



N-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage V_{DS} 30 V
- Drain-Source On-Resistance
- $R_{DS(ON)}$ 25m Ω , at $V_{GS}= 10V$, $I_D=4.0A$
 $R_{DS(ON)}$ 36m Ω , at $V_{GS}= 4.5V$, $I_D= 3.5A$
- Continuous Drain Current at $T_A=25^\circ C$ $I_D = 4.7A$
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

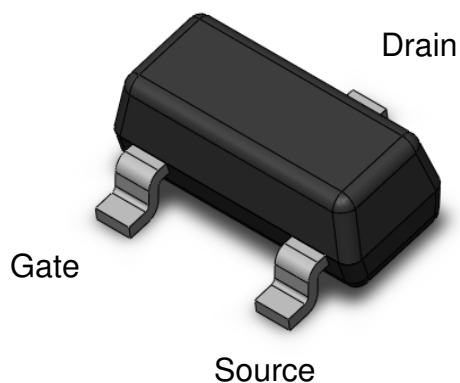
Description

The CT2306-R3 uses high performance Trench Technology to provide excellent $R_{DS(ON)}$ and low gate charge which is suitable for most of the synchronous buck converter applications.

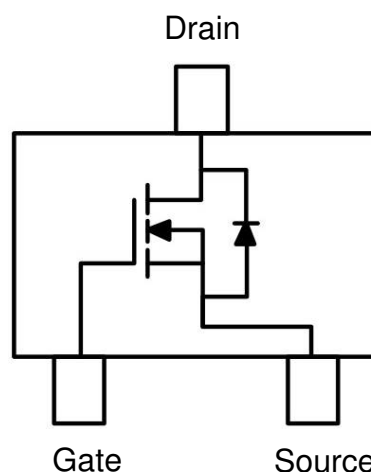
Applications

- Power Management
- DC-DC Converter
- Load Switch

Package Outline



Schematic



**Absolute Maximum Rating at 25°C**

Symbol	Parameters	Test Conditions	Min	Notes
V _{DS}	Drain-Source Voltage	30	V	
V _{GS}	Gate-Source Voltage	±20	V	
I _D	Continuous Drain Current @T _A =25°C	4.7	A	1
I _{DM}	Pulsed Drain Current	20	A	1
P _D	Total Power Dissipation @T _A =25°C	1.3	W	2
T _{STG}	Storage Temperature Range	-55 to 150	°C	
T _J	Operating Junction Temperature Range	-55 to 150	°C	

Thermal Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R _{θJA}	Thermal Resistance Junction-Ambient		--	125	--	°C /W	1,4



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Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Static Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{DS}}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V	
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	μA	
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA	

On Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$R_{DS(ON)}$	Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 4.0A$	-	25	45	$m\Omega$	3
		$V_{GS} = 4.5V, I_D = 3.5A$	-	36	50	$m\Omega$	
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu A$	1.0	---	3.0	V	3

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C_{ISS}	Input Capacitance	$V_{GS} = 0V,$ $V_{DS} = 15V$ $f = 1MHz$	-	382	-	pF	
C_{OSS}	Output Capacitance		-	65	-		
C_{RSS}	Reverse Transfer Capacitance		-	16	-		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$T_{D(ON)}$	Turn-On Delay Time	$V_{DS} = 15V,$ $V_{GS} = 10V,$ $R_G = 3\Omega,$ $I_D = 3.4A$	-	9	-	ns	Fig 8 & 9
T_R	Rise Time		-	15	-		
$T_{D(OFF)}$	Turn-Off Delay Time		-	32	-		
T_F	Fall Time		-	3	-		
Q_G	Total Gate Charge	$V_{DS} = 15V,$ $V_{GS} = 15V,$ $I_D = 3.4A$	-	6.4	-	nC	Fig 6 & 7
Q_{GS}	Gate-Source Charge		-	3	-		
Q_{GD}	Gate-Drain (Miller) Charge		-	2.5	-		



