



CTL0203PS-R3

P-Channel Enhancement MOSFET

Features

- Drain-Source Breakdown Voltage $V_{DS} -30\text{ V}$
- Drain-Source On-Resistance
 $R_{DS(ON)} 160\text{m}\Omega$, at $V_{GS} = -4.5\text{V}$, $I_D = -1.6\text{A}$
 $R_{DS(ON)} 110\text{m}\Omega$, at $V_{GS} = -10\text{V}$, $I_D = -2.0\text{A}$
- Continuous Drain Current at $T_A=25^\circ\text{C}$ $I_D = -2.0\text{A}$
- Advanced high cell density Trench Technology
- RoHS Compliance & Halogen Free

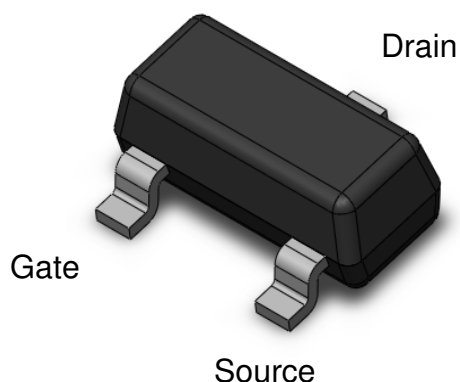
Description

The CTL0203PS-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. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management.

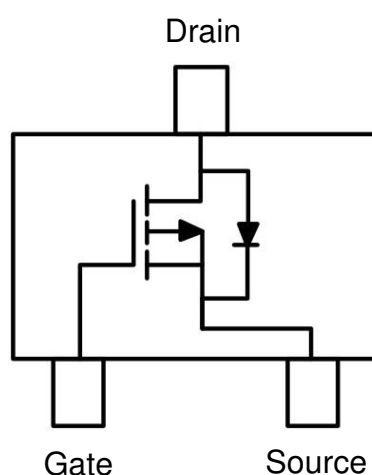
Applications

- Power Management
- Portable Equipment
- Battery Powered System
- Load Switch

Package Outline



Schematic





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P-Channel Enhancement MOSFET

Absolute Maximum Rating at 25°C

| Symbol | Parameters | Test Conditions | Min | Notes |
|------------------|--------------------------------------|-----------------|-----|-------|
| V _{DS} | Drain-Source Voltage | -30 | V | |
| V _{GS} | Gate-Source Voltage | ±20 | V | |
| I _D | Continuous Drain Current | -2.0 | A | 1 |
| I _{DM} | Pulsed Drain Current | -8 | A | 1 |
| P _D | Total Power Dissipation | 0.78 | 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) | | -- | 110 | 160 | °C /W | 1,4 |

**CTL0203PS-R3****P-Channel Enhancement MOSFET****Electrical Characteristics** $T_A = 25^\circ\text{C}$ (unless otherwise specified)**Static Characteristics**

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|------------------|--------------------------------|---|-----|-----|------|-------|-------|
| B _{VDS} | 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} = -4.5V, I _D = -1.6A | - | 160 | 200 | mΩ | 3 |
| | | V _{GS} = -10V, I _D = -2.0A | - | 110 | 130 | mΩ | |
| V _{GS(th)} | Gate-Source Threshold Voltage | V _{GS} = V _{DS} , I _D = -250μA | -1 | --- | -3 | 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 | - | 205 | - | pF | |
| C _{OSS} | Output Capacitance | | - | 42 | - | | |
| C _{RSS} | Reverse Transfer Capacitance | | - | 13 | - | | |

