CTL0383NS-R3

N-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage V_{DSS} 30 V
- Drain-Source On-Resistance
  $R_{DS(ON)}$ 48mΩ, at V_{GS}= 10V, I_D= 3.4A
  $R_{DS(ON)}$ 54mΩ, at V_{GS}= 4.5V, I_D= 2.7A
  $R_{DS(ON)}$ 75mΩ, at V_{GS}= 2.5V, I_D= 1.0A
- Continuous Drain Current at T_C=25˚C I_D = 3.8A
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

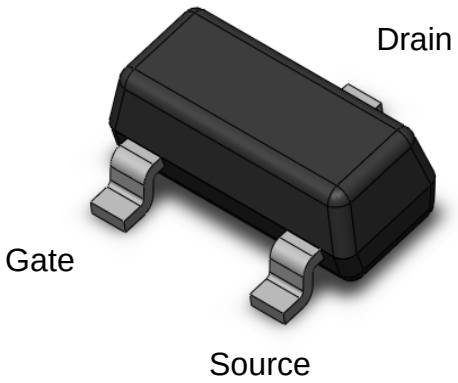
Description

The CTL0383NS-R3 is the N-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. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where low in-line power loss are needed in a very small outline surface mount package.

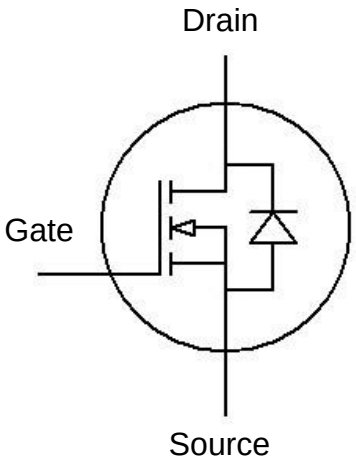
Applications

- Power Management
- Lithium Ion Battery

Package Outline



Schematic



Absolute Maximum Rating at 25ºC

Symbol	Parameters	Test Conditions	Min	Notes
V_{DS}	Drain-Source Voltage	30	V	
V_{GS}	Gate-Source Voltage	±12	V	
I_D	Continuous Drain Current	3.8	A	1
I_{DM}	Pulsed Drain Current	15	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
$R_{\Theta JA4}$	Thermal Resistance Junction-Ambient (t=10s)		--	90	--	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	30	-	-	V	
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 30V, V_{GS} = 0V	-	-	1	μ A	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±10V, 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 = 3.4A	-	48	60	mΩ	3
		V_{GS} = 4.5V, I_D = 2.7A	-	54	70	mΩ	
		V_{GS} = 2.5V, I_D = 1.0A	-	75	100	mΩ	
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS} = V_{DS}, I I_D =-250μA	0.6	---	1.4	V	3

Dynamic Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
C_{ISS}	Input Capacitance	V_{GS} =0V,	-	247	-	pF	
C_{OSS}	Output Capacitance	V_{DS} =15V	-	33	-		
C_{RSS}	Reverse Transfer Capacitance	f=1MHz	-	5	-		

Switching Characteristics

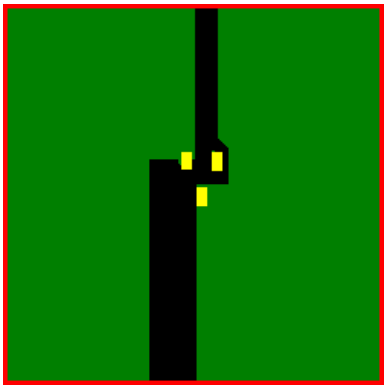
Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$T_{D(ON)}$	Turn-On Delay Time	V_{DS} = 15V ,	-	97.2	-	ns	
T_R	Rise Time	V_{GS} = 10V,	-	128	-		
$T_{D(OFF)}$	Turn-Off Delay Time	R_G = 6Ω,	-	2600	-		
T_F	Fall Time	R_L= 15Ω,	-	677	-		
Q_G	Total Gate Charge	V_{DS} = 15V ,	-	4.7	-	nC	
Q_{GS}	Gate-Source Charge	V_{GS} = 4.5V,	-	1.9	-		
Q_{GD}	Gate-Drain Charge	I_D = 2.1A	-	1.6	-		

Drain-Source Diode Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
V_{SD}	Body Diode Forward Voltage	V_{GS} = 0V, I_D = 3.4A	-	0.8	1.2	V	
I_{SD}	Body Diode Continuous Current		-	-	3.8	A	1

Note:

1. The power dissipation is limited by 150℃ junction temperature.
2. Device mounted on a glass-epoxy board



FR-4

25.4 × 25.4 mm .

