CTL0423PS

P-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage V_{DSS} - 30 V
- Drain-Source On-Resistance

  $R_{DS(ON)}$ 34mΩ, at V_{GS}= - 10V, I_{DS}= - 4.2A

  $R_{DS(ON)}$ 43mΩ, at V_{GS}= - 4.5V, I_{DS}= - 4.0A
- Continuous Drain Current at T_C=25˚C I_D = - 4.2A
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

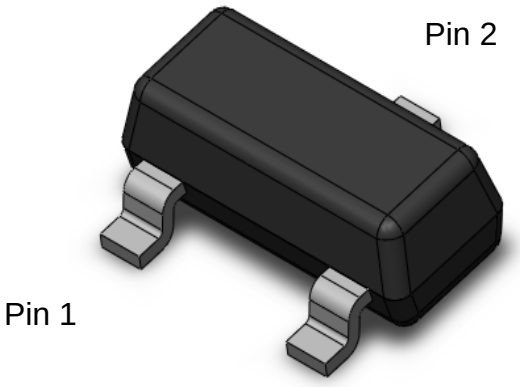
Description

The CTL0423PS 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 .

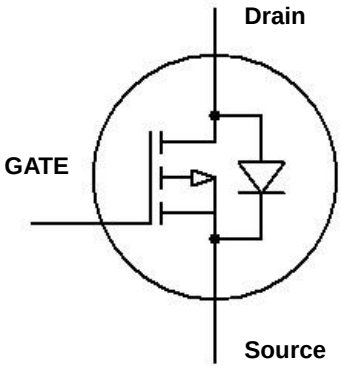
Applications

- Power Management
- Lithium Ion Battery

Package Outline



Schematic



Gate: Pin 1
Drain: Pin2
Source: Pin3

Absolute Maximum Rating at 25°C

Symbol	*Parameters*	*Ratings*	*Units*	*Notes*
V_{DS}	Drain-Source Voltage	-30	V	
V_{GS}	Gate-Source Voltage	±20	V	
I_D	Continuous Drain Current	-4.2	A	1
I_{DM}	Pulsed Drain Current	-16	A	1
P_D	Total Power Dissipation	1.25	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*
$R_{\Theta JA}$	Thermal Resistance Junction-Ambient (t=10s)		-	200	-	°C /W	1,4

Electrical Characteristics T_C = 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	-30	-	-	V	
I_{DSS}	Drain-Source Leakage Current	V_{DS} = -30V, V_{GS} = 0V	-	-	-1	μA	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±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 = -4.2A	-	34	48	mΩ	Fig 4
		V_{GS} = -4.5V, I_D = -4.0A	-	43	85	mΩ	
$V_{GS(TH)}$	Gate-Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250μA	-1.0	-	-3.0	V	Fig 5

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C_{ISS}	Input Capacitance	V_{DS} = -15V ,	-	696	-	pF	Fig 3
C_{OSS}	Output Capacitance	V_{GS} = 0V,	-	71	-		
C_{RSS}	Reverse Transfer Capacitance	f=1MHz	-	86	-		

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 = 6Ω, I_D = -1.0A	-	4.75	-	ns	Fig 11 & 12
T_R	Rise Time		-	21	-		
$T_{D(OFF)}$	Turn-Off Delay Time		-	39	-		
T_F	Fall Time		-	20.5			
Q_G	Total Gate Charge	V_{DS} = -15V , . V_{GS} = -10V, I_D = -4.2A	-	21	-	nC	Fig 9 & 10
Q_{GS}	Gate-Source Charge		-	2.8	-		
Q_{GD}	Gate-Drain (Miller) Charge		-	4.1	-		

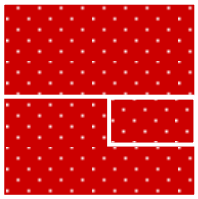
Drain-Source Diode Characteristics

Symbol	*Parameters*	*Test Conditions*	*Min*	*Typ*	*Max*	*Units*	*Notes*
V_{DS}	Drain-Source Forward Voltage	V_{GS} = 0V, I_D = -4.2A			1.2	V	
I_S	Continuous Forward Current				-4.2	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