Switching Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|---------------------|---------------------|---|-----|-----|-----|-------|-------|
| T _{D(ON)} | Turn-On Delay Time | V _{DS} = -15V , V _{GS} = -4.5V, R _G = 6Ω, R _L = 15Ω, | - | 18 | - | ns | |
| T _R | Rise Time | | - | 16 | - | | |
| T _{D(OFF)} | Turn-Off Delay Time | | - | 32 | - | | |
| T _F | Fall Time | | - | 8 | - | | |
| Q _G | Total Gate Charge | V _{DS} = -15V , V _{GS} = -4.5V, I _D = -2A | - | 3.7 | - | nC | |
| Q _{GS} | Gate-Source Charge | | - | 2 | - | | |
| Q _{GD} | Gate-Drain Charge | | - | 1 | - | | |

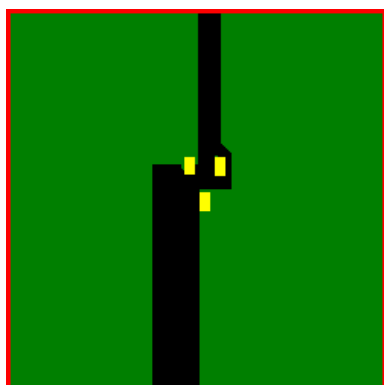


Drain-Source Diode Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|-----------------|-------------------------------|--|-----|-------|------|-------|-------|
| V _{SD} | Body Diode Forward Voltage | V _{GS} = 0V, I _D = -1A | - | -0.85 | -1.2 | 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

