CTL0015PS-R3

P-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage V_{DSS} -50 V
- Drain-Source On-Resistance
  $R_{DS(ON)}$ 5Ω, at V_{GS}= -5.0V, I_D= -0.1A
- Continuous Drain Current at T_C=25˚C I_D = -0.13A
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

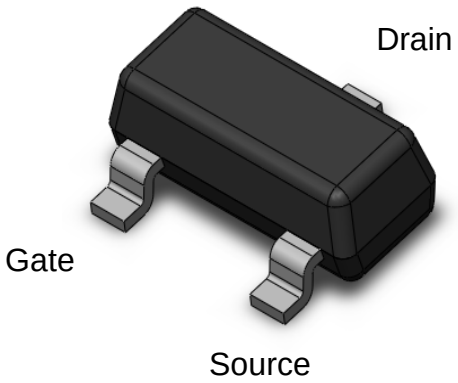
Description

The CTL0015PS-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.

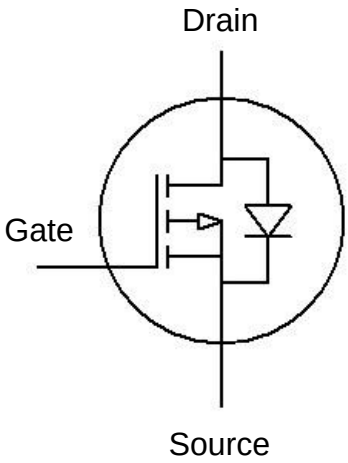
Applications

- DC to DC Converter
- Load switching
- Battery

Package Outline



Schematic



Absolute Maximum Rating at 25ºC

Symbol	Parameters	Test Conditions	Min	Notes
V_{DS}	Drain-Source Voltage	-50	V	
V_{GS}	Gate-Source Voltage	±20	V	
I_D	Continuous Drain Current	-0.13	A	1
I_{DM}	Pulsed Drain Current	-0.52	A	1
P_D	Total Power Dissipation	0.225	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
$R_{\Theta JA4}$	Thermal Resistance Junction-Ambient (t=10s)		--	175	--	ºC /W	1,4

Electrical Characteristics T_A = 25°C (unless otherwise specified)

Static Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
B_{VDSS}	Drain-Source Breakdown Voltage	V_{GS}= 0V, I_D= -250μA	-50	-	-	V	
I_{DSS}	Drain-Source Leakage Current	V_{DS} = -25V, V_{GS} = 0V	-	-	-0.1	μ A	
I_{DSS}	Drain-Source Leakage Current	V_{DS} = -50V, V_{GS} = 0V			15	μ A	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±60	μ A	

On Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$R_{DS(ON)}$	Drain-Source On-Resistance	V_{GS} = -5.0V, I_D = -100mA	-	5.0	10	Ω	3
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS} = V_{DS}, I I_D =-250μA	-0.8	---	-2.0	V	3

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C_{ISS}	Input Capacitance	V_{GS} =0V,	-	29	-	pF	
C_{OSS}	Output Capacitance	V_{DS} =-5V	-	11	-		
C_{RSS}	Reverse Transfer Capacitance	f=1MHz	-	4.8	-		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$T_{D(ON)}$	Turn-On Delay Time	V_{DS} = -15V , R_G = 15Ω, I_D =-2.5A	-	2.5	-	ns	
T_R	Rise Time		-	1.0	-		
$T_{D(OFF)}$	Turn-Off Delay Time		-	16	-		
T_F	Fall Time		-	8.0	-		
Q_G	Total Gate Charge	V_{DS} = -15V ,	-	0.6	-	nC	

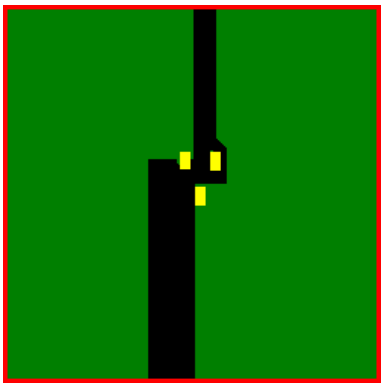
Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_{SD}	Body Diode Forward Voltage	V_{GS} = 0V, I_D = -3.1	-	-2.5	-	V	
I_{SD}	Body Diode Continuous Current		-	-	-130	mA	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