2 Oz Copper

Test Board

3. The data tested by pulsed , pulse width ≦ 300μs , duty cycle ≦ 2%
4. Thermal Resistance follow JESD51-3.

Typical Characteristic Curves

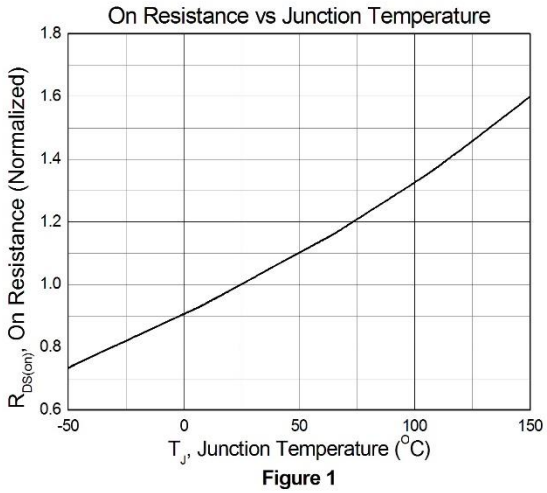


Figure 1

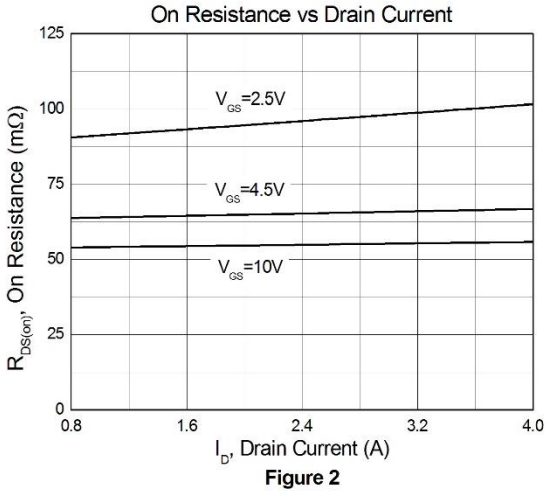


Figure 2

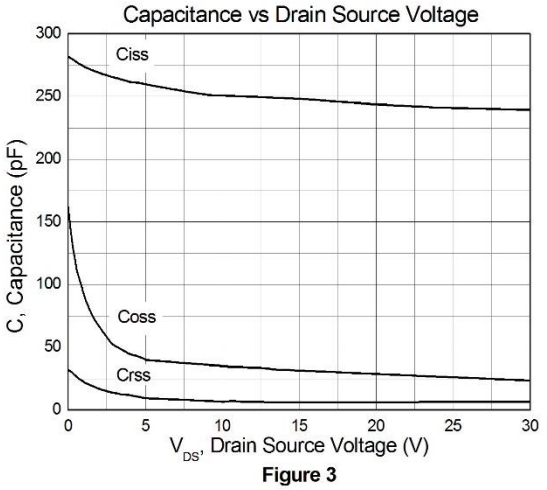


