



Features

- Drain-Source Breakdown Voltage V_{DSS} - 50 V
- Drain-Source On-Resistance
 $R_{DS(ON)}$ 5 Ω , at $V_{GS} = -5.0V$, $I_{DS} = -100mA$
- Continuous Drain Current at $T_A=25^\circ C$ $I_D = -130mA$
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

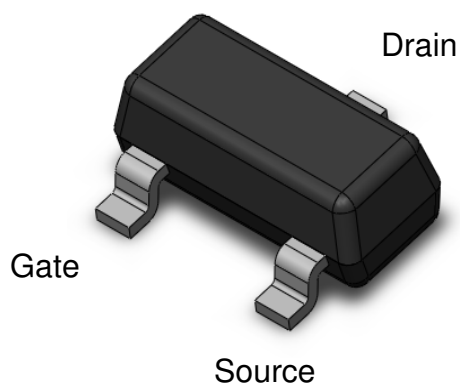
Description

The CTLM13PS05-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 .

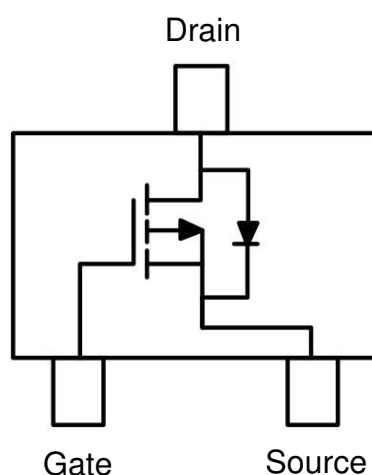
Applications

- Power Management
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch

Package Outline



Schematic



**Absolute Maximum Rating at 25°C**

Symbol	Parameters	Ratings	Units	Notes
V_{DS}	Drain-Source Voltage	-50	V	
V_{GS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current @ $T_A=25^\circ\text{C}$	-0.13	A	1
I_{DM}	Pulsed Drain Current	-0.52	A	1
P_D	Total Power Dissipation @ $T_A=25^\circ\text{C}$	0.225	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=10s)		-	555	-	$^\circ\text{C}/\text{W}$	1,4

**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	$V_{GS}=0V, I_D = -250\mu A$	-50	-	-	V	
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = -50V, V_{GS} = 0V$	-	-	-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	$V_{GS} = -5V, I_D = -100mA$	-	5	10		Fig 4
$V_{GS(TH)}$	Gate-Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = -250\mu A$	-0.8	-	-2.0	V	Fig 5

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C_{ISS}	Input Capacitance	$V_{DS} = -5V,$ $V_{GS} = 0V,$ $f=1MHz$	-	30	-	pF	Fig 3
C_{OSS}	Output Capacitance		-	10	-		
C_{RSS}	Reverse Transfer Capacitance		-	5	-		

Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$T_{D(ON)}$	Turn-On Delay Time	$V_{DS} = -15V, R_L = 50\Omega$ $I_D = -2.5A$	-	2.5	-	ns	Fig 11 & 12
T_R	Rise Time		-	1.0	-		
$T_{D(OFF)}$	Turn-Off Delay Time		-	16	-		
T_F	Fall Time		-	8	-		



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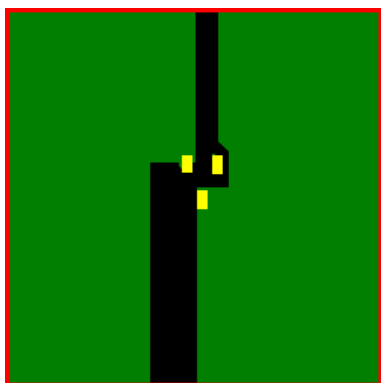
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Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _D = -0.1A	-	-2.5	-	V	
I _{SD}	Body Diode Continuous Current		-	-	-0.13	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

