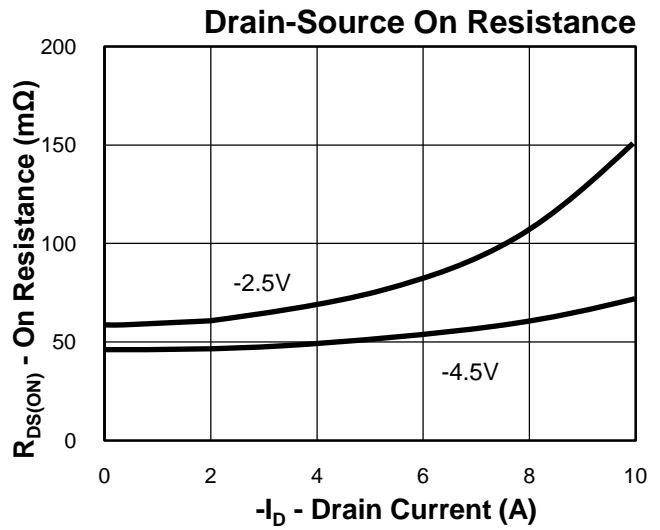
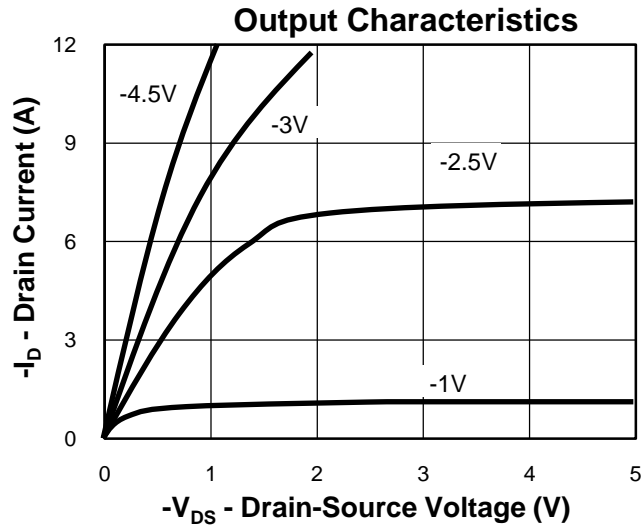
Typical Characteristics



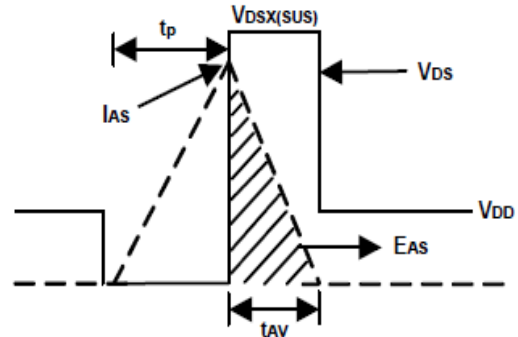
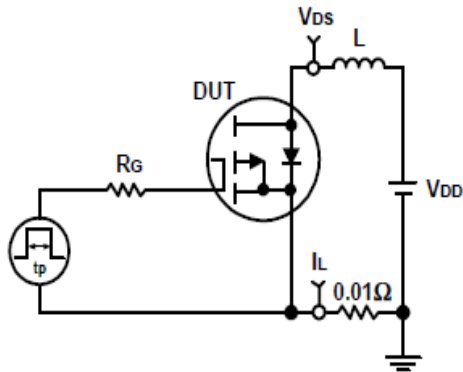
Thermal Transient Impedance



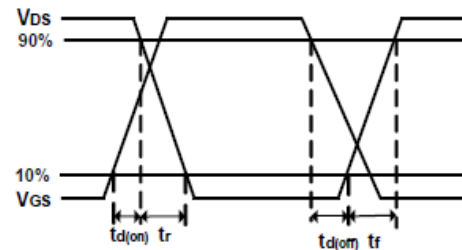
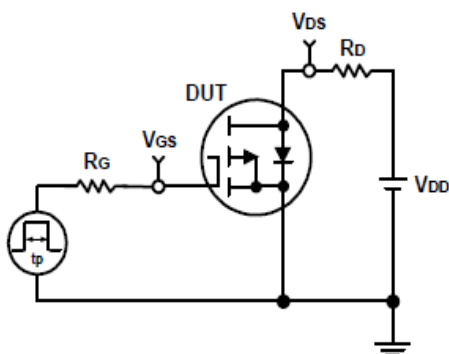
Typical Characteristics



