# PAN0023WSR

**N-CH 100V Fast Switching MOSFET**

**$V_{DS}$=100V, $I_D$=3.6A, $RDS_{(ON)}$=105mΩ**

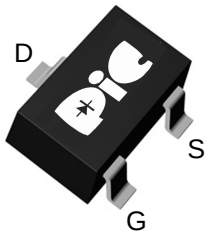
## ➢ General Description

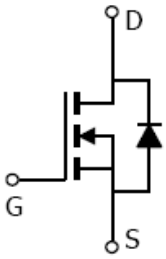
This PAN0023WSR N-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent Rds(On) performance and efficiency for power switching and load switching application., this device also comply with the RoHS and Green Product requirement with full function reliability approved.

## ➢ Feature

- ●Super high density cell design for extremely low RDS (ON)
- ●Exceptional on-resistance and maximum DC current capability
- ●ESD Protection Diode design–in
- ●SOT-323 package design

## ➢ SOT-323




## ➢ Application

- ●Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- ●High saturation current capability. Direct Logic-Level Interface: TTL/CMOS
- ●Battery Operated Systems
- ●Solid-State Relays

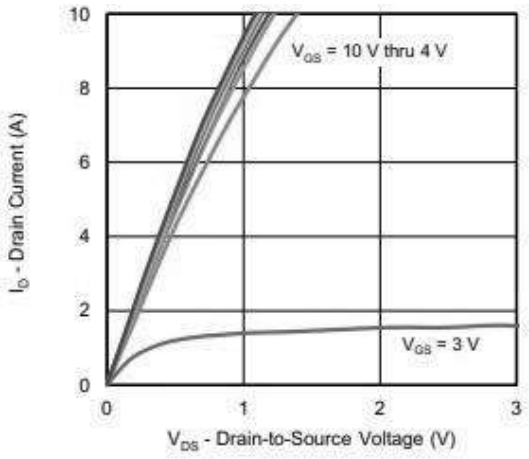
## ➢ Absolute Maximum Ratings

| Parameter | | Symbol | Typical | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 100 | V |
| Gate –Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current($T_J$=150℃) | $T_A$=25℃ | $I_D$ | 3.6 | A |
| | $T_A$=70℃ | | 2.8 | |
| Pulsed Drain Current | | $I_{DM}$ | 6 | A |
| Continuous Source Current(Diode Conduction) | | $I_S$ | 2.8 | A |
| Power Dissipation | $T_A$=25℃ | $P_D$ | 0.35 | W |
| | $T_A$=70℃ | | 0.22 | |
| Operating Junction Temperature | | $T_J$ | 150 | 150 |
| Storage Temperature Range | | $T_{STG}$ | -55/150 | -55/150 |
| Thermal Resistance-Junction to Ambient | | $R_{\theta JA}$ | 120 | 120 |

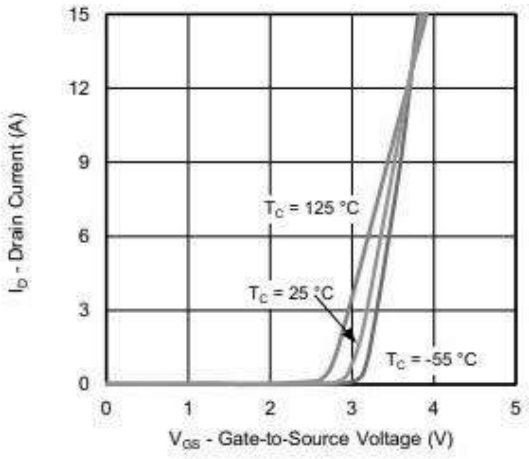
## ➢ Electrical Characteristics ($T_A$=25°C Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=250uA | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 1.0 | | 2.5 | |
| Gate Leakage Current | $I_{GSS}$ | $V_{DS}$=0V,$V_{GS}$=±12V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=80V,$V_{GS}$=0V | | | 1 | uA |
| | | $V_{DS}$=80V,$V_{GS}$=0V $T_J$=85°C | | | 10 | |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=3.6A | | 95 | 105 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=2.8A | | 115 | 125 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=10V,$I_D$=3.6A | | 18 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=1.0A,$V_{GS}$=0V | | 0.8 | 1.2 | V |
| **Dynamic** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=50V,$V_{GS}$=4.5V $I_D$≡1.0A | | 2.7 | 5.4 | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 1.3 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 0.6 | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=50V,$V_{GS}$=0V f=1MHz | | 345 | | pF |
| Output Capacitance | $C_{oss}$ | | | 25 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 5 | | |
| Turn-On Time | $t_{d(on)}$ | $V_{DD}$=50V,$R_L$=50Ω $I_D$≡1.0A,$V_{GEN}$=10V $R_G$=1Ω | | 10 | 20 | ns |
| | $t_r$ | | | 5 | 10 | |
| Turn-Off Time | $t_{d(off)}$ | | | 15 | 30 | |
| | $t_f$ | | | 5 | 10 | |

