



P-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage $V_{DS} -20\text{ V}$
- Drain-Source On-Resistance
 $R_{DS(ON)} 55\text{m}\Omega$, at $V_{GS} = -4.5\text{V}$, $I_D = -3.2\text{A}$
 $R_{DS(ON)} 70\text{m}\Omega$, at $V_{GS} = -2.5\text{V}$, $I_D = -2.4\text{A}$
 $R_{DS(ON)} 100\text{m}\Omega$, at $V_{GS} = -1.8\text{V}$, $I_D = -1.7\text{A}$
- Continuous Drain Current at $T_A=25^\circ\text{C}$ $I_D = -3.2\text{A}$
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

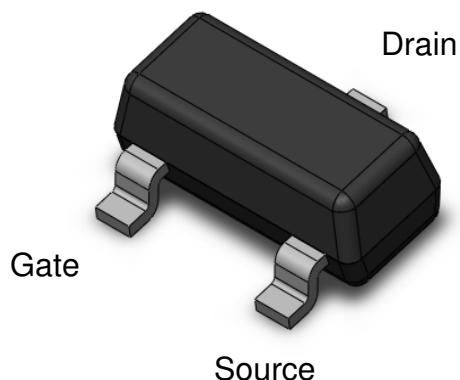
Applications

- Power Management
- Lithium Ion Battery
- High-Side Switching

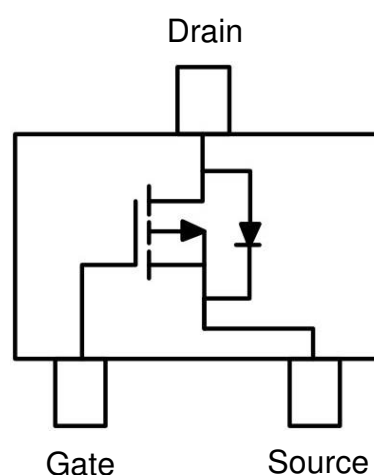
Description

The CTL0322PS-R3 is the P-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

Package Outline



Schematic





Absolute Maximum Rating at 25°C

Symbol	Parameters	Test Conditions	Min	Notes
V _{DS}	Drain-Source Voltage	-20	V	
V _{GS}	Gate-Source Voltage	±12	V	
I _D	Continuous Drain Current @T _A =25°C	-3.2	A	1
I _{DM}	Pulsed Drain Current	-10	A	1
P _D	Total Power Dissipation	1.4	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 _{θJA4}	Thermal Resistance Junction-Ambient (t=10s)		--	65	--	°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 DSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-20	-	-	V	
I _{DSS}	Drain-Source Leakage Current	V _{DS} = -20V, V _{GS} = 0V	-	-	-1	μA	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±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 = -3.2A	-	55	75	mΩ	3
		V _{GS} = -2.5V, I _D = -2.4A	-	70	95	mΩ	
		V _{GS} = -1.8V, I _D = -1.7A	-	100	130	mΩ	
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} = V _{DS} , I _D = -250μA	-0.4	-0.6	-0.9	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	-	650	680	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} = -6V, V _{GS} = -4.5V, R _G = 6Ω, R _L = 3.6Ω,	-	52	-	ns	
T _R	Rise Time		-	30	-		
T _{D(OFF)}	Turn-Off Delay Time		-	53	-		
T _F	Fall Time		-	10	-		
Q _G	Total Gate Charge	V _{DS} = -6V, V _{GS} = -4.5V, I _D = -4A	-	9.3	-	nC	
Q _{GS}	Gate-Source Charge		-	3	-		
Q _{GD}	Gate-Drain Charge		-	1.5	-		

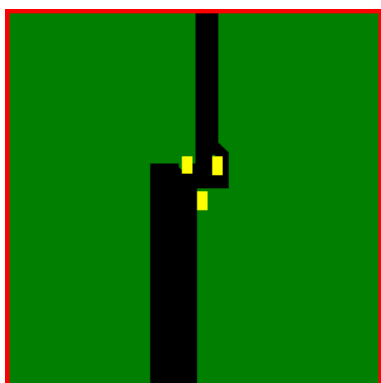


Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _D = -1A	-	-0.7	-1.0	V	
I _{SD}	Body Diode Continuous Current		-	-	-1	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 4. Thermal Resistance follow JESD51-3.