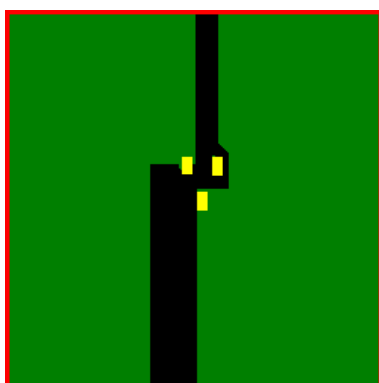
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Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _D = 4.7	-	-	1.2	V	
I _{SD}	Body Diode Continuous Current		-	-	4.7	A	1

Note:

1. The power dissipation is limited by 150°C junction temperature.
2. Device mounted on a glass-epoxy board



FR-4
25.4 × 25.4 mm .
2 Oz Copper

Actual Size

3. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
4. Thermal Resistance follow JESD51-3.



Typical Characteristic Curves

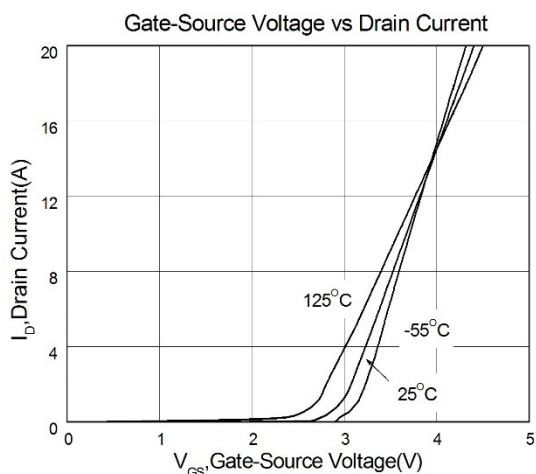


Figure 1

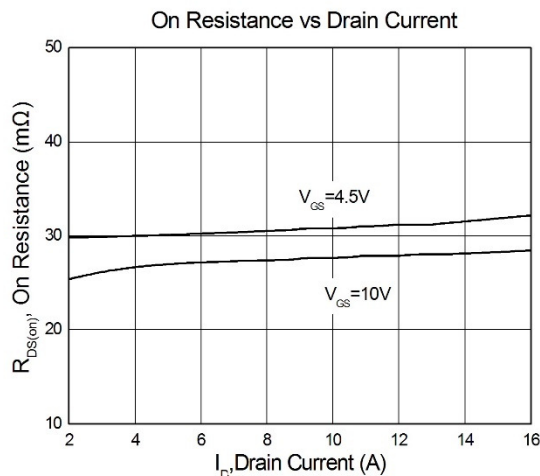


Figure 2

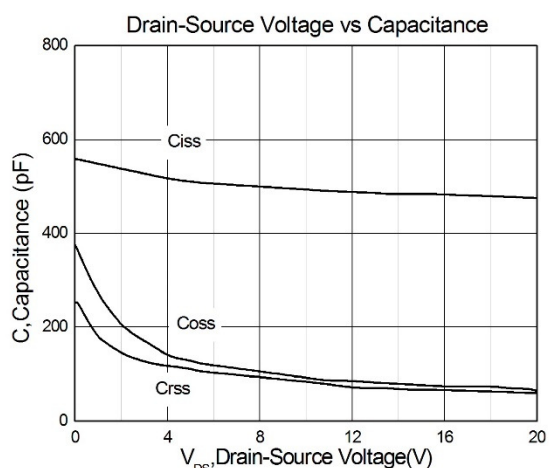


Figure 3

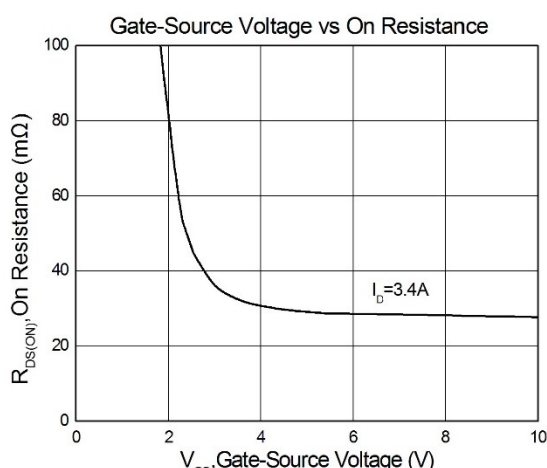


Figure 4

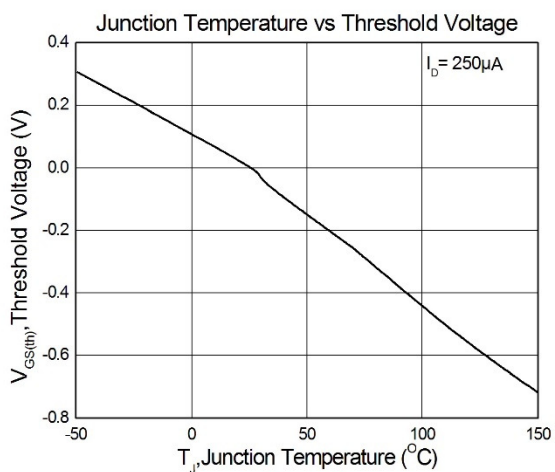


Figure 5



Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