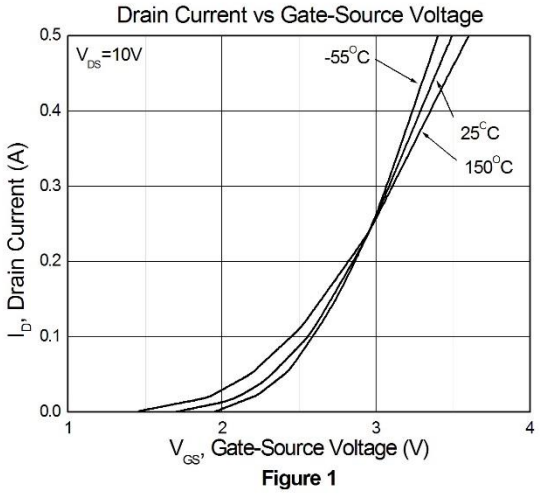


Figure 1

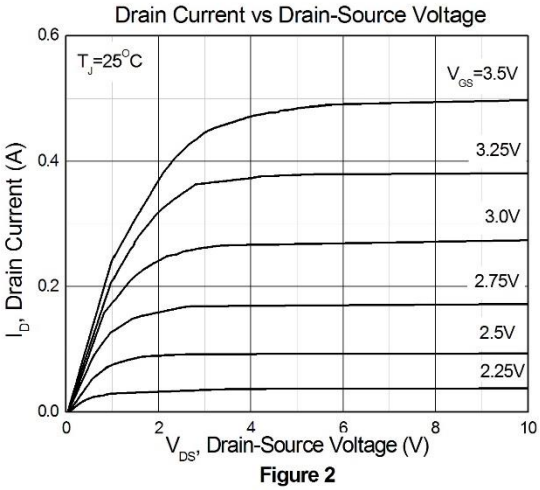


Figure 2

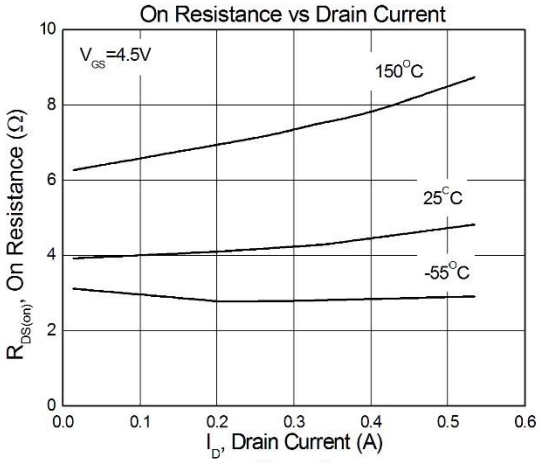


Figure 3

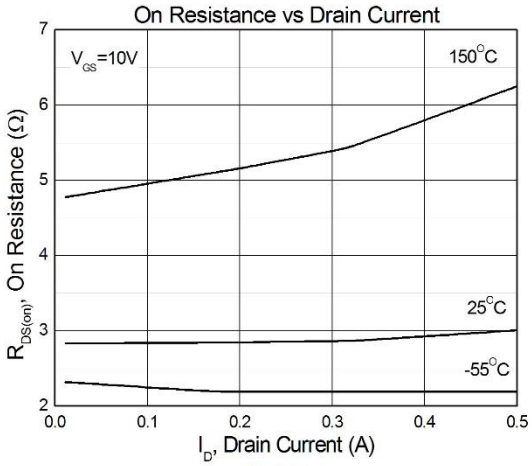


Figure 4

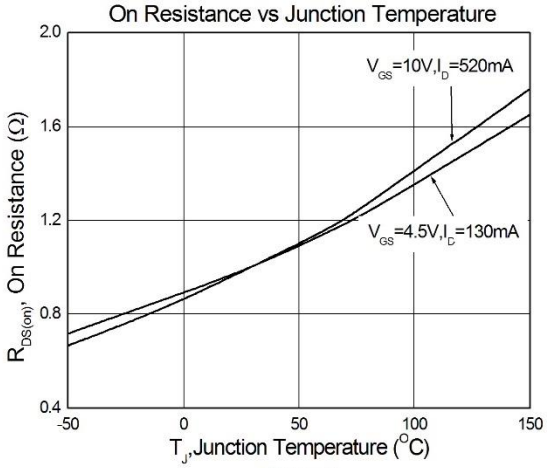