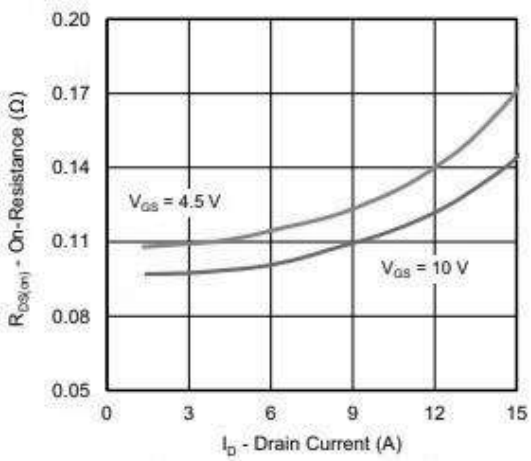
## ➢ Typical Characteristics



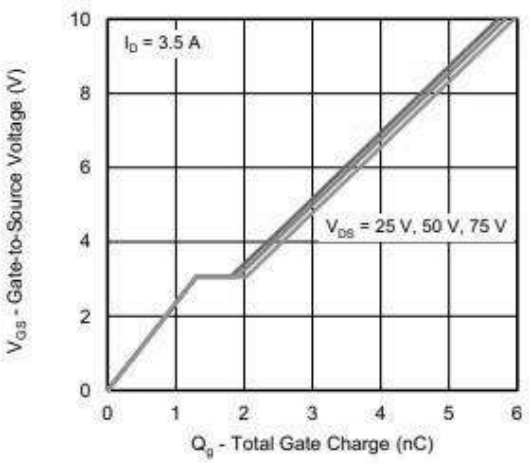

**Output Characteristics**



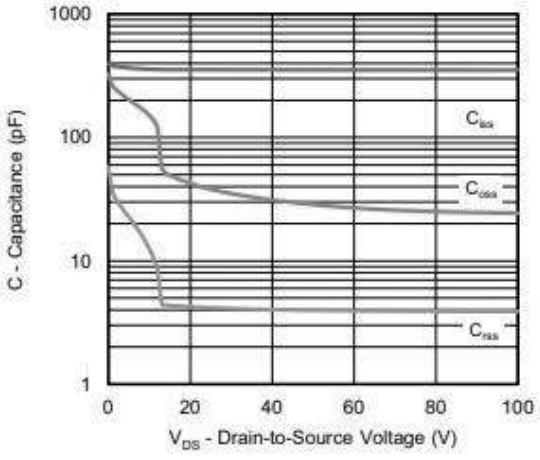

**Transfer Characteristics**



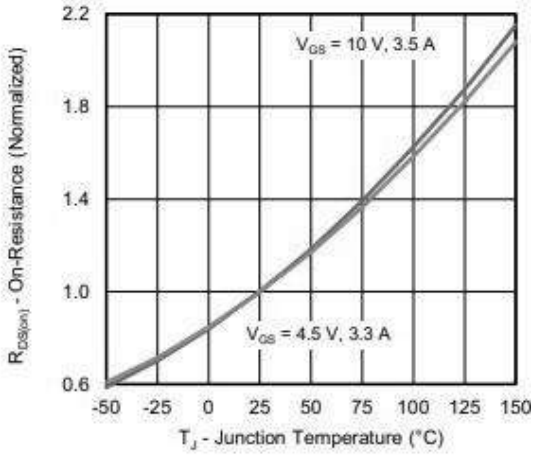

**On-Resistance vs. Drain Current and Gate Voltage**



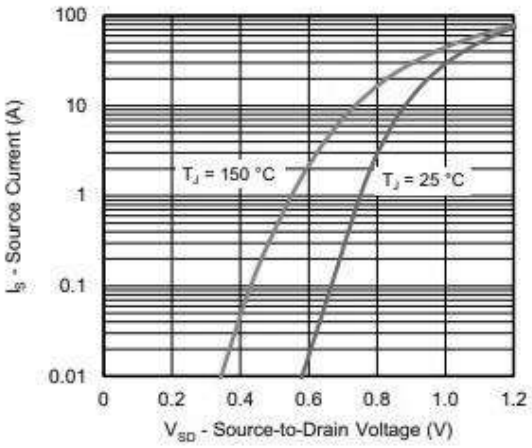

**Capacitance**



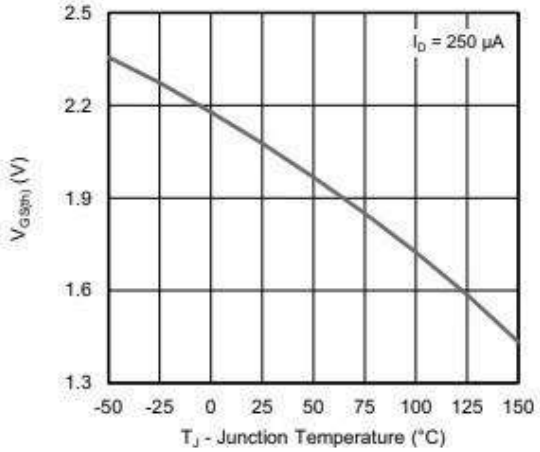

**Gate Charge**



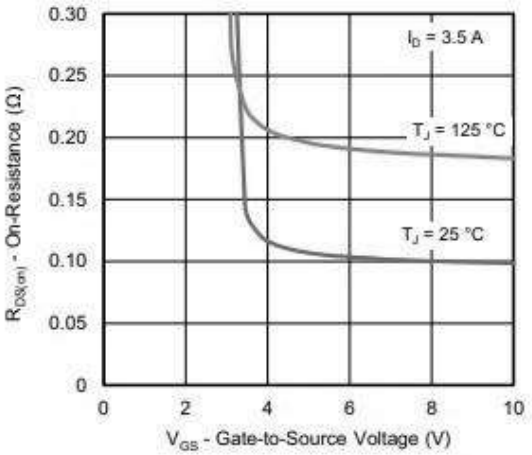