Figure 3

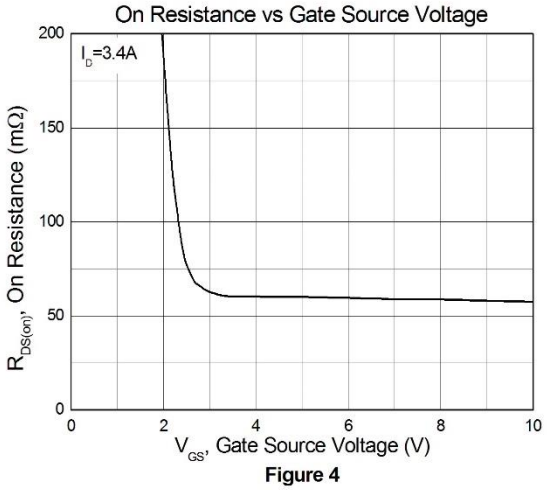


Figure 4

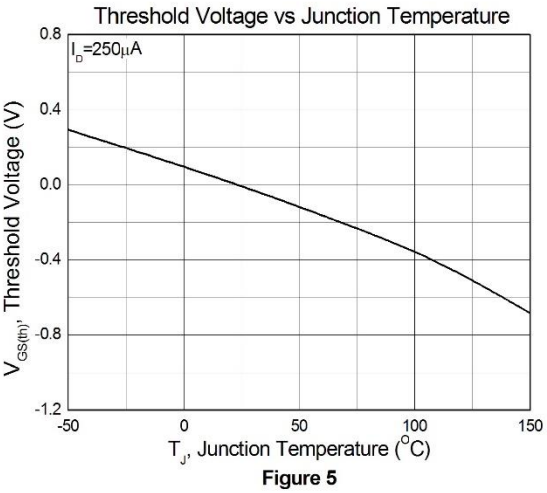


Figure 5

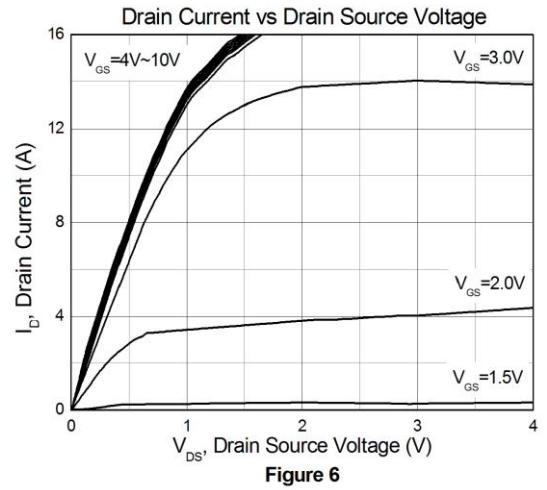


Figure 6

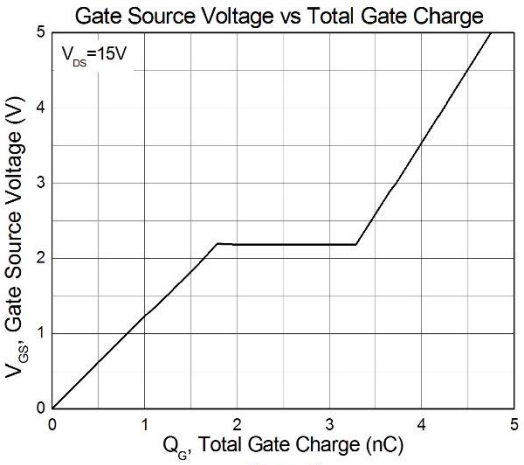


Figure 7

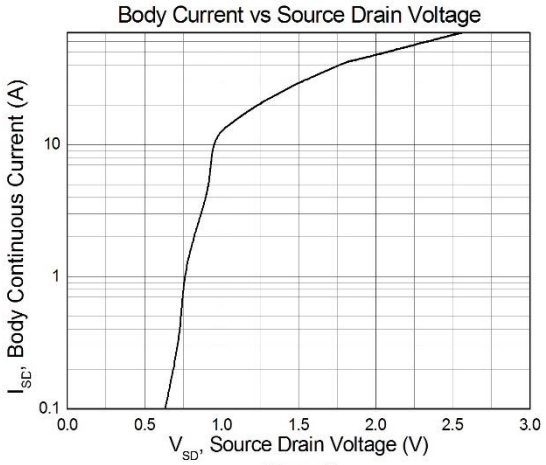


Figure 8

Test Circuits & Waveforms

