

**N-Channel Enhancement MOSFET****Features**

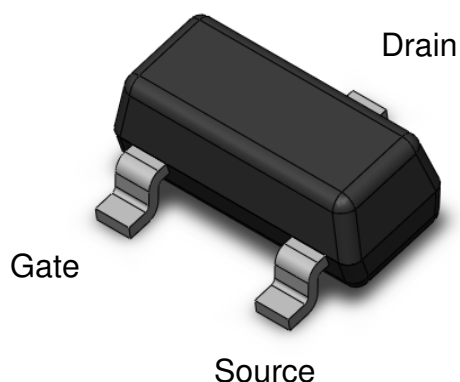
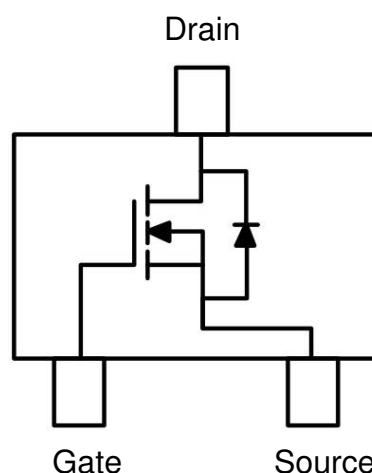
- Drain-Source Breakdown Voltage V_{DS} 20 V
- Drain-Source On-Resistance
 $R_{DS(ON)}$ 22m Ω , at V_{GS} = 4.5V, I_{DS} = 4.0A
 $R_{DS(ON)}$ 27m Ω , at V_{GS} = 2.5V, I_{DS} = 3.0A
- Continuous Drain Current at $T_A=25^{\circ}\text{C}$ I_D = 4.0A
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

Applications

- Power Management
- Lithium Ion Battery

Description

The CT2300-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 .

Package Outline**Schematic**

**Absolute Maximum Rating at 25°C**

Symbol	Parameters	Ratings	Units	Notes
V_{DS}	Drain-Source Voltage	20	V	
V_{GS}	Gate-Source Voltage	± 12	V	
I_D	Continuous Drain Current @ $T_A=25^\circ\text{C}$	4.0	A	1
I_{DM}	Pulsed Drain Current	13.5	A	1
P_D	Total Power Dissipation @ $T_A=25^\circ\text{C}$	1.25	W	2
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$	

Thermal Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ($t=10\text{s}$)		-	175	-	$^\circ\text{C}/\text{W}$	1,4



N-Channel Enhancement MOSFET

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	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V	
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA	

On Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$R_{DS(ON)}$	Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=4.5A$	-	22	33	m Ω	
		$V_{GS}=2.5V, I_D=4.0A$	-	27	40	m Ω	
$V_{GS(TH)}$	Gate-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	-	1.0	V	

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C_{ISS}	Input Capacitance	$V_{DS}=10V,$ $V_{GS}=0V,$ $f=1MHz$	-	600	-	pF	
C_{OSS}	Output Capacitance		-	85	-		
C_{RSS}	Reverse Transfer Capacitance		-	75	-		

Switching Characteristics

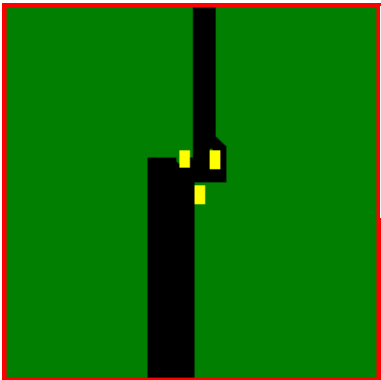
Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$T_{D(ON)}$	Turn-On Delay Time	$V_{DS}=10V, V_{GS}=4.5V,$ $R_G=6\Omega, I_D=1A$	-	3.5	-	ns	Fig 11 & 12
T_R	Rise Time		-	23	-		
$T_{D(OFF)}$	Turn-Off Delay Time		-	39	-		
T_F	Fall Time		-	24	-		
Q_G	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V,$ $I_D=4.5A$	-	7.5	-	nC	Fig 9 & 10
Q_{GS}	Gate-Source Charge		-	1	-		
Q_{GD}	Gate-Drain (Miller) Charge		-	2	-		



Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _{SD} = 4.0A			1.3	V	
I _{SD}	Body Diode Continuous Current				4.0	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 ≤ 300μs , duty cycle ≤ 2%
- 4. Thermal Resistance follow JESD51-3.