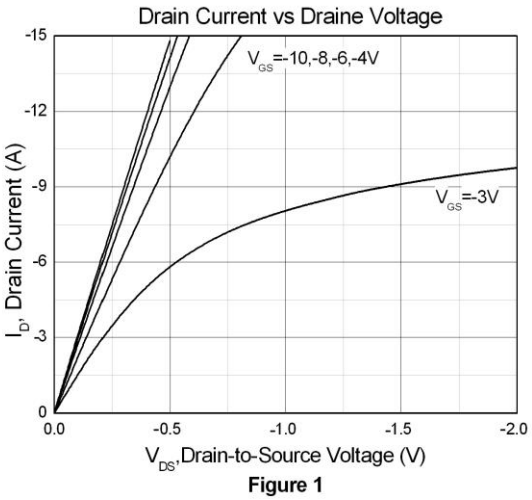


Figure 1

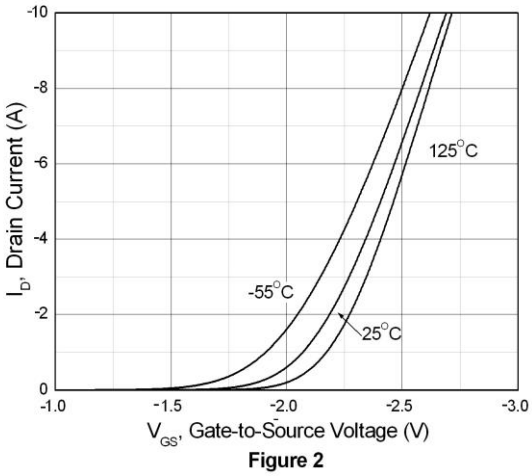


Figure 2

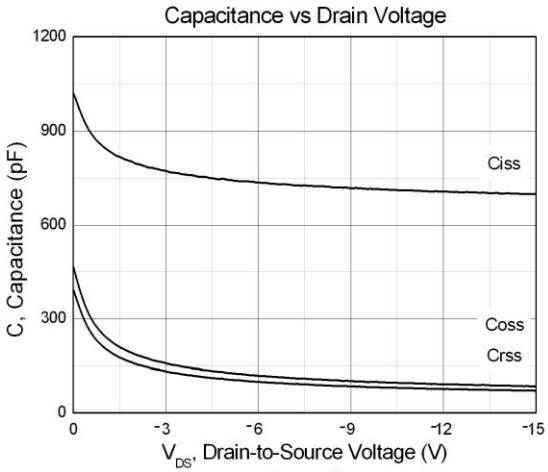


Figure 3

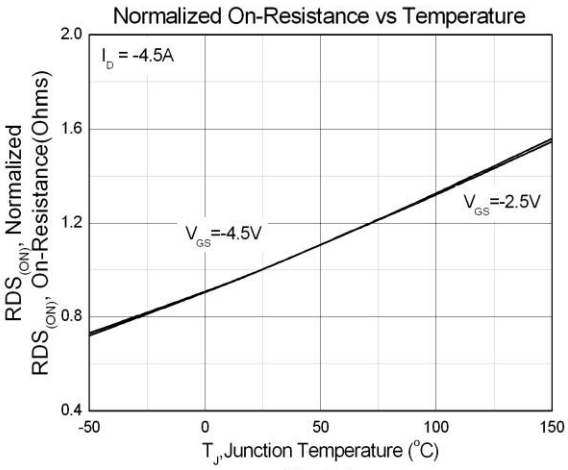


Figure 4

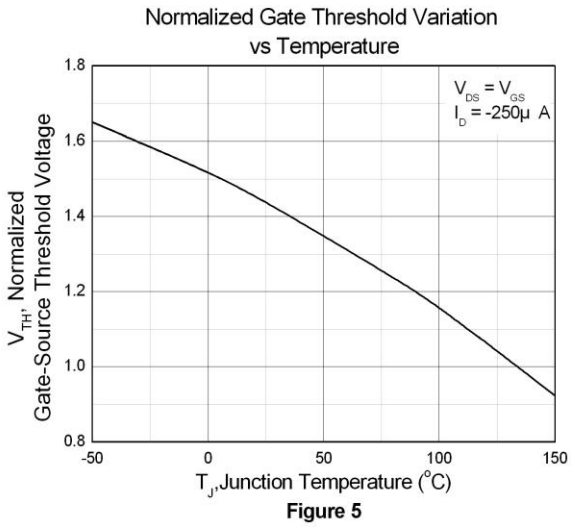