Avalanche Test Circuit and Waveforms

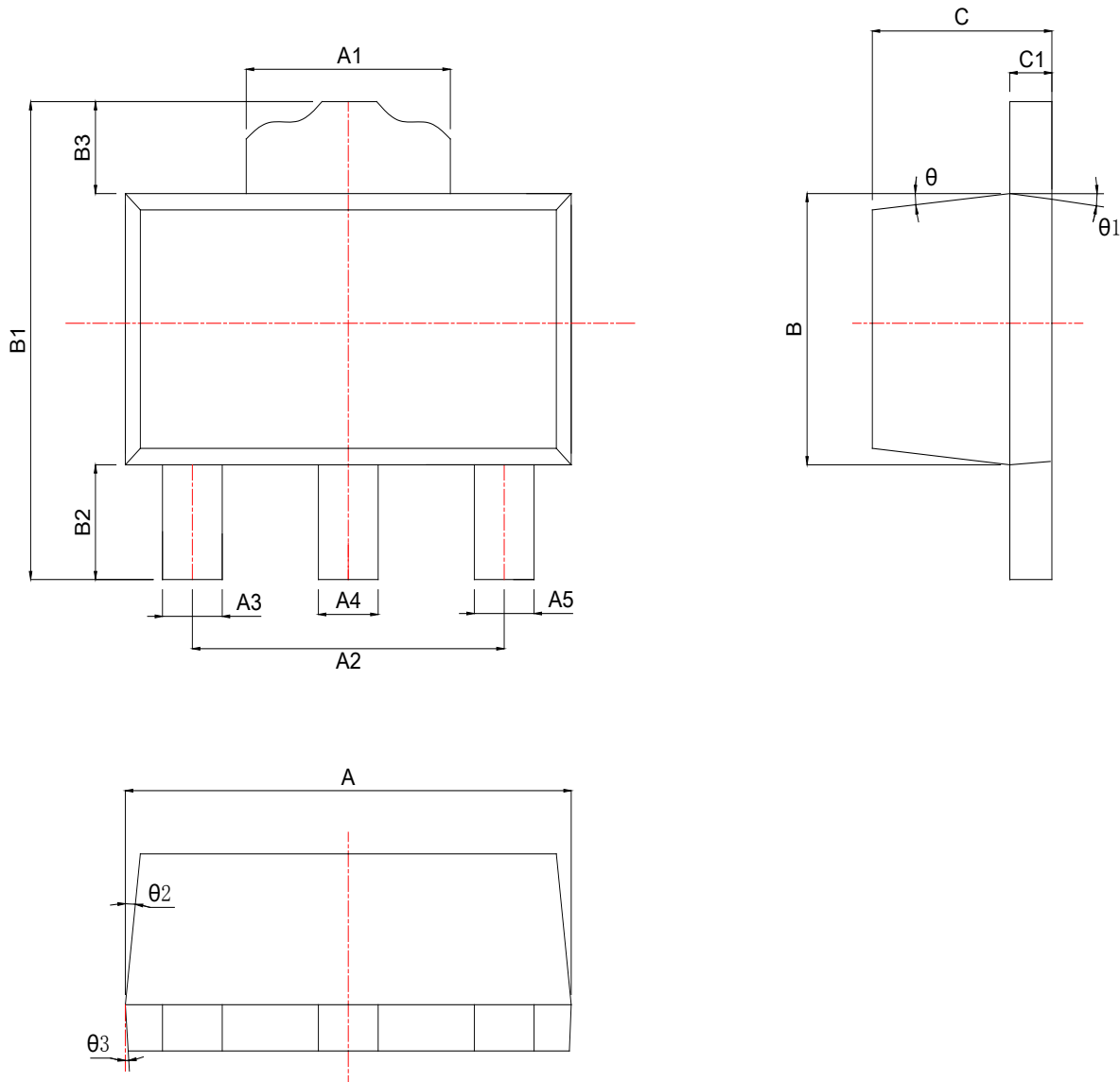


Switching Time Test Circuit and Waveforms



Package Information

SOT89



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.50	4.60	0.173	0.177	0.181
A1	1.65	1.70	1.75	0.065	0.067	0.069
A2	2.95	3.00	3.05	0.116	0.118	0.120
A3	0.32	0.42	0.52	0.013	0.017	0.020
A4	0.38	0.48	0.58	0.015	0.019	0.023
A5	0.32	0.42	0.52	0.013	0.017	0.020
B	2.30	2.45	2.60	0.091	0.096	0.102
B1	4.05	4.15	4.25	0.159	0.163	0.167
B2	0.80	1.00	1.20	0.031	0.039	0.047
B3	0.80	1.00	1.20	0.031	0.039	0.047
C	1.40	1.50	1.60	0.055	0.059	0.063
C1	0.35	0.40	0.45	0.014	0.016	0.018
θ		10° TYP4			10° TYP4	
θ_1		5° TYP4			5° TYP4	
θ_2		10° TYP4			10° TYP4	
θ_3		5° TYP4			5° TYP4	

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