Figure 5

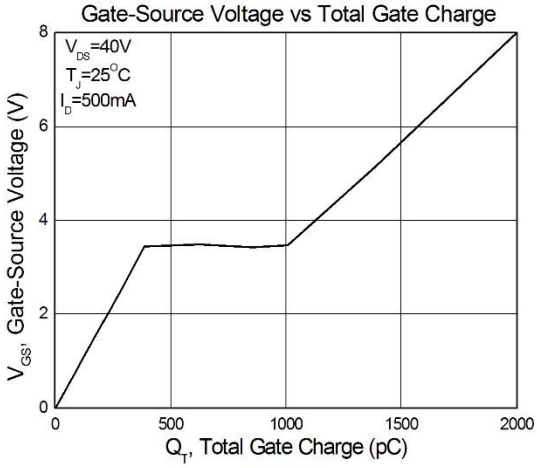


Figure 6

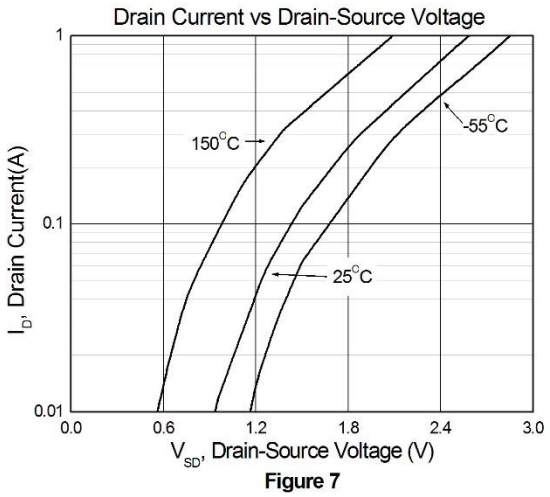

Drain Current vs Drain-Source Voltage
1
0.1
0.01
0.0
0.6
1.2
1.8
2.4
3.0
150°C
-55°C
25°C
I_D, Drain Current(A)
V_SD, Drain-Source Voltage (V)