Typical Characteristic Curves

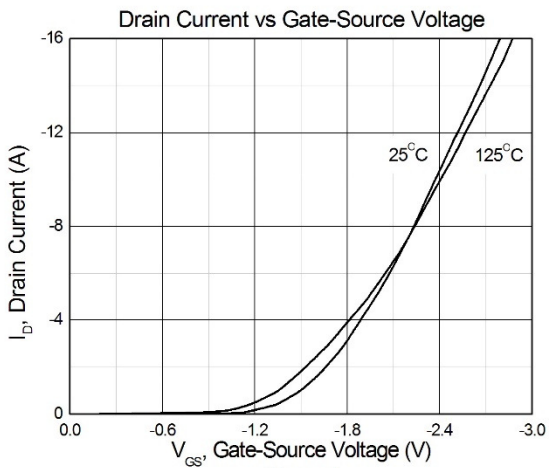


Figure 1

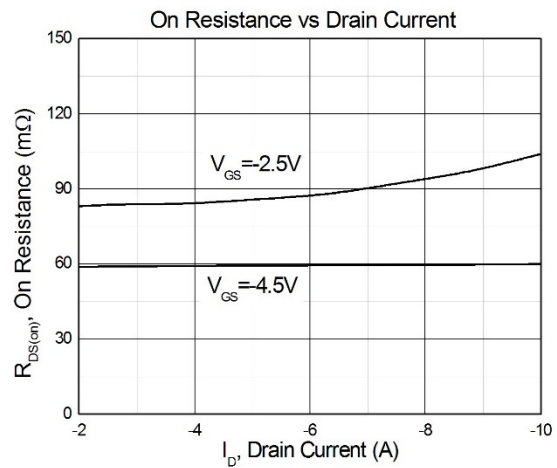


Figure 2

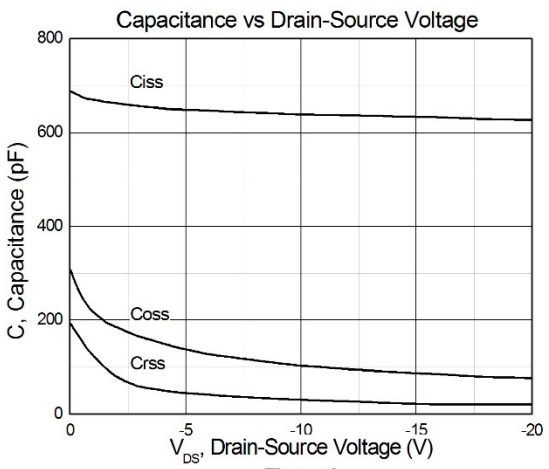


Figure 3