Test Board

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

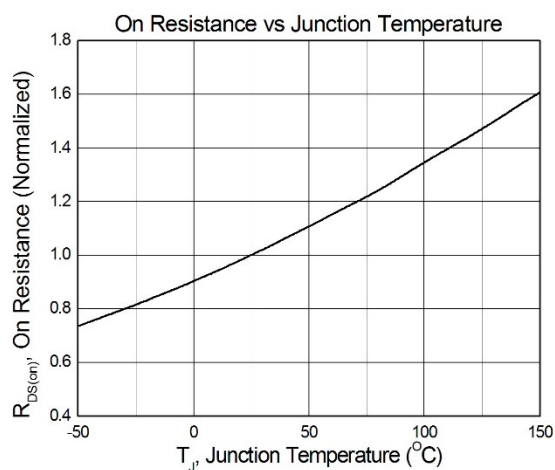


Figure 1

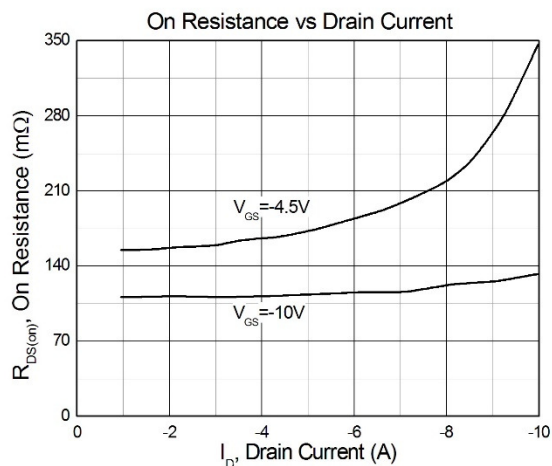


Figure 2

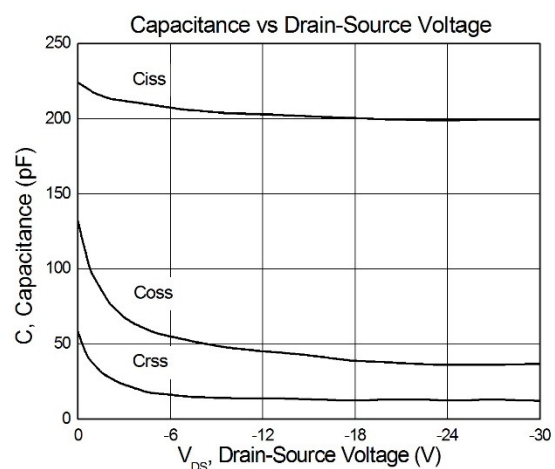


Figure 3