Figure 7

Test Circuits & Waveforms

Figure 8: Gate Charge Test Circuit

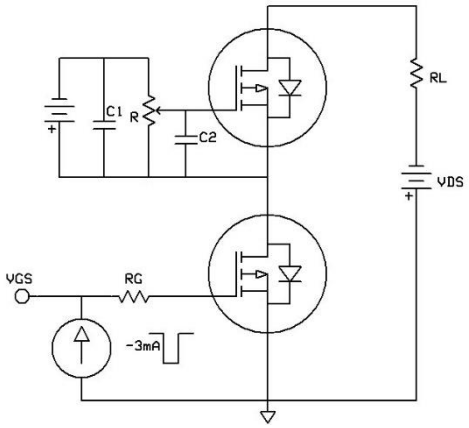


Figure 9: Gate Charge Waveform

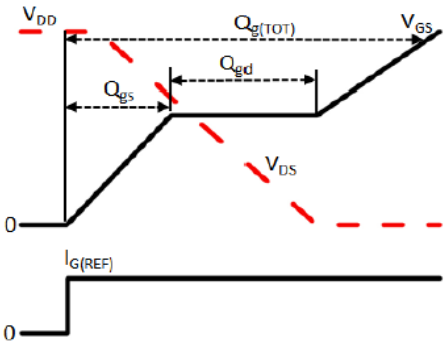


Figure 10: Switching Time Test Circuit

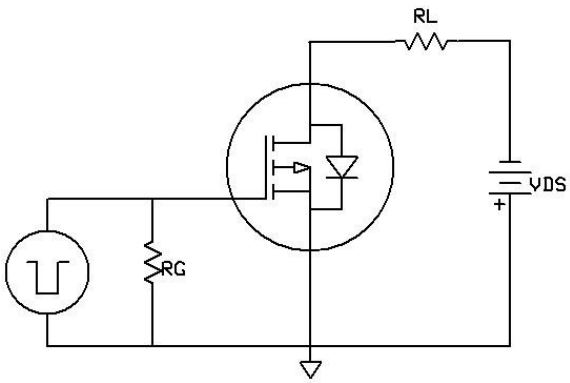
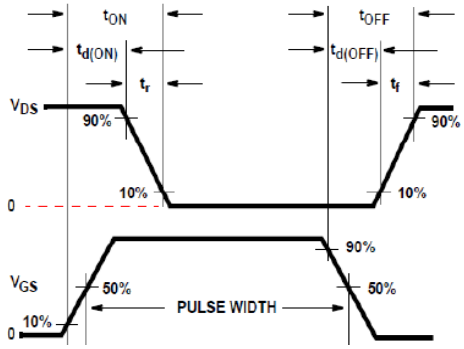
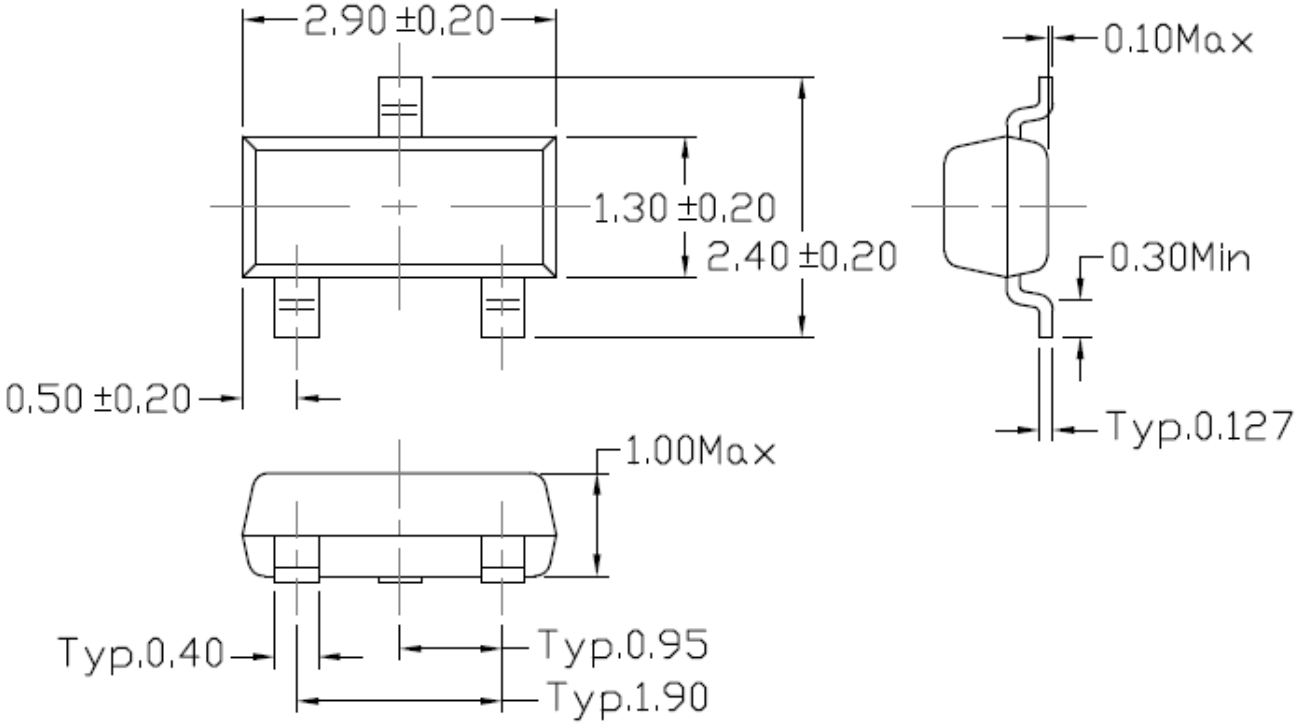


Figure 111: Switching Time Waveform

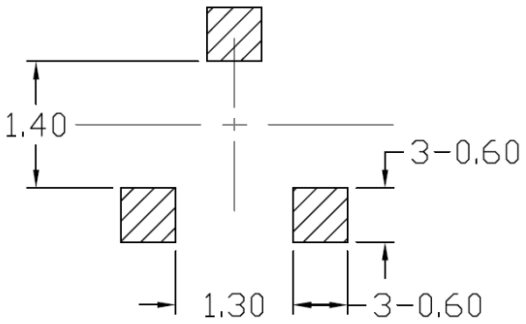


Package Dimension (SOT-23)