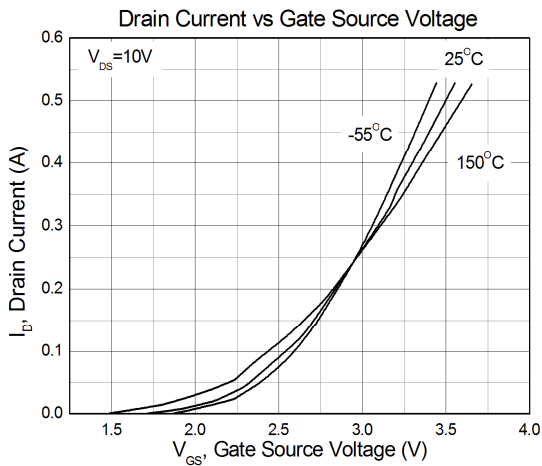


Figure 1

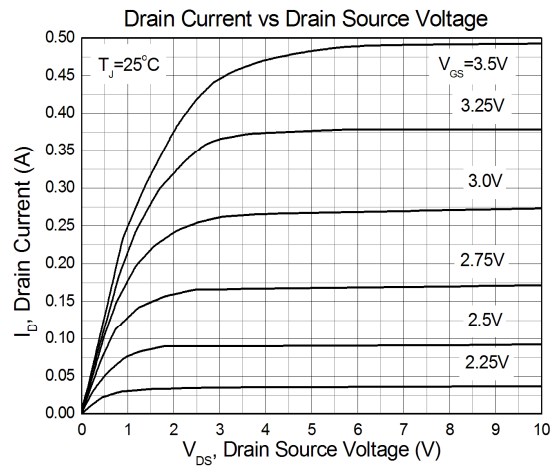


Figure 2

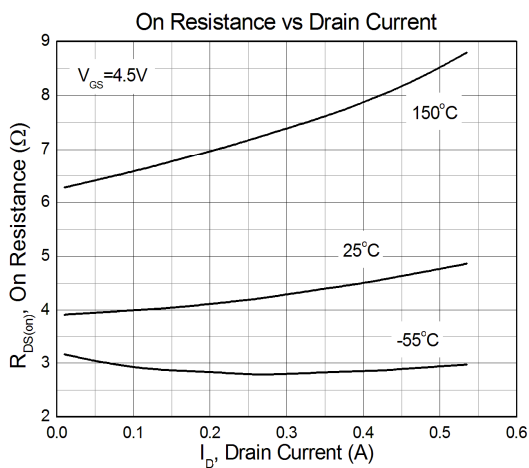


Figure 3

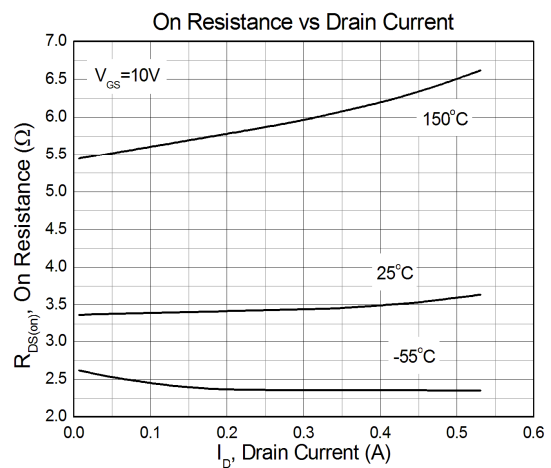


Figure 4

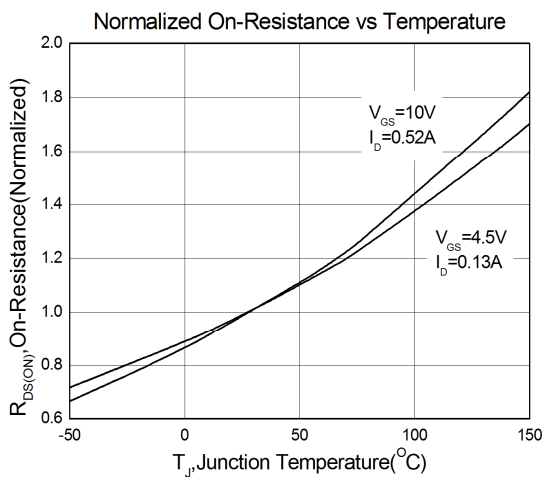


Figure 5

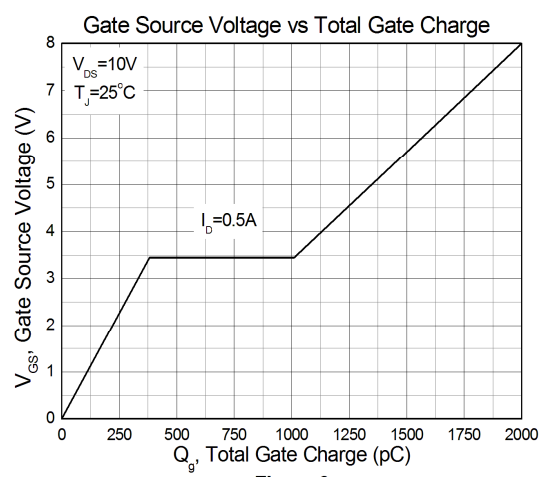
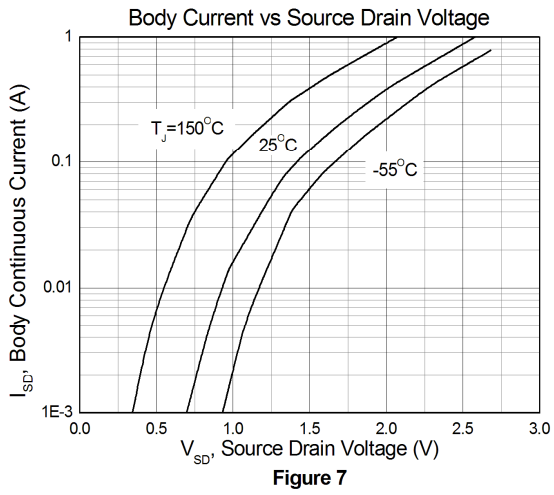