Typical Characteristic Curves

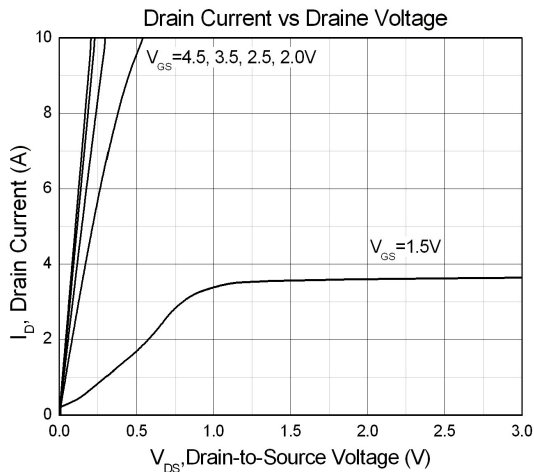


Figure 1

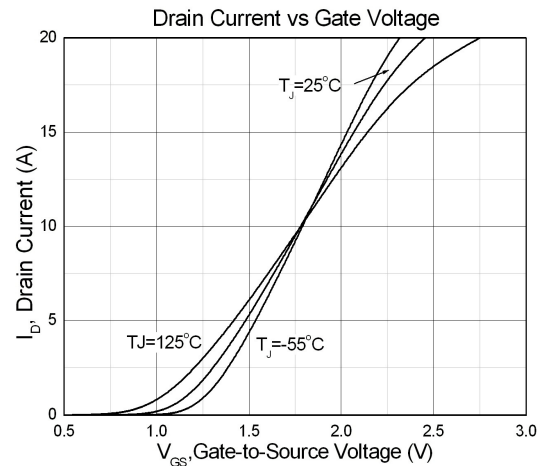


Figure 2

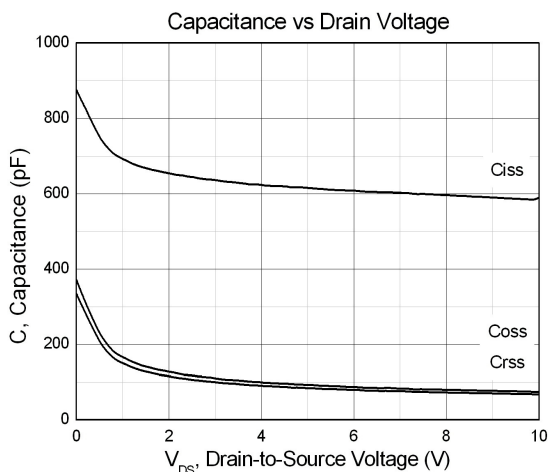


Figure 3