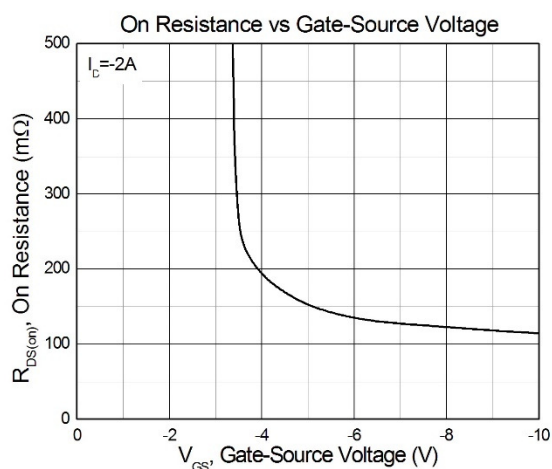


Figure 4

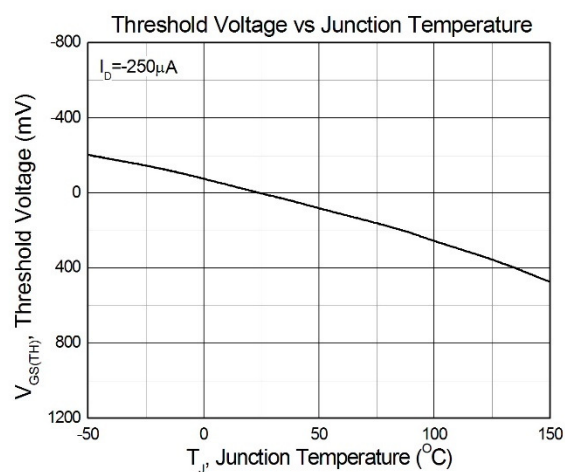


Figure 5

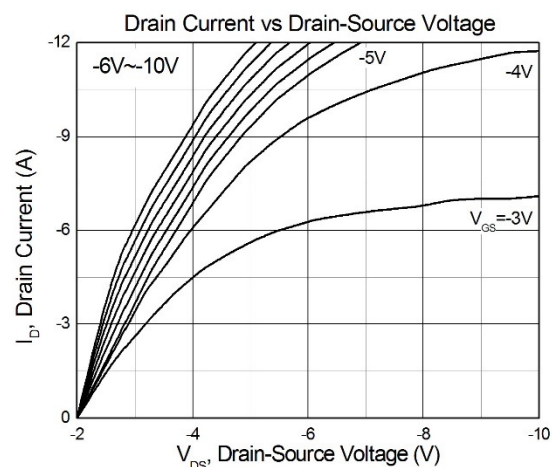
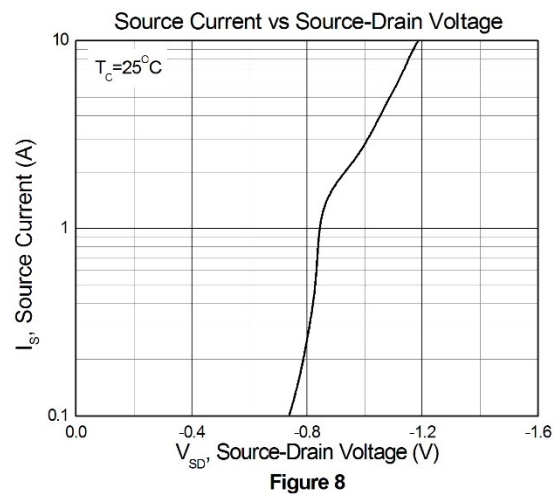
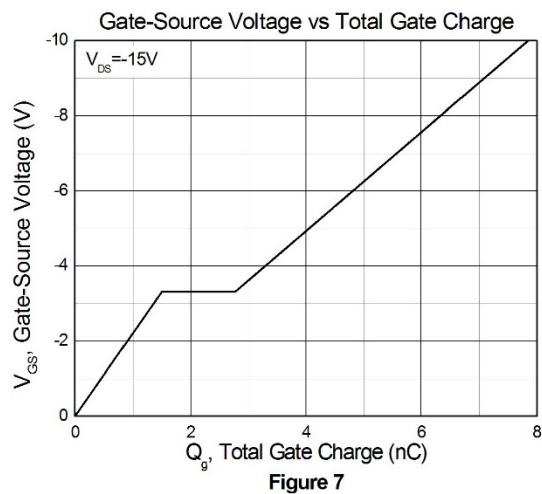