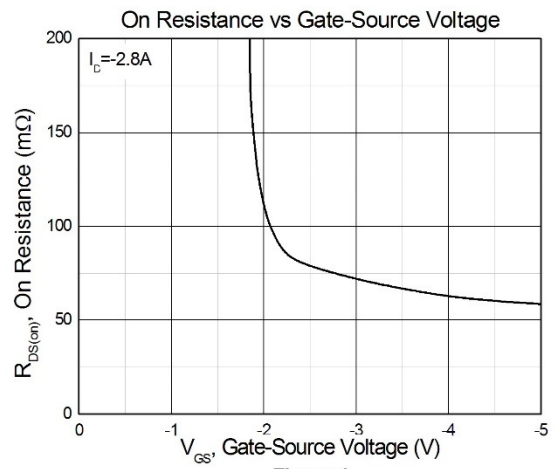


Figure 4

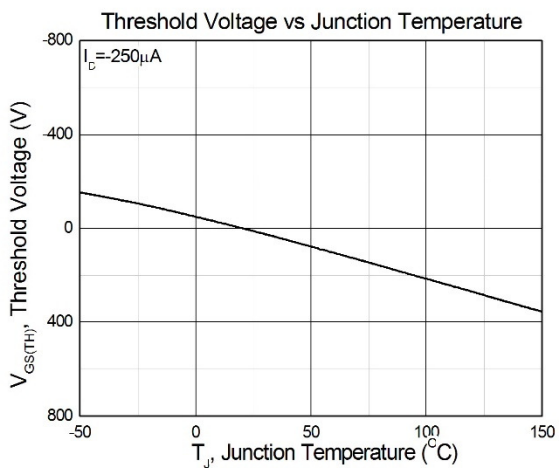


Figure 5

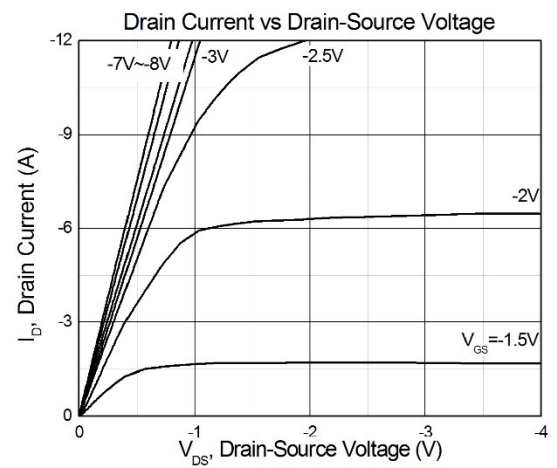
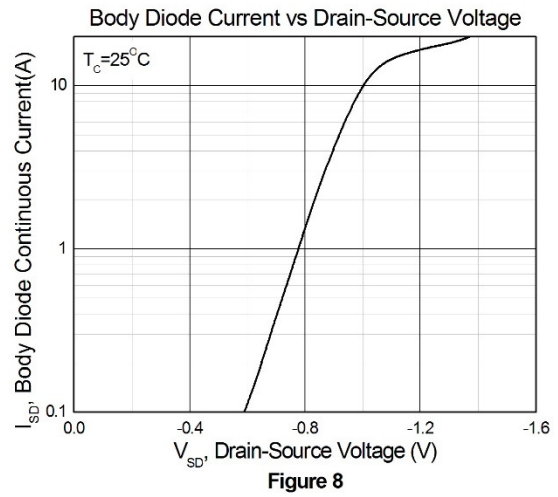
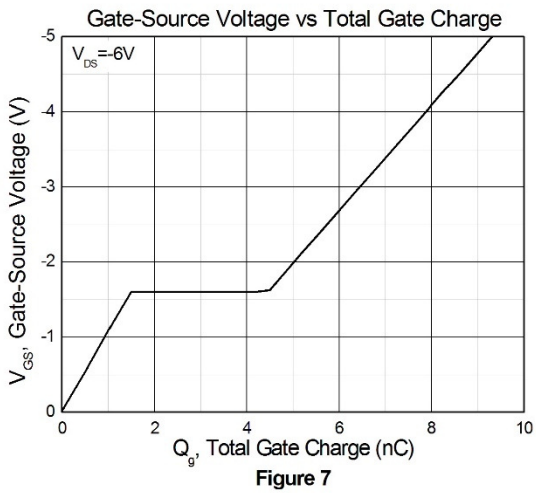