Figure 12: Gate Charge Test Circuit

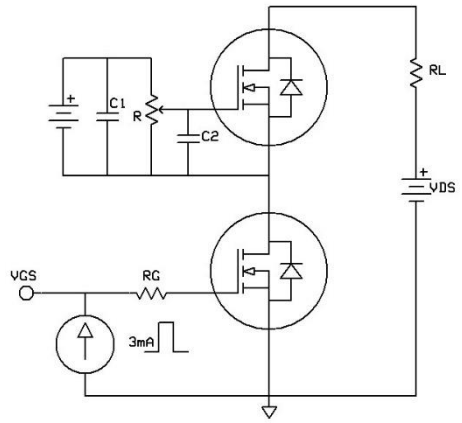


Figure 13: Gate Charge Waveform

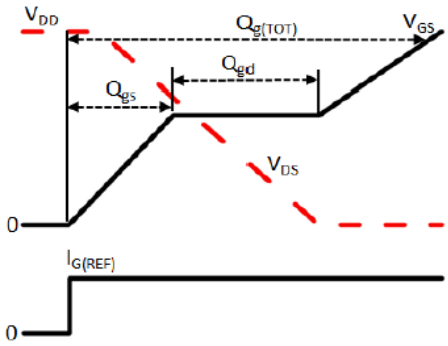


Figure 14: Switching Time Test Circuit

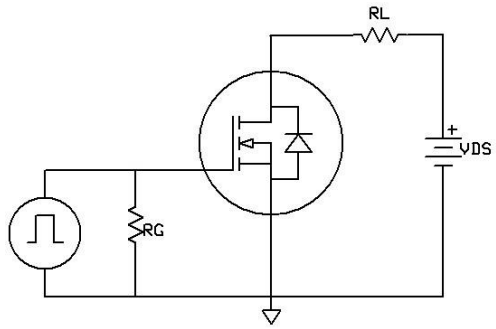
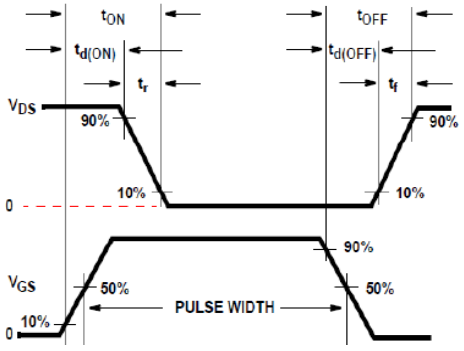
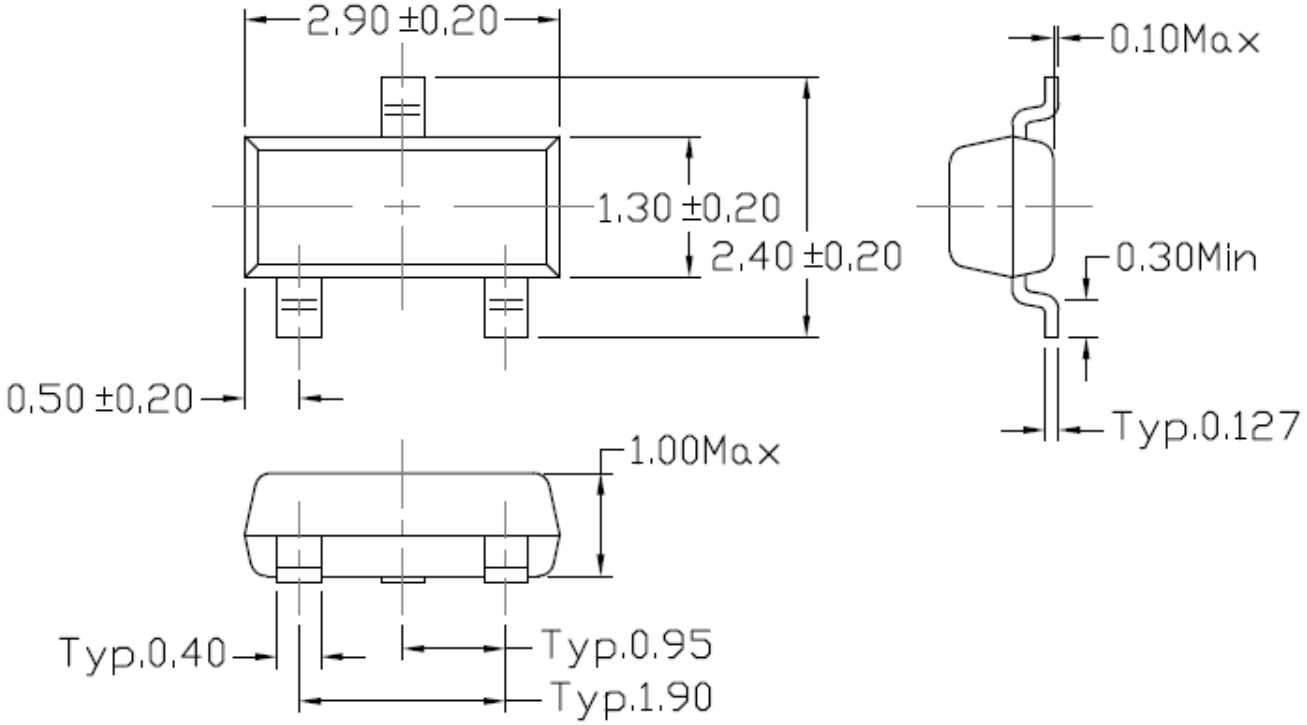