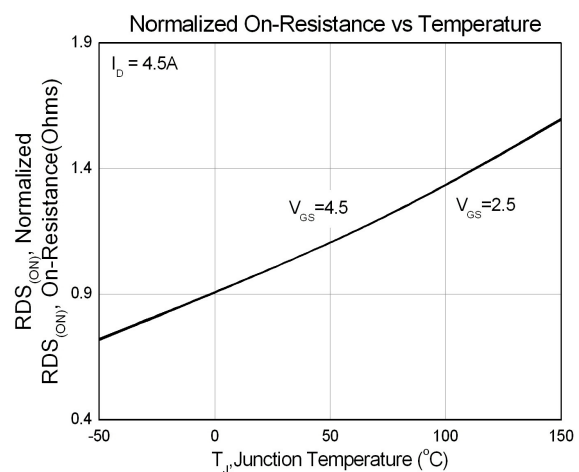


Figure 4

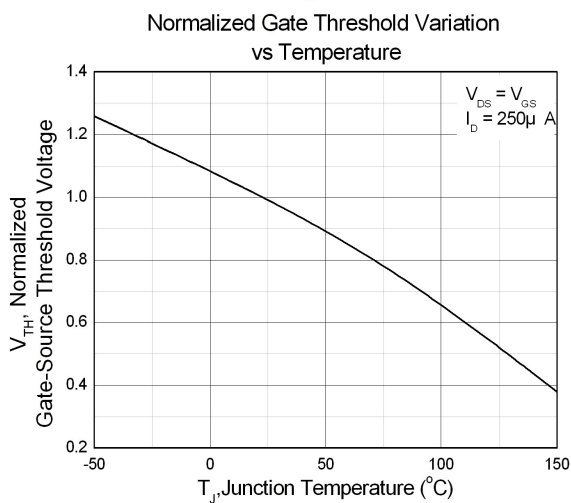


Figure 5

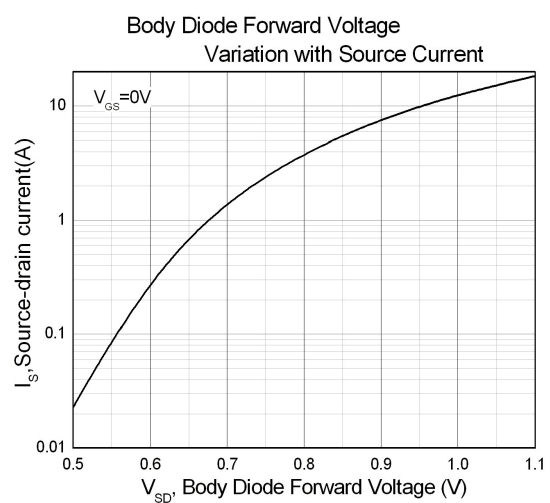
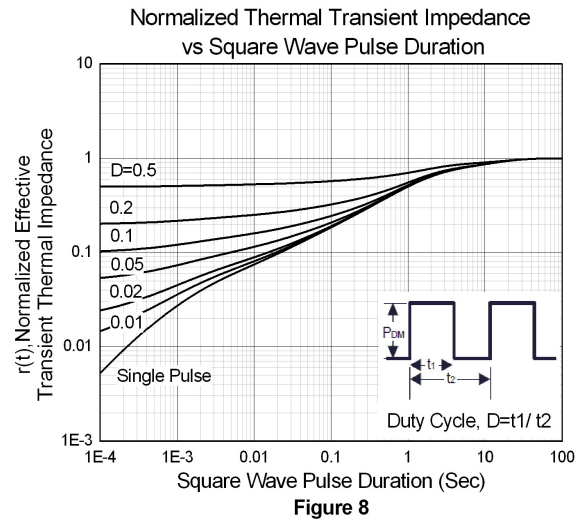
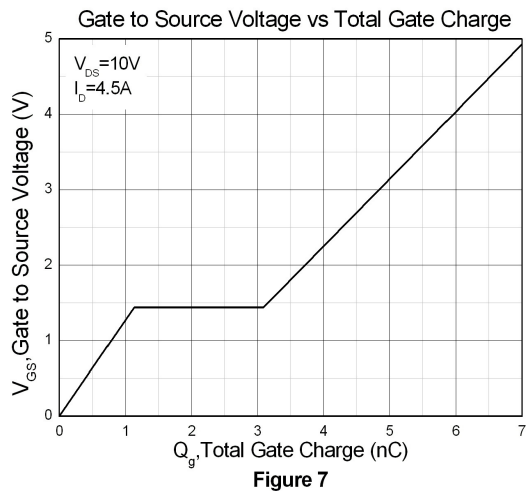