**On-Resistance vs. Junction Temperature**



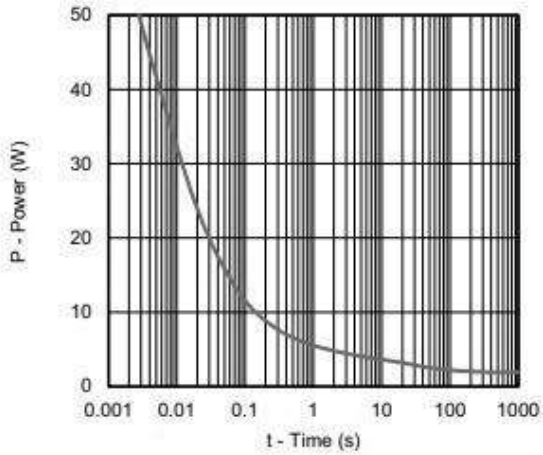

**Source-Drain Diode Forward Voltage**



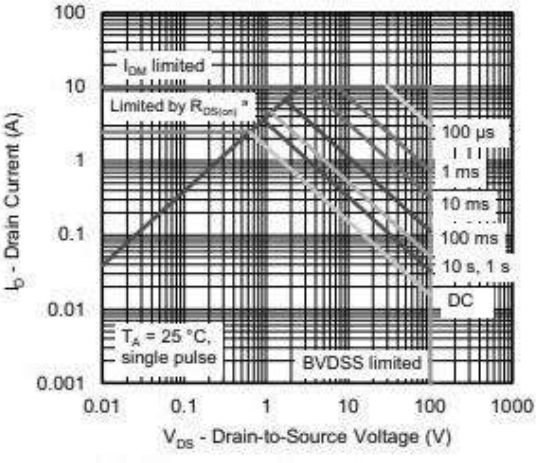

**Threshold Voltage**



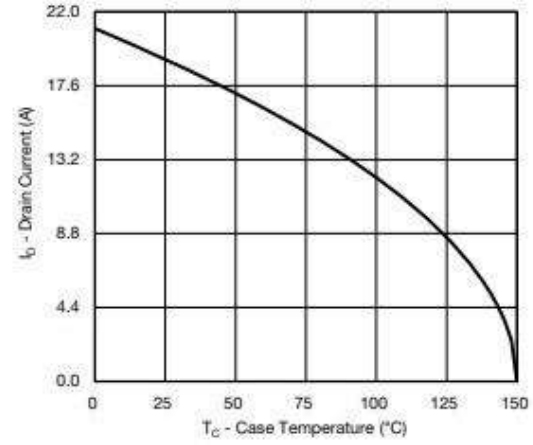

**On-Resistance vs. Gate-to-Source Voltage**



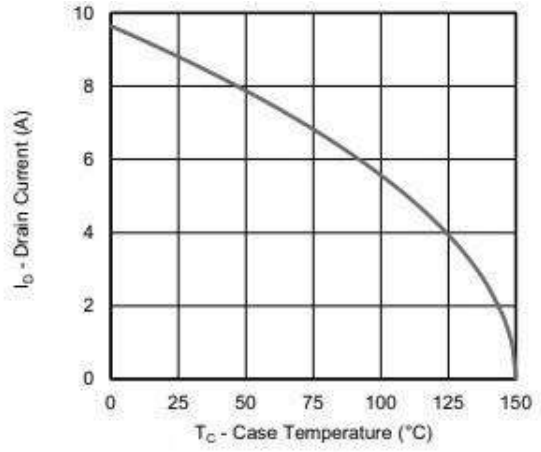

**Single Pulse Power, Junction-to-Ambient**



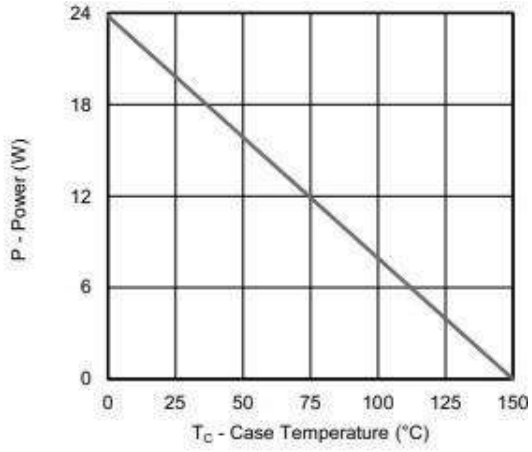

**Safe Operating Area, Junction-to-Ambient**



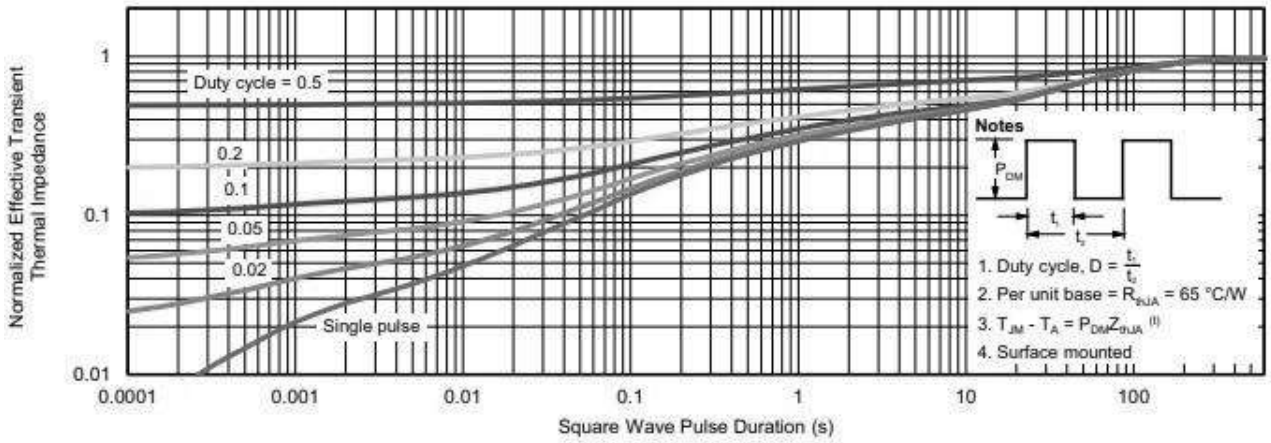

**Current Derating***



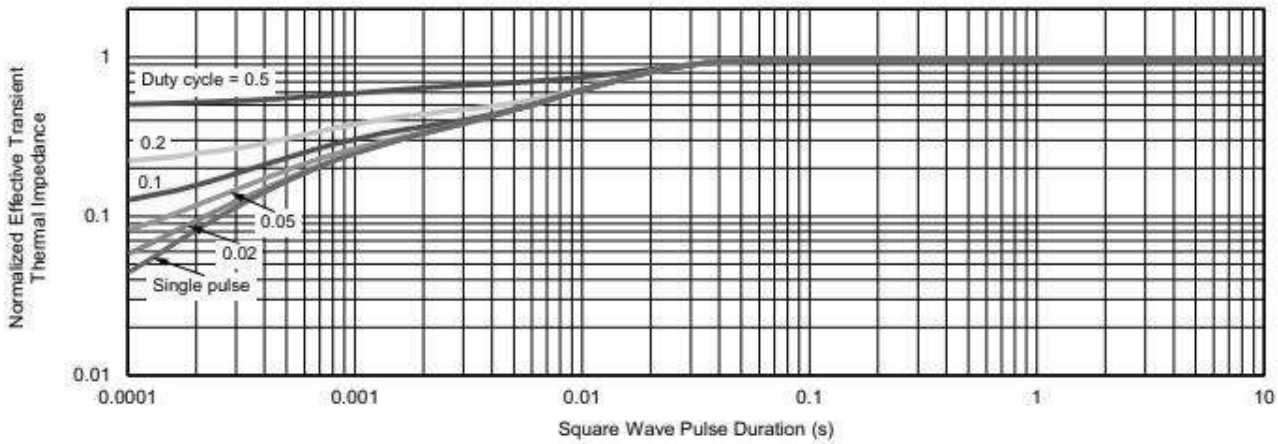