Figure 6



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Test Circuits & Waveforms

Figure 8: Gate Charge Test Circuit

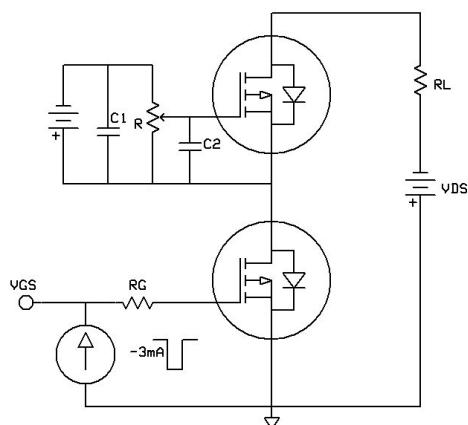


Figure 9: Gate Charge Waveform

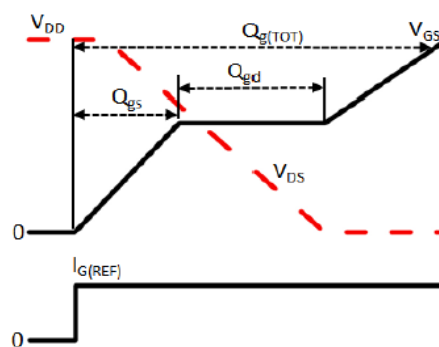