Figure 6





Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

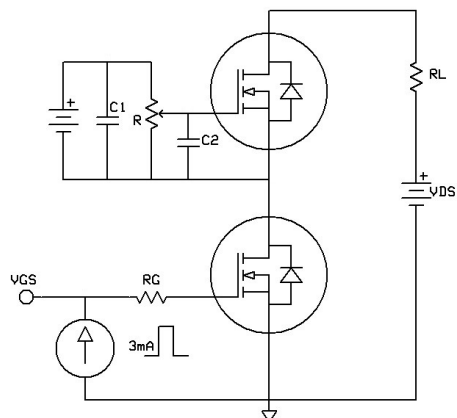


Figure 10: Gate Charge Waveform

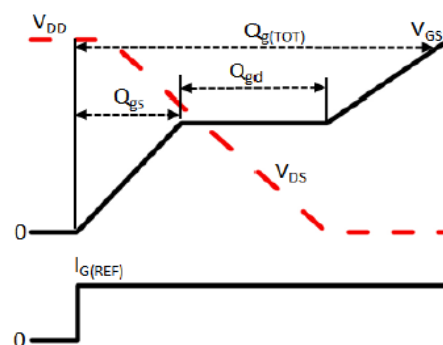


Figure 11: Switching Time Test Circuit

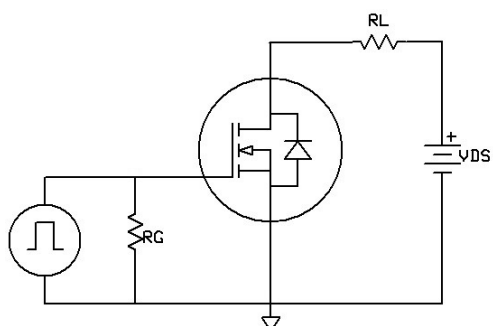
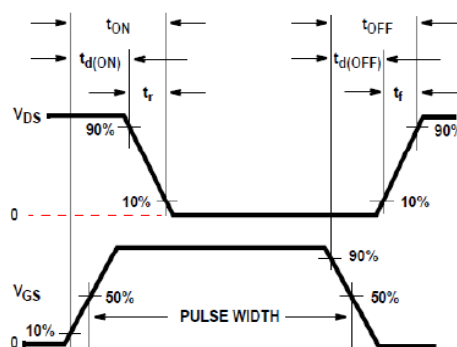
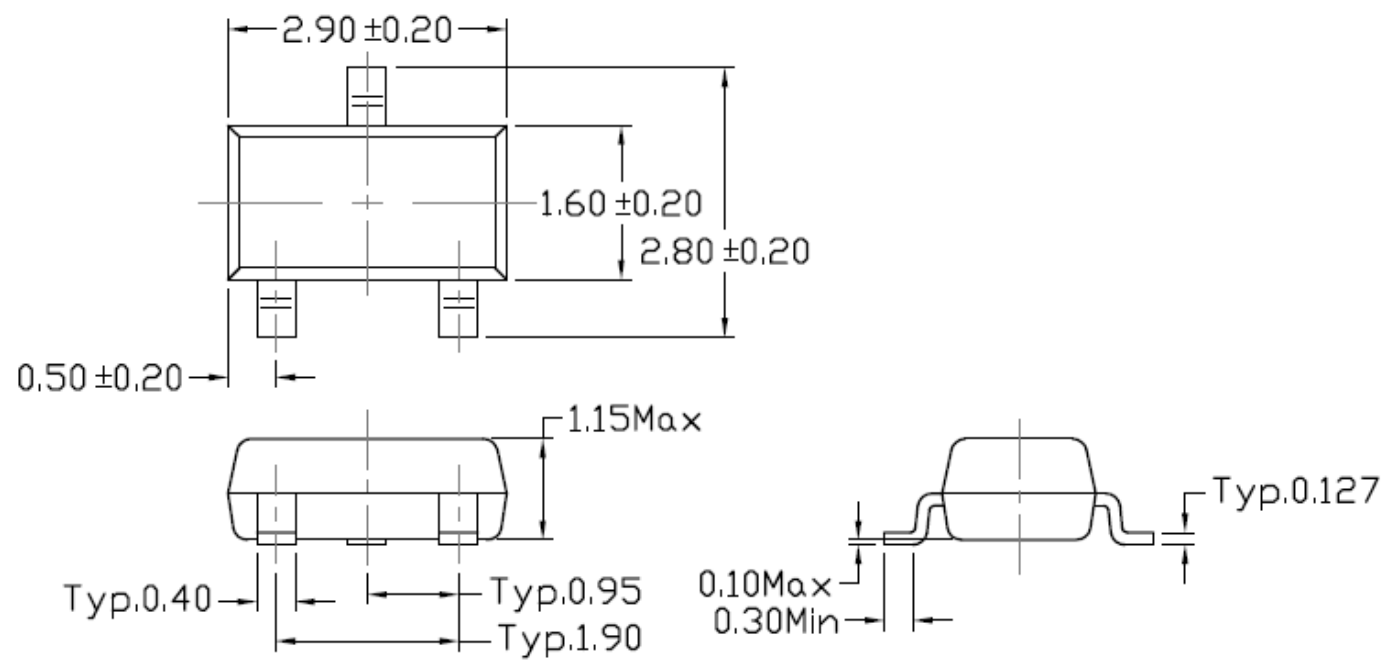


Figure 12: Switching Time Waveform



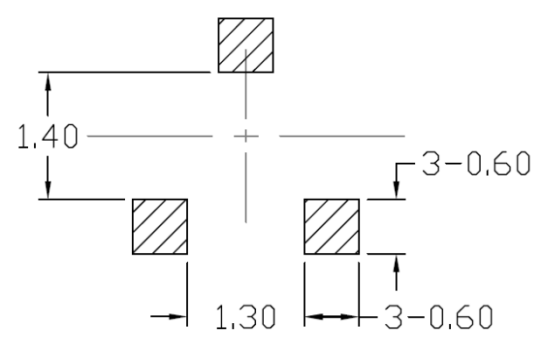


Package Dimension (SC-59)