**Current Derating [a]**




**Power, Junction-to-Case**

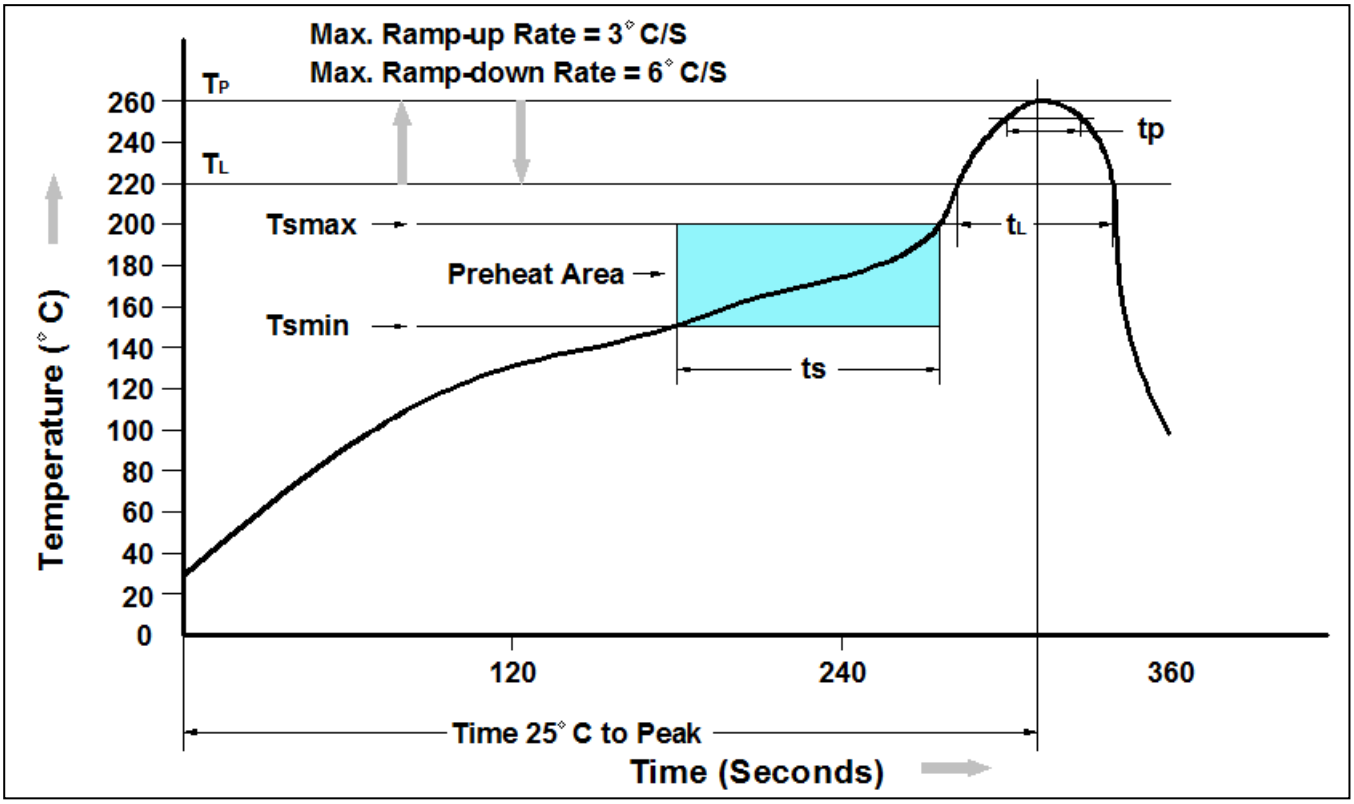



**Normalized Thermal Transient Impedance, Junction-to-Ambient**




**Normalized Thermal Transient Impedance, Junction-to-Case**

## ➢ Recommand IR Reflow Soldering Thermal Profile

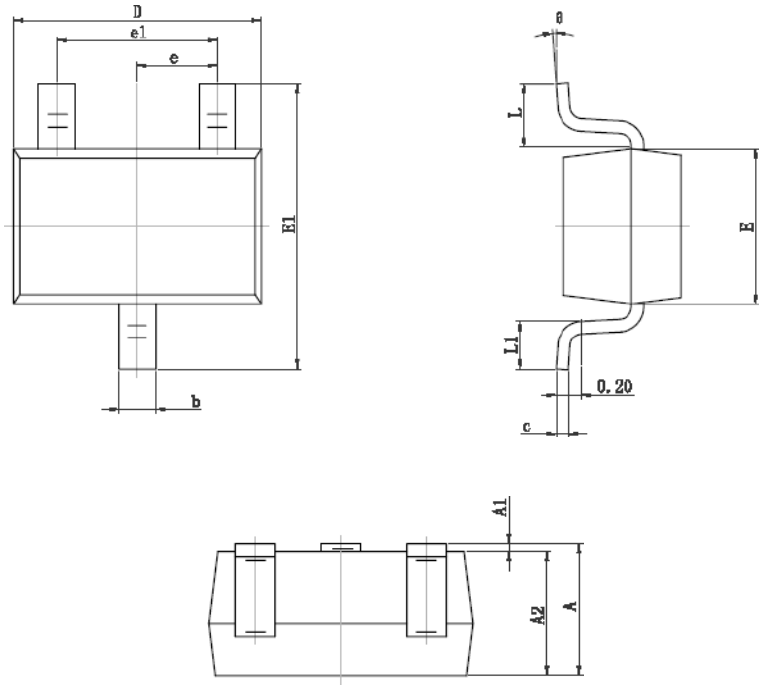



| Profile Feature | Pb-Free Assembly Profile |
|---|---|
| Temperature Min. (Tsmin) | 150°C |
| Temperature Max. (Tsmax) | 200°C |
| Time (ts) from (Tsmin to Tsmax) | 60-120 seconds |