Figure 10: Switching Time Test Circuit

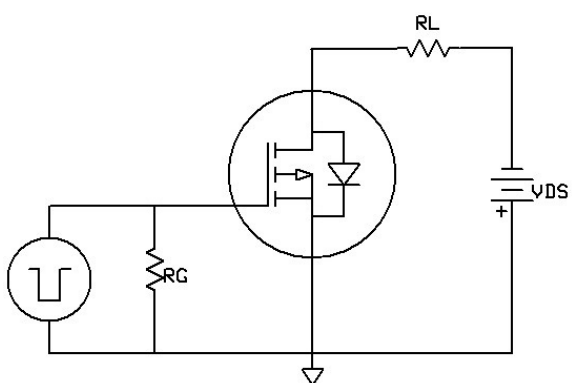
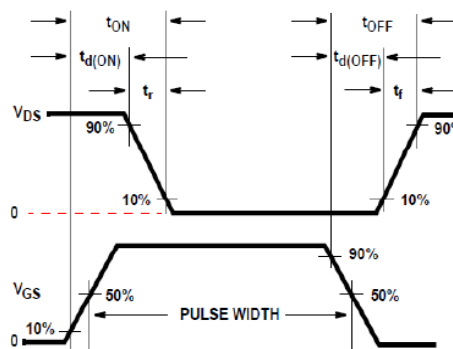
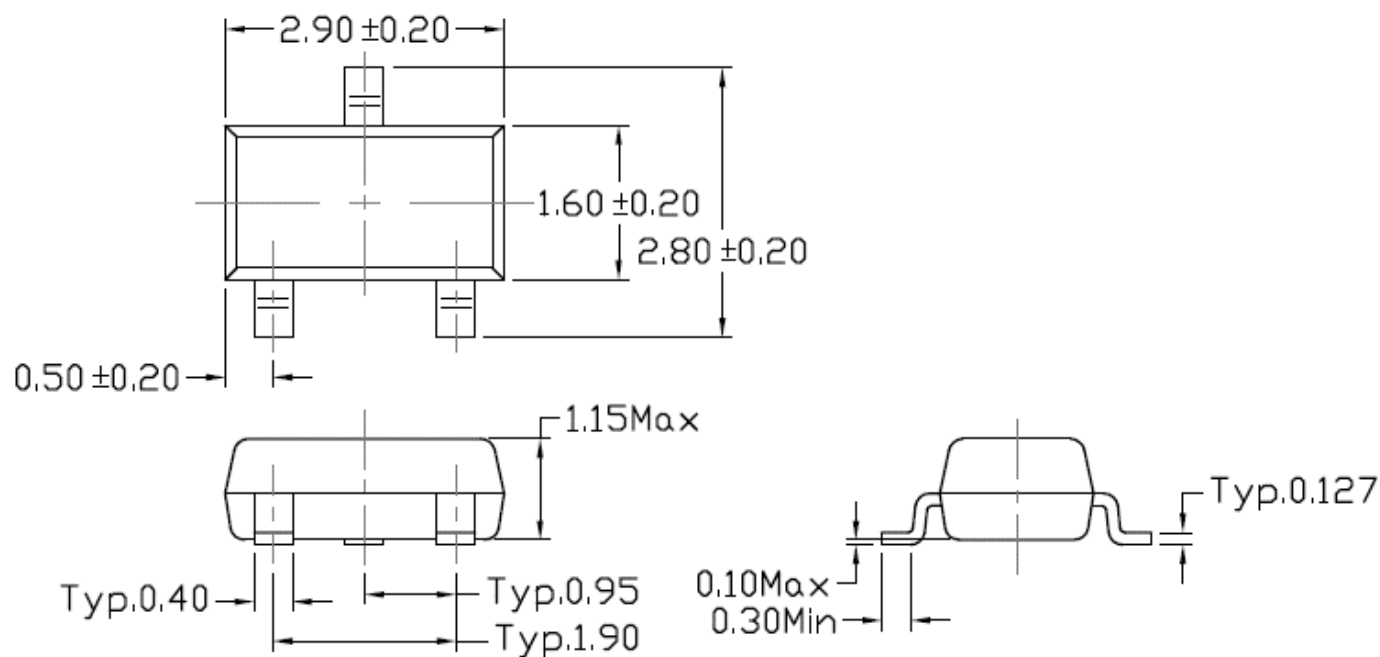


Figure 11: Switching Time Waveform

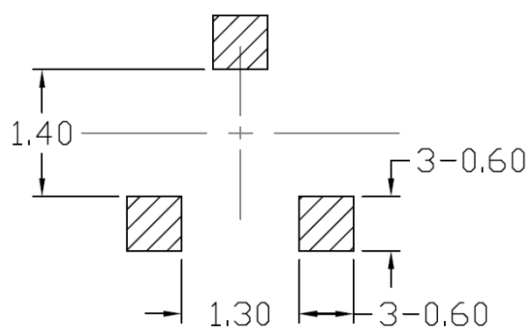




Package Dimension (SC-59)