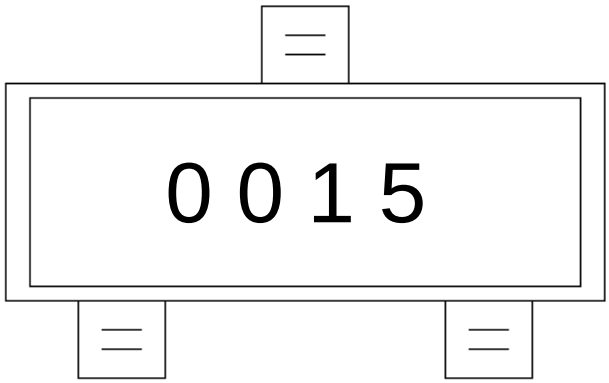
Note: Dimensions in mm

Recommended pad layout for surface mount leadform



Note: Dimensions in mm

Marking Information

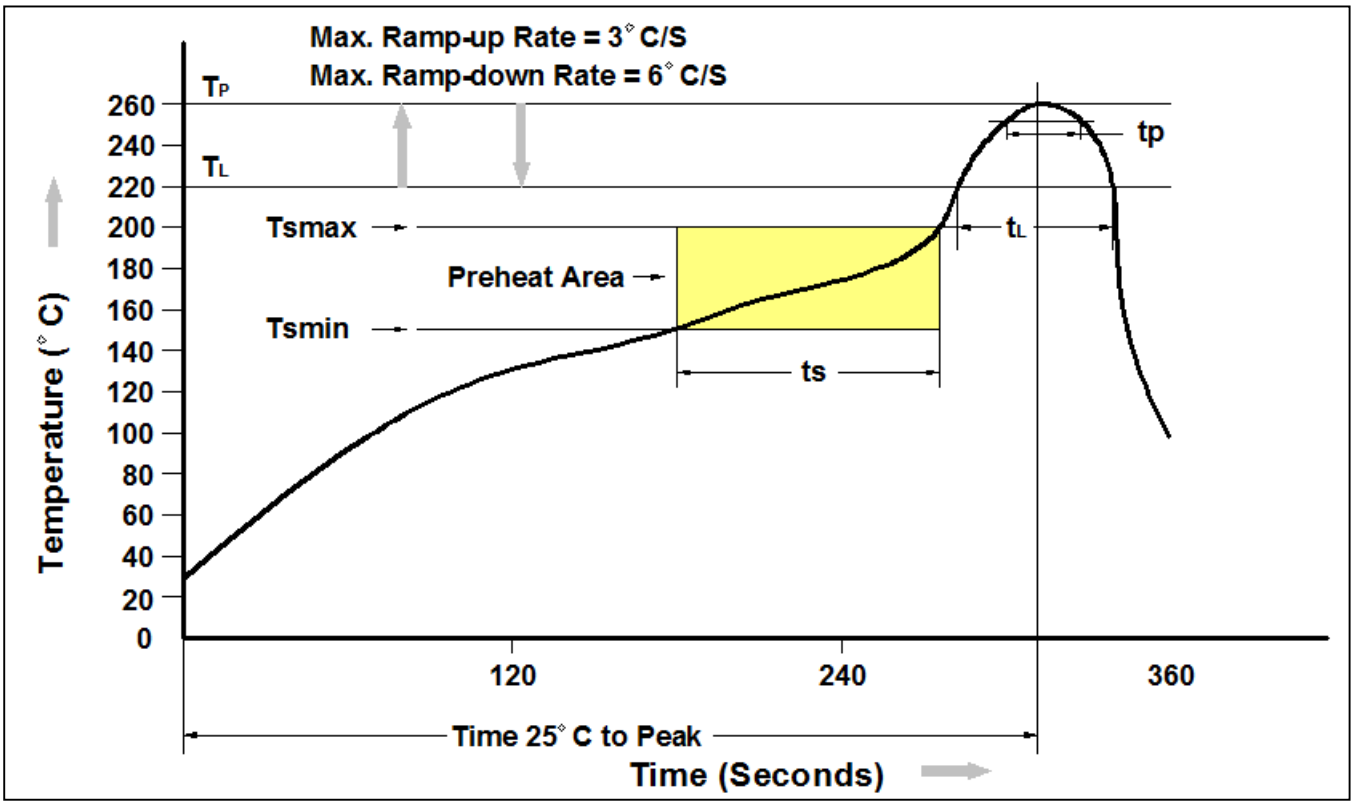


0015: Device Number

Ordering Information

Part Number	*Description*	*Quantity*
CTL0015PS-R3	SOT-23 Reel	3000 pcs

Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	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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