Figure 5

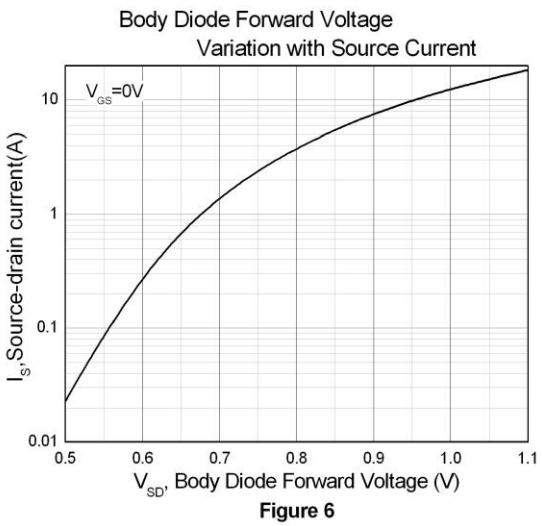


Figure 6

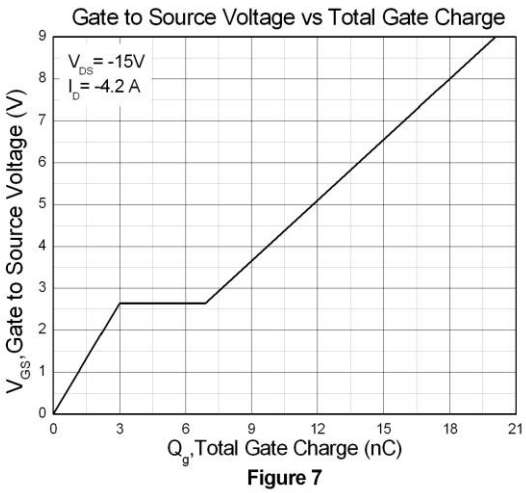


Figure 7

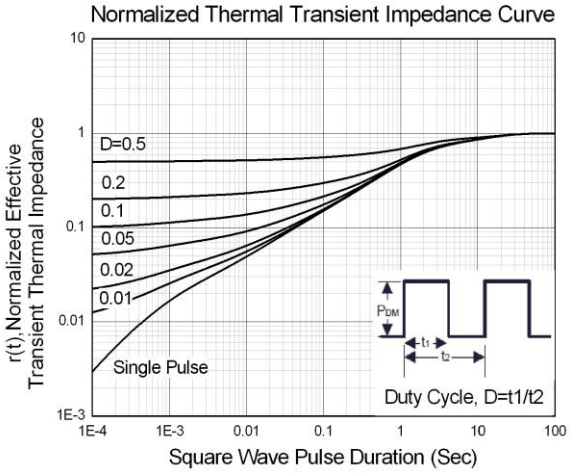


Figure 8

Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

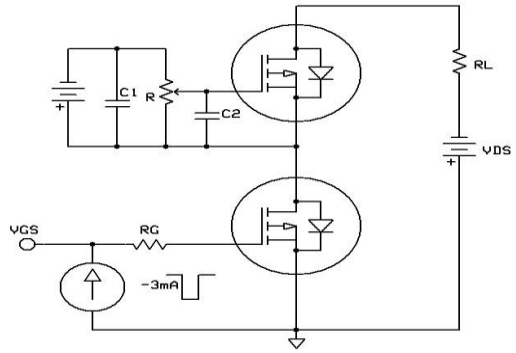