| Average Ramp-up Rate (tL to tP) | 3°C/second max. |
| Liquidous Temperature (TL) | 217°C |
| Time (tL) Maintained Above (TL) | 60 – 150 seconds |
| Peak Temperature | 260°C +0°C / -5°C |
| Time (tP) within 5°C of actual Peak Temperature | 30 seconds |
| Ramp-down Rate (TP to TL) | 6°C/second max |
| Time 25°C to Peak Temperature | 8 minutes max. |

## ➢ Ordering Information

| Part Number | Description | Quantity |
|---|---|---|
| PAN0023WSR | SOT-323 Reel | 3000 pcs |

## ➢ Package Information ( SOT-323 )




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.100 | 0.035 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.200 | 0.400 | 0.008 | 0.016 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.000 | 2.200 | 0.079 | 0.087 |
| E | 1.150 | 1.350 | 0.045 | 0.053 |
| E1 | 2.150 | 2.450 | 0.085 | 0.096 |
| e | 0.650 TYP | | 0.026 TYP | |
| e1 | 1.200 | 1.400 | 0.047 | 0.055 |
| L | 0.525 REF | | 0.021 REF | |
| L1 | 0.260 | 0.460 | 0.010 | 0.018 |
| θ | 0° | 8° | 0° | 8° |

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