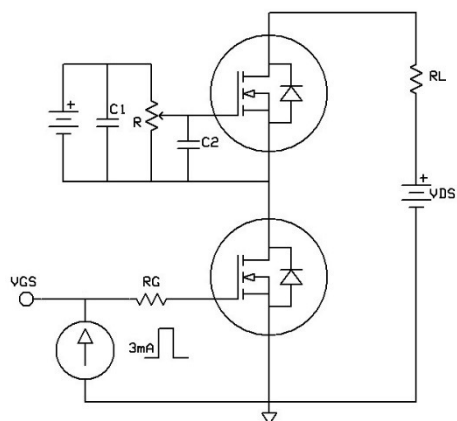


Figure 10: Gate Charge Waveform

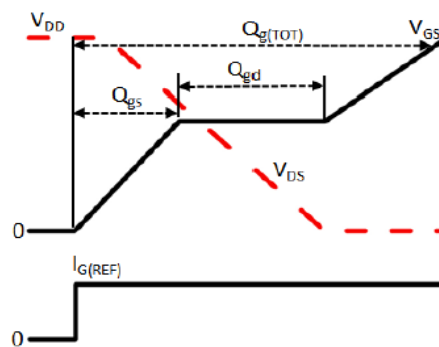


Figure 11: Switching Time Test Circuit

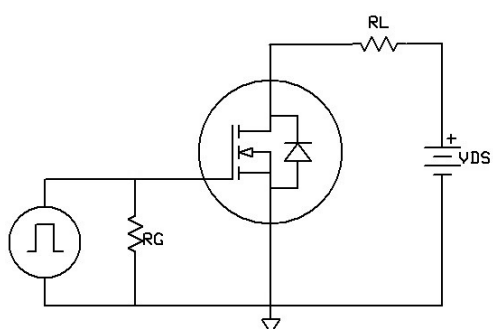
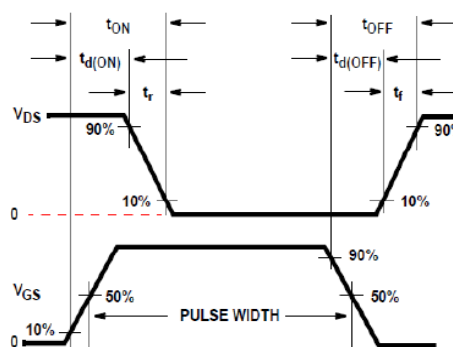
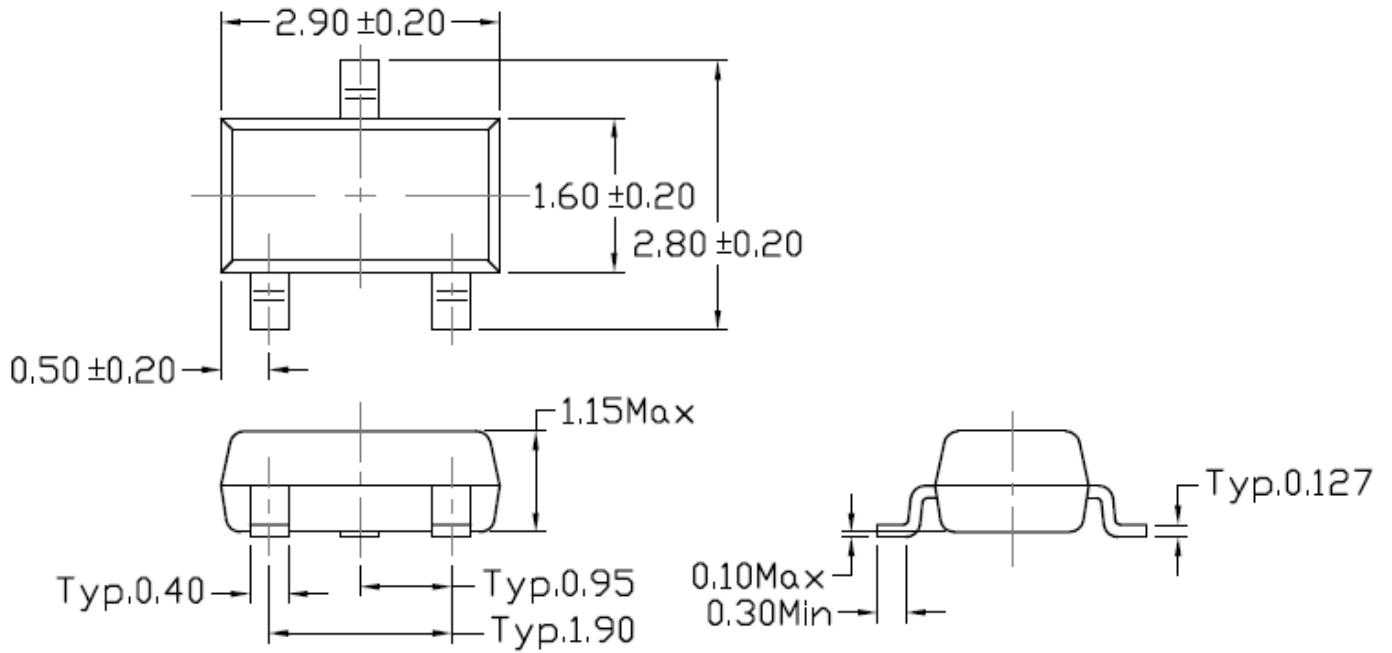


Figure 12: Switching Time Waveform



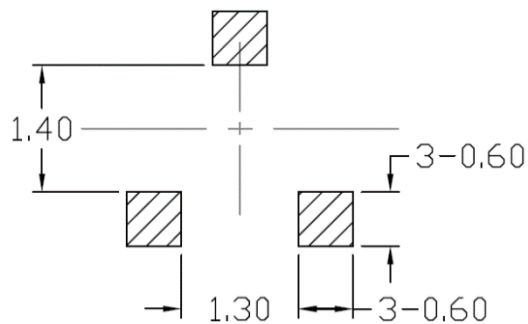


Package Dimension (SC-59)