Figure 10: Gate Charge Waveform

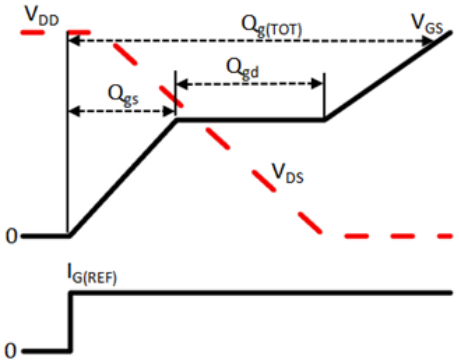


Figure 11: Switching Time Test Circuit

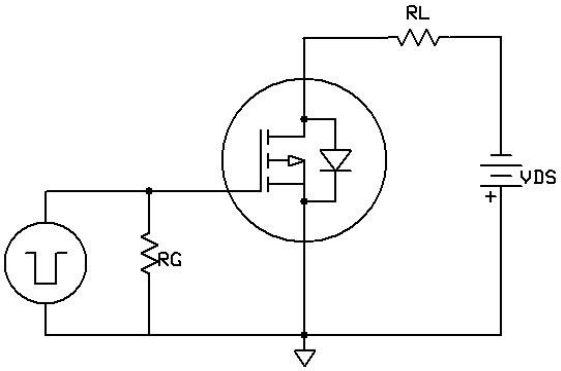
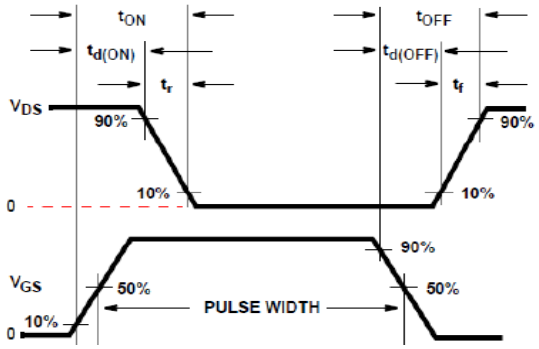
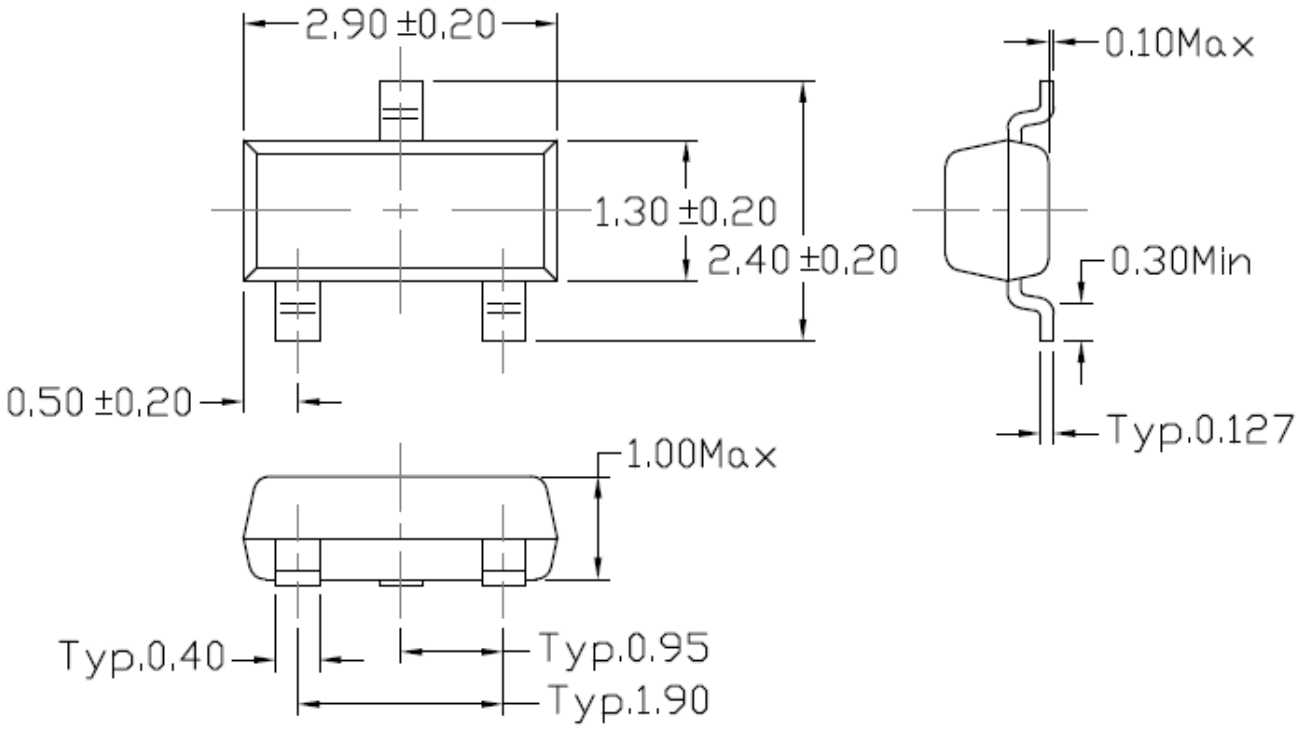