Note: Dimensions in mm

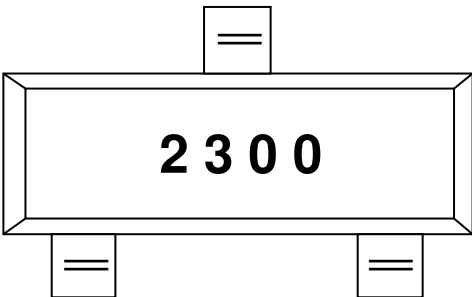
Recommended pad layout for surface mount leadform



Note: Dimensions in mm



Marking Information



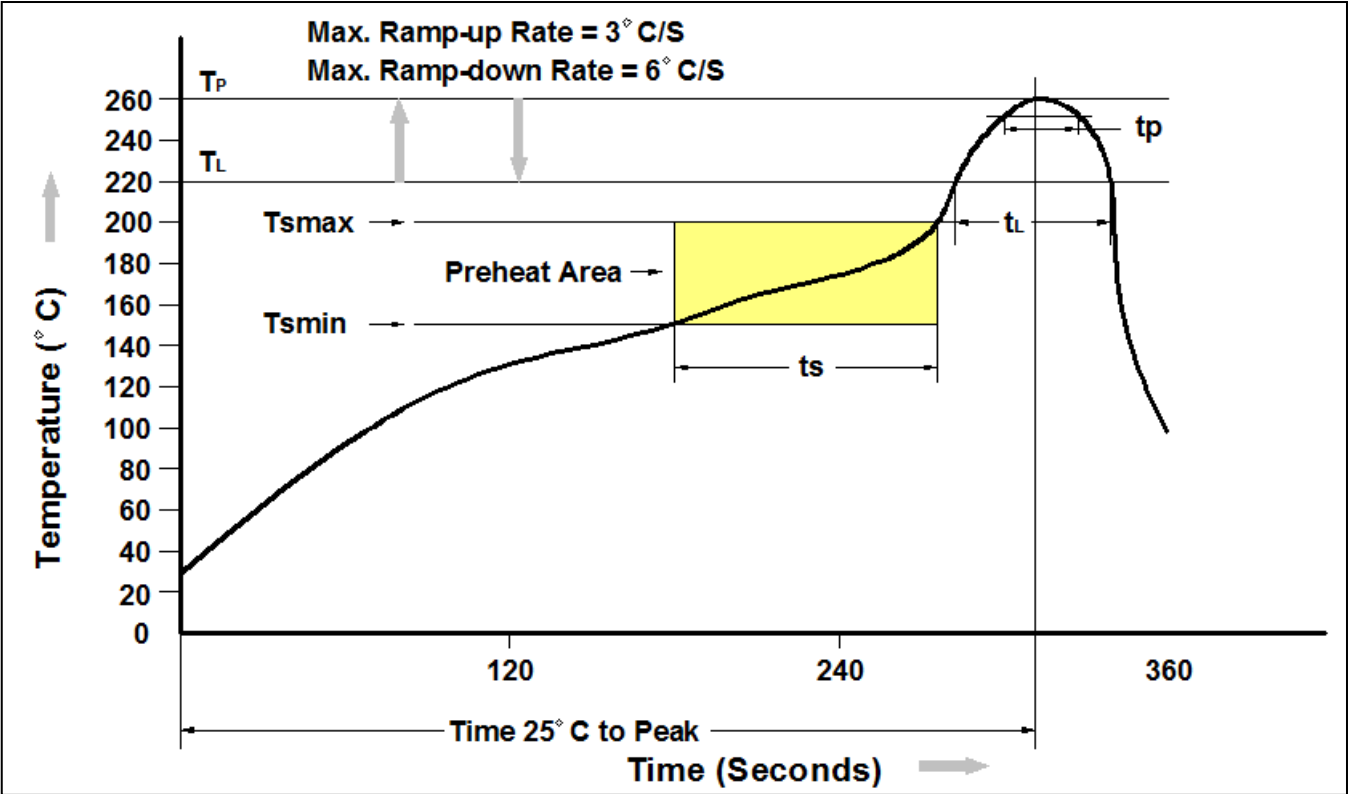
2300 : Device Number

Ordering Information

Part Number	Description	Quantity
CT2300-R3	SC-59 Reel	3000 pcs



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150 °C
Temperature Max. (T _{smax})	200 °C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Ramp-up Rate (t _L to t _P)	3 °C/second max.
Liquidous Temperature (T _L)	217 °C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Body Package Temperature	260 °C +0 °C / -5 °C
Time (t _P) within 5 °C of 260 °C	30 seconds
Ramp-down Rate (T _P to T _L)	6 °C/second max
Time 25 °C to Peak Temperature	8 minutes max.



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