Figure 6



P-Channel Enhancement MOSFET





Test Circuits & Waveforms

Figure 9: Gate Charge Test Circuit

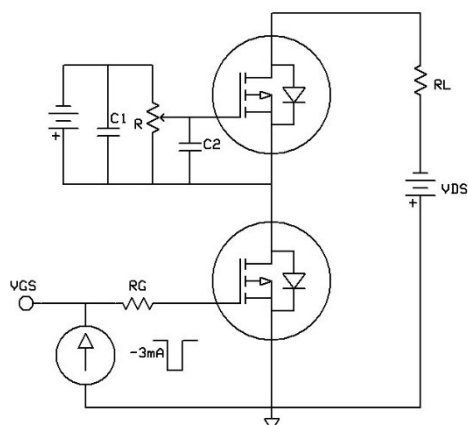


Figure 10: Gate Charge Waveform

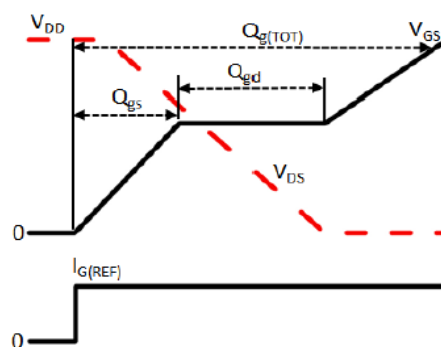


Figure 11: Switching Time Test Circuit

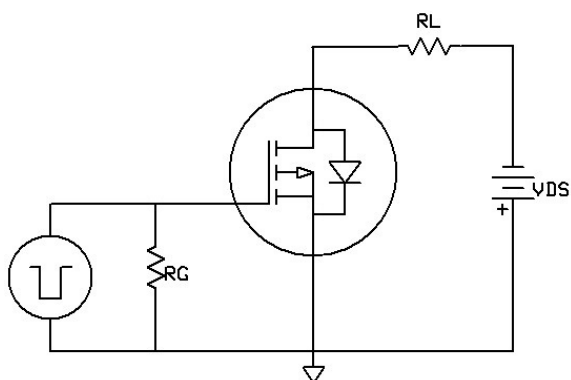
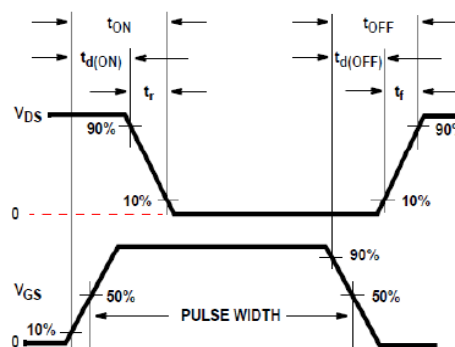
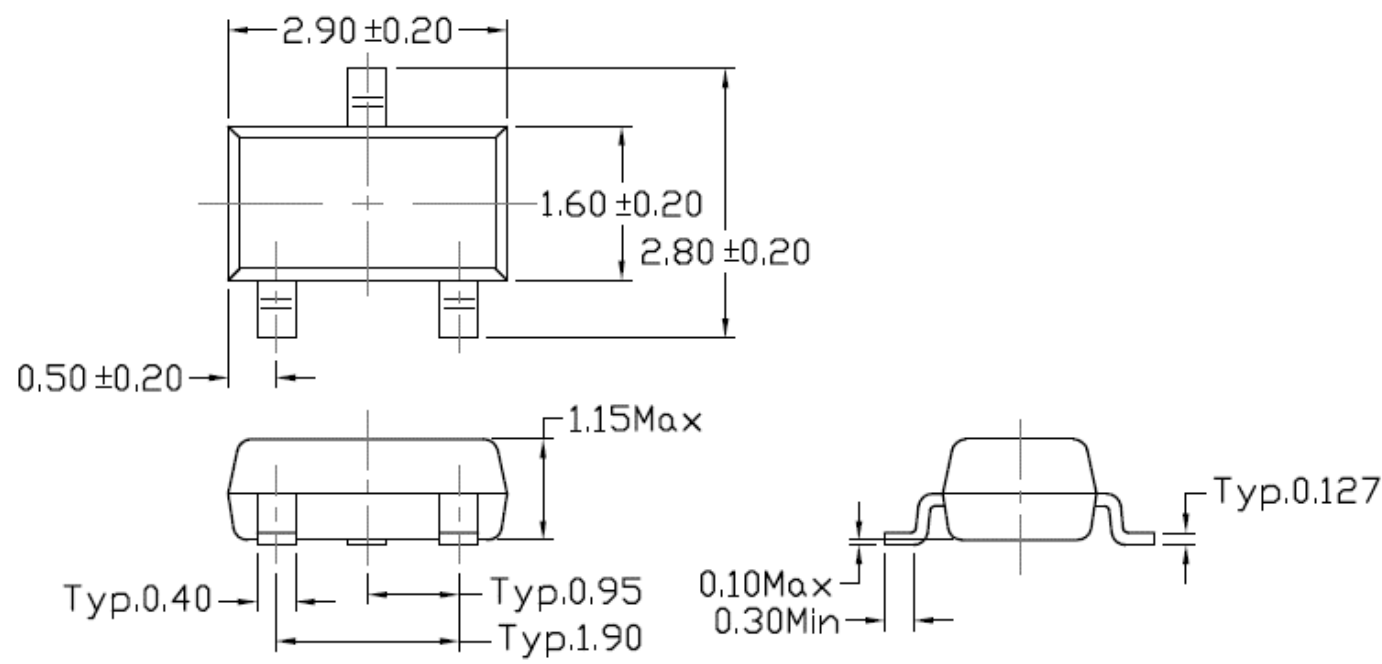


Figure 12: Switching Time Waveform

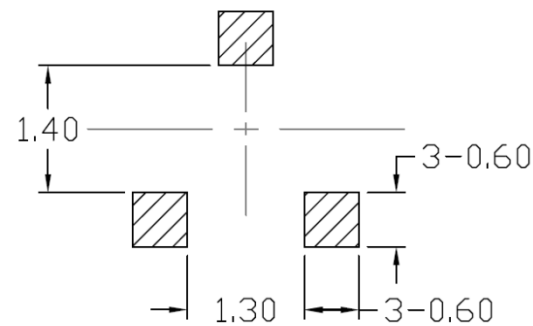




Package Dimension (SC-59)