Figure 6





Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

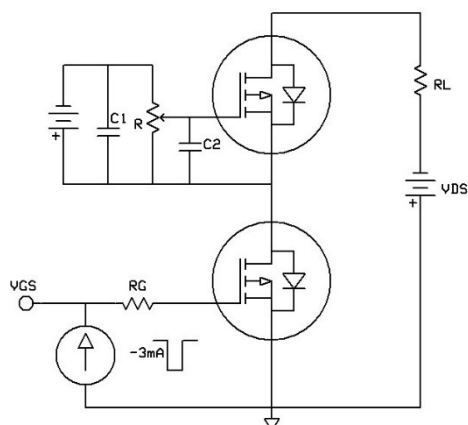


Figure 10: Gate Charge Waveform

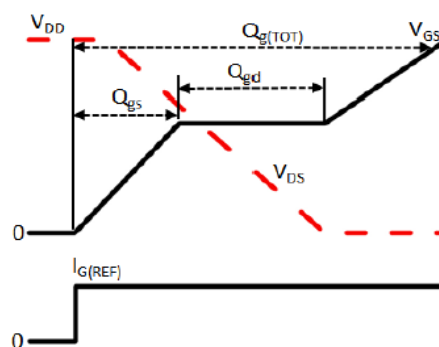


Figure 11: Switching Time Test Circuit

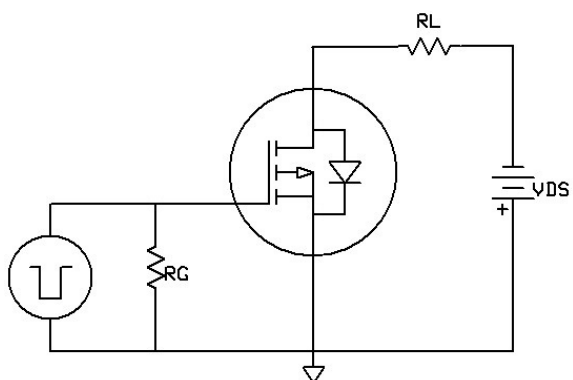
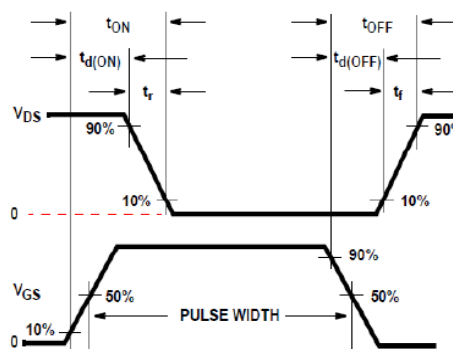
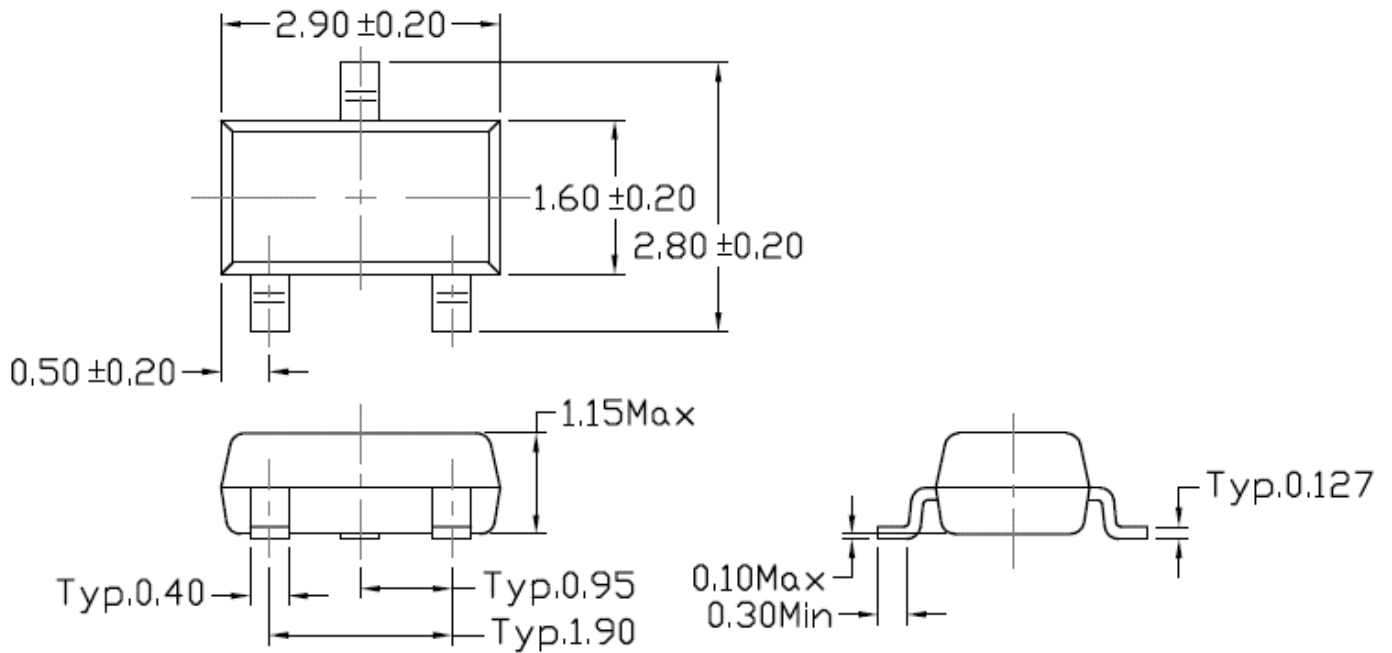


Figure 12: Switching Time Waveform



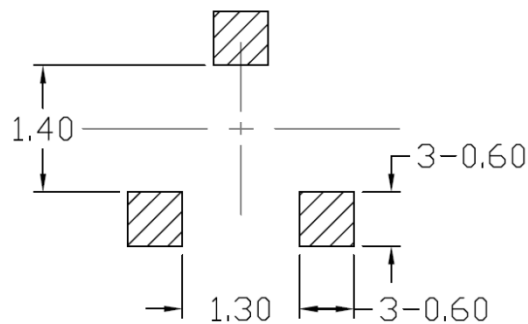


Package Dimension (SC-59)