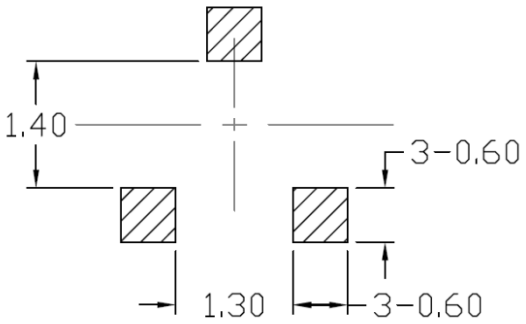
Figure 15: Switching Time Waveform



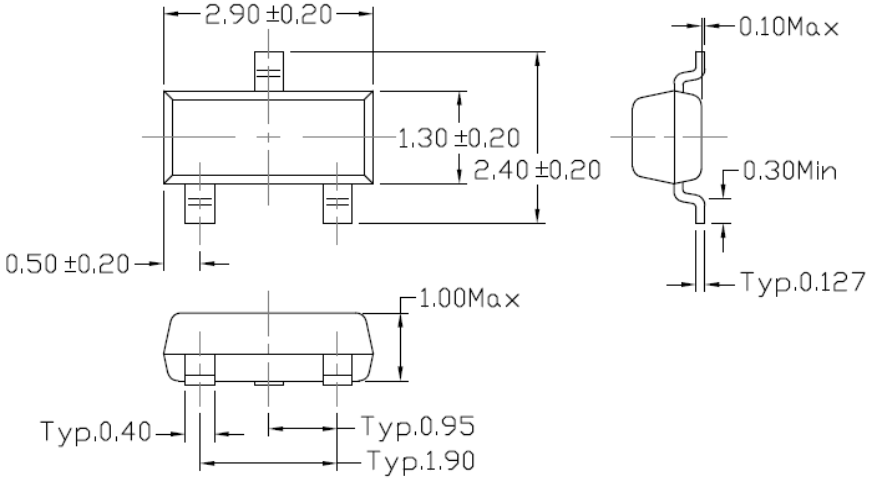
Package Dimension (SOT-23)



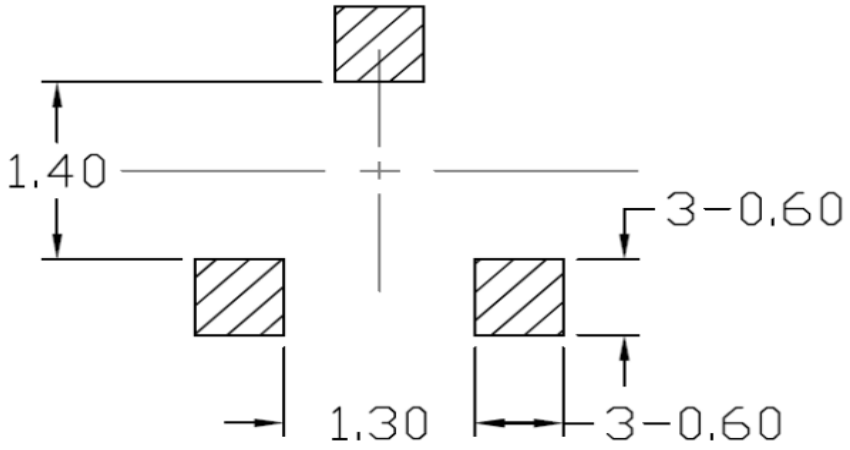
Recommended pad layout for surface mount leadform