Recommended pad layout for surface mount leadform

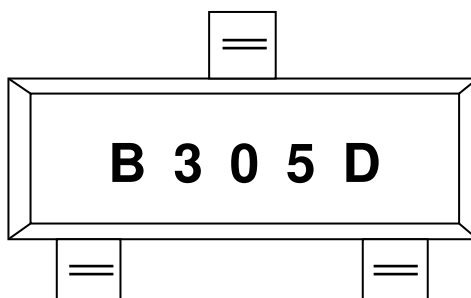




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Marking Information



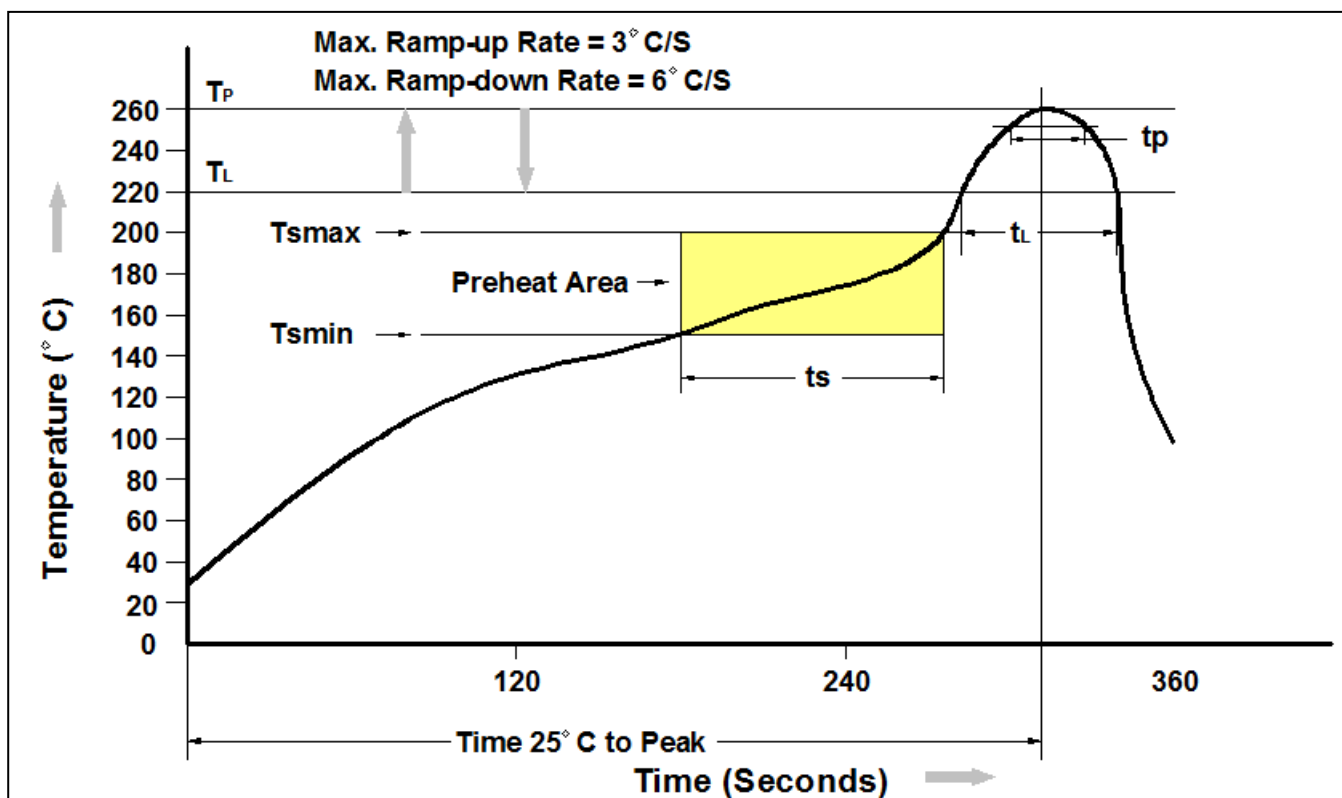
B305D : Device Number

Ordering Information

<i>Part Number</i>	<i>Description</i>	<i>Quantity</i>
CTLM13PS05-R3	SC-59 Reel	3000 pcs



Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{min})	150 °C
Temperature Max. (T _{max})	200 °C
Time (t _s) from (T _{min} to T _{max})	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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