Figure 12: Switching Time Waveform

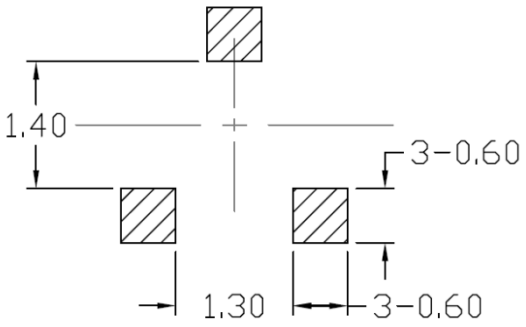


Package Dimension *Dimensions in mm unless otherwise stated*



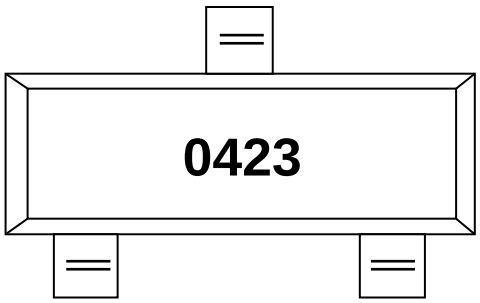
Note: Dimensions in mm

Recommended pad layout for surface mount leadform



Note: Dimensions in mm

Marking Information

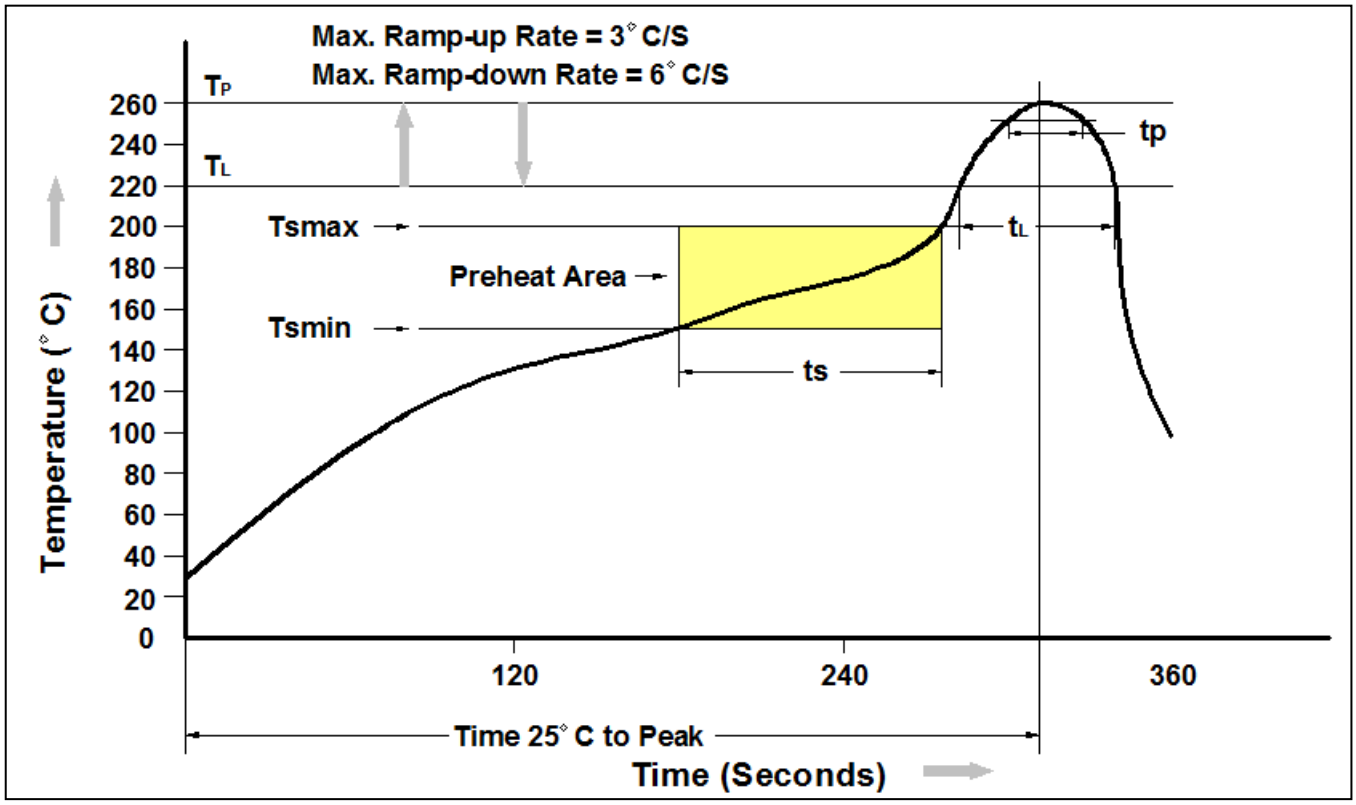


0423 : Device Number

Ordering Information

Part Number	*Description*	*Quantity*
CTL0423PS	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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