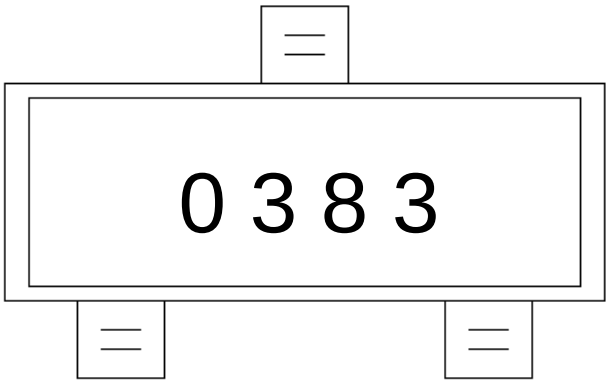
Package Dimension *Dimensions in mm unless otherwise stated*



Recommended pad layout for surface mount leadform



Marking Information

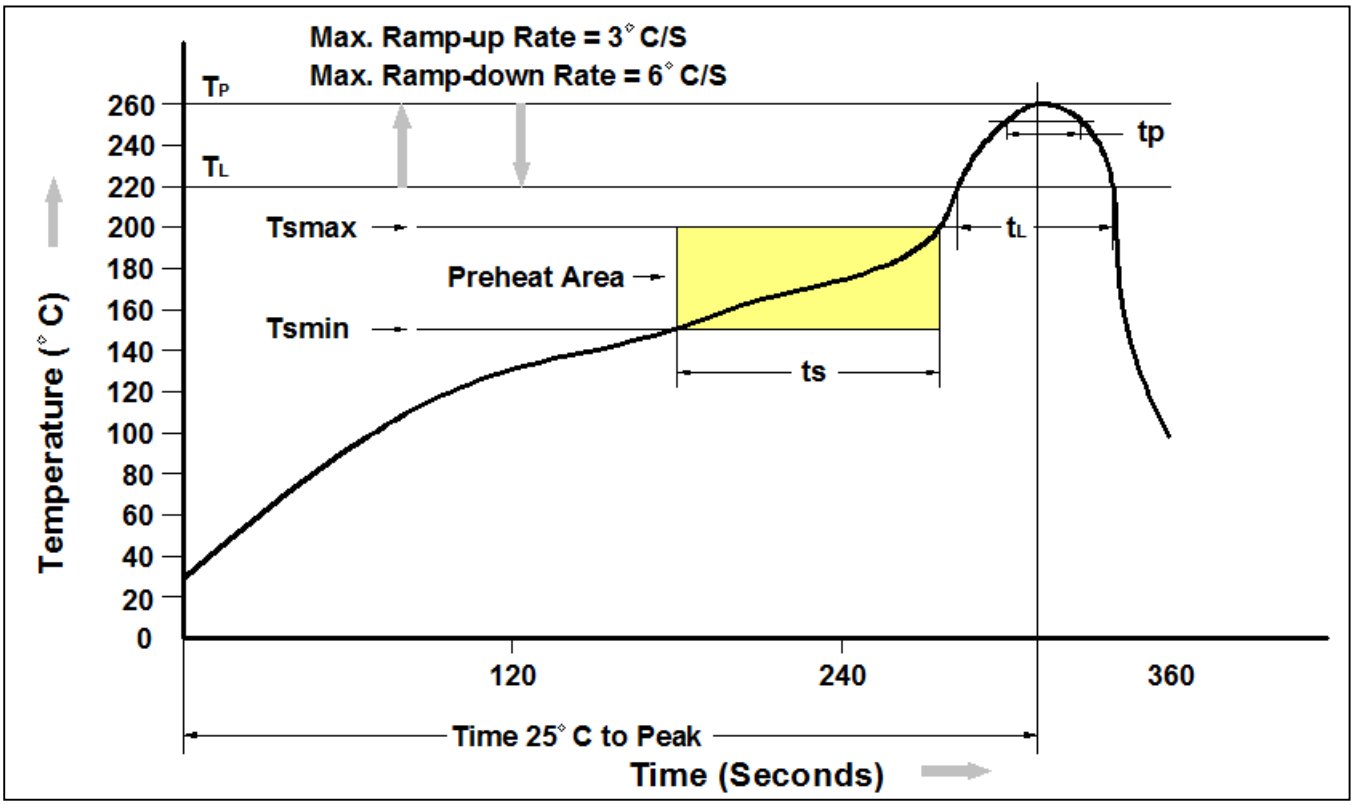


0383: Device Number

Ordering Information

Part Number	*Description*	*Quantity*
CTL0383NS-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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