Recommended pad layout for surface mount leadform

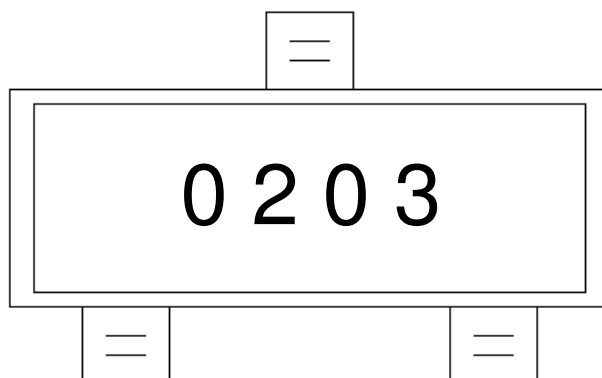




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Marking Information



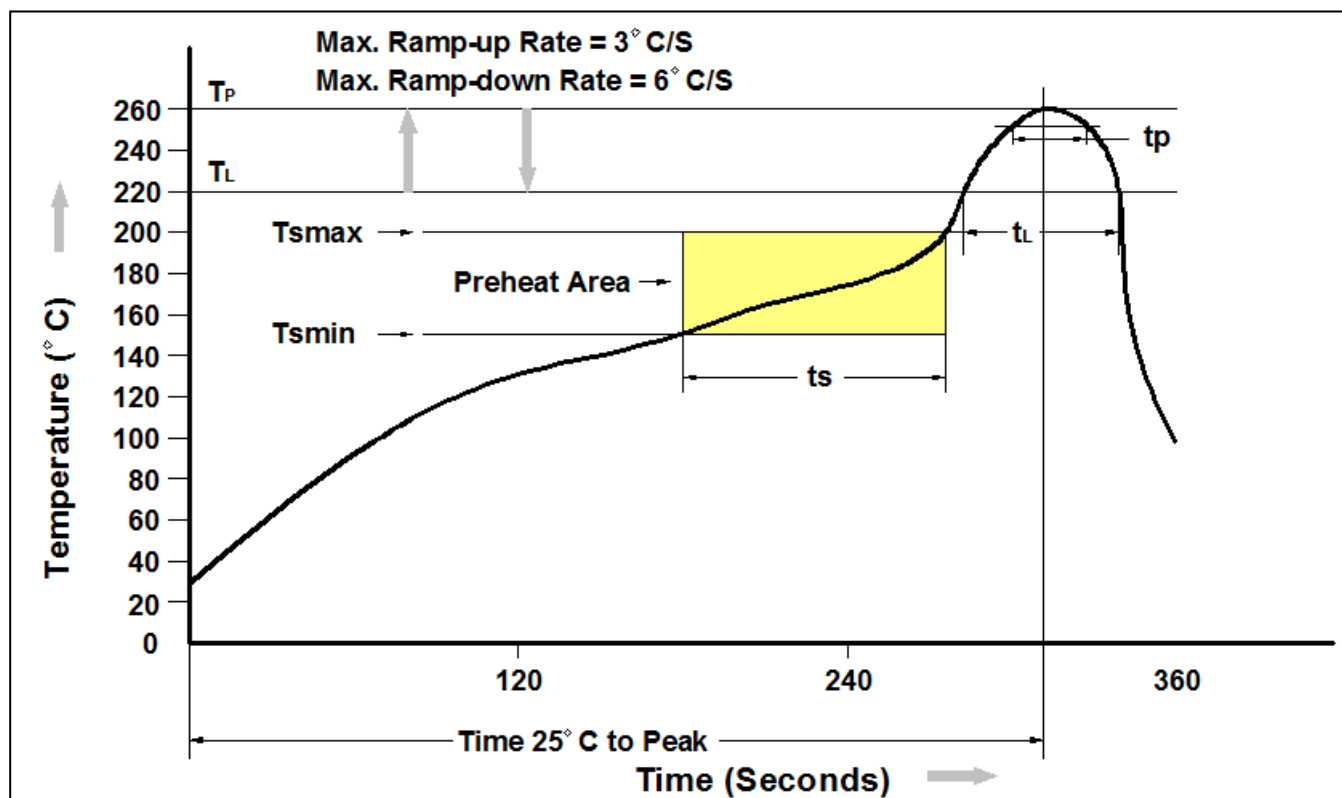
0203: Device Number

Ordering Information

| Part Number | Description | Quantity |
|--------------|-------------|----------|
| CTL0203PS-R3 | SOT-23 Reel | 3000 pcs |



Reflow Profile



| Profile Feature | Pb-Free Assembly Profile |
|---|--------------------------|
| Temperature Min. (T _{smin}) | 150 °C |
| Temperature Max. (T _{smax}) | 200 °C |
| Time (ts) 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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