Note: Dimensions in mm

Recommended pad layout for surface mount leadform



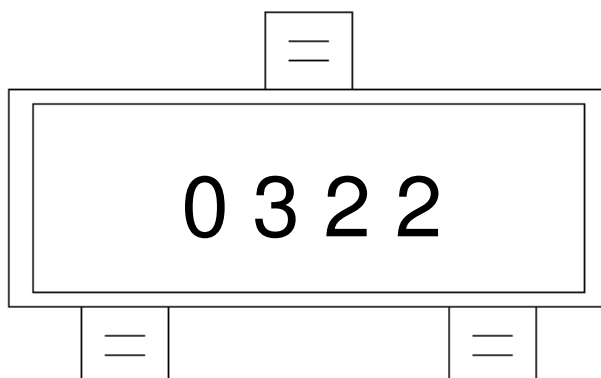
Note: Dimensions in mm



CTL0322PS-R3

P-Channel Enhancement MOSFET

Marking Information



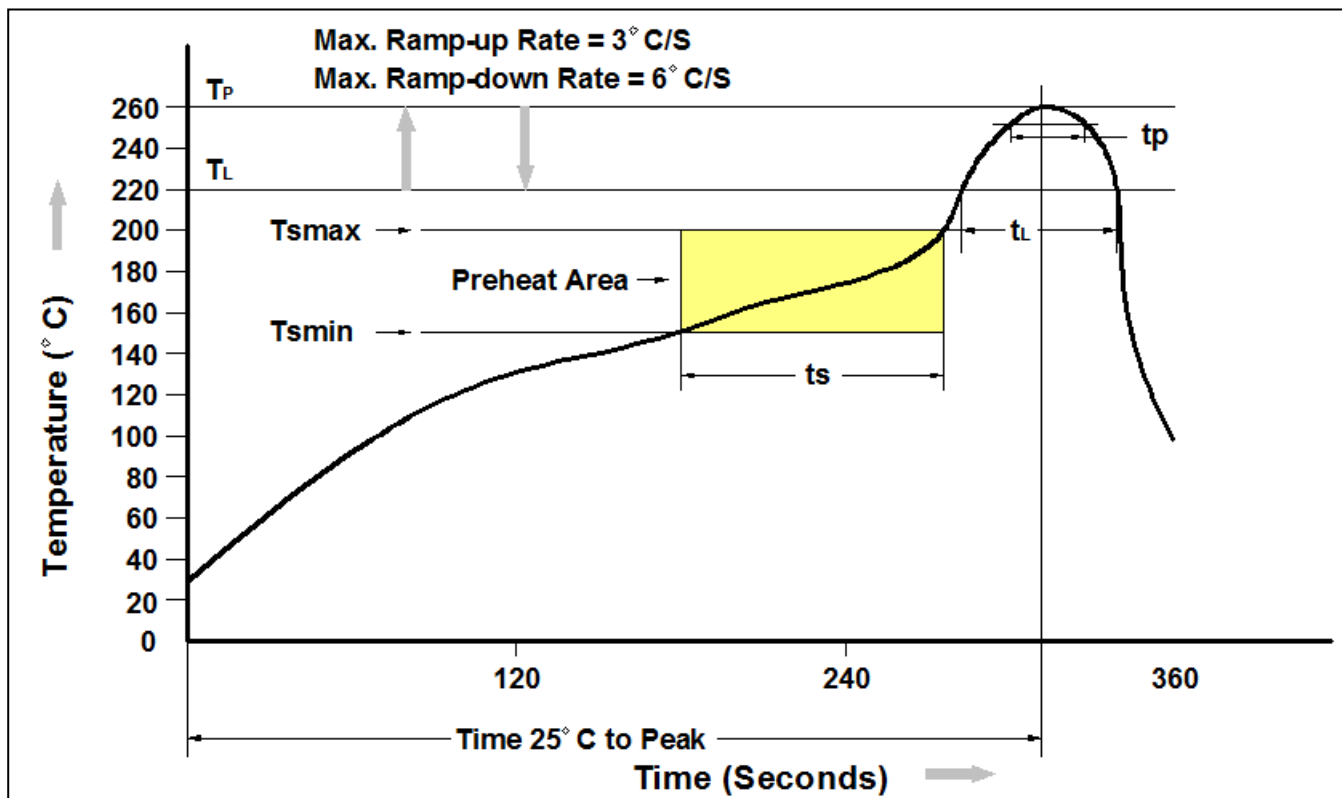
0322: Device Number

Ordering Information

Part Number	Description	Quantity
CTL0322PS-R3	SC-59Reel	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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