Note: Dimensions in mm

Recommended pad layout for surface mount leadform



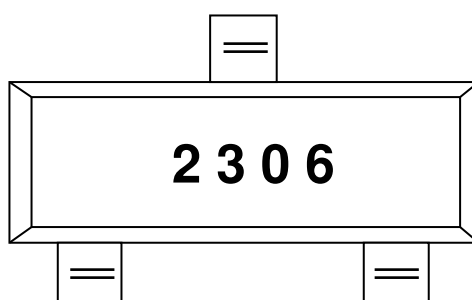
Note: Dimensions in mm



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Marking Information



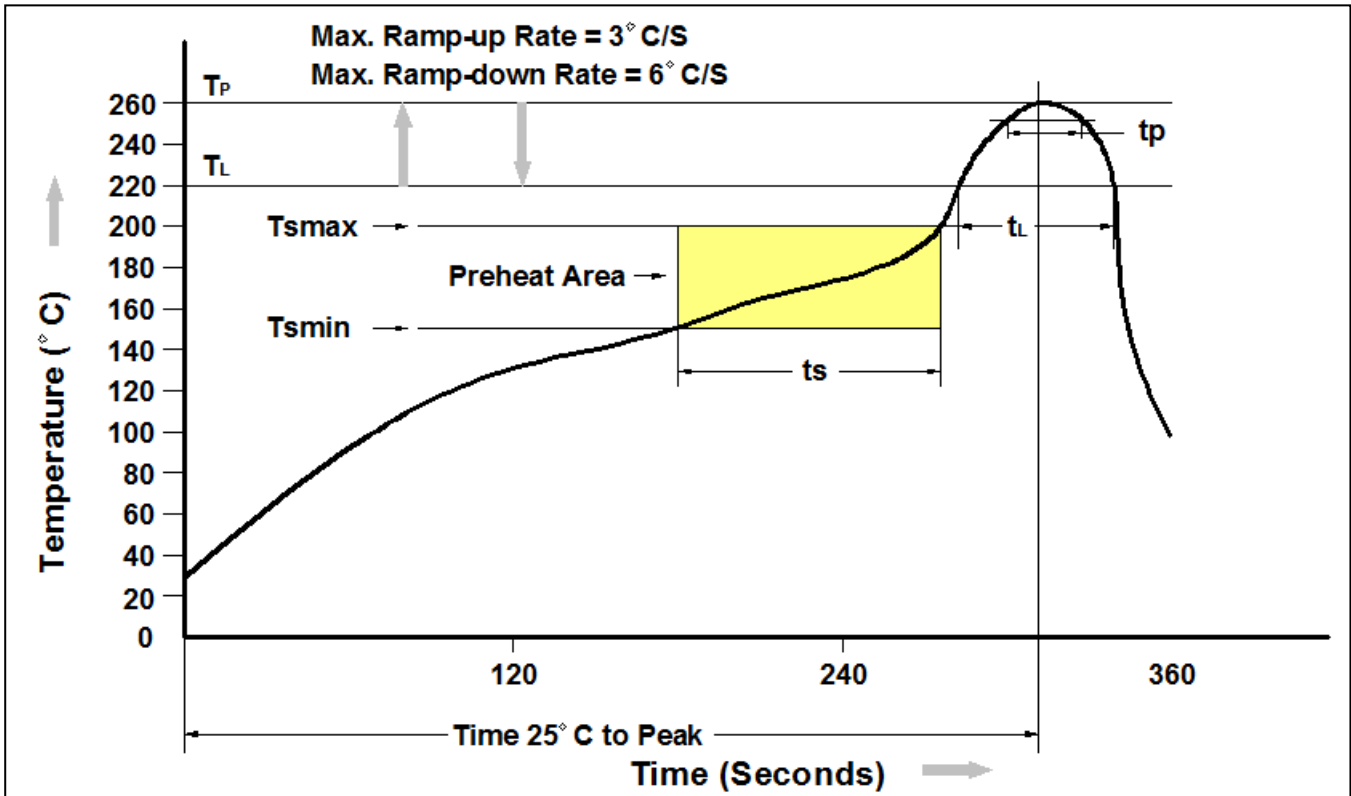
2306 : Device Number

Ordering Information

<i>Part Number</i>	<i>Description</i>	<i>Quantity</i>
CT2306-R3	SC-59 Reel	3000 pcs



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T Amin)	150 °C
Temperature Max. (Tsmax)	200 °C
Time (ts) from (T Amin to Tsmax)	60-120 seconds
Ramp-up Rate (tL to tP)	3 °C/second max.
Liquidous Temperature (TL)	217 °C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Body Package Temperature	260 °C +0 °C / -5 °C
Time (tP) within 5 °C of 260 °C	30 seconds
Ramp-down Rate (TP to TL)	6 °C/second max
Time 25 °C to Peak Temperature	8 minutes max.



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