# PAN00TK08K

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

**$V_{DS}$=100V, $I_D$=2.2A ,$RDS_{(ON)}$=310mΩ**

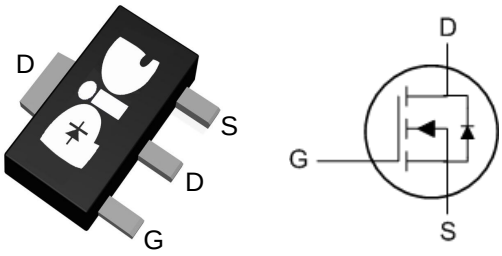
## ➢ General Description

This PAN00TK08K 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)
- ●SOT-89-3L package design

## ➢ SOT-89-3L




## ➢ Application

- ●Motor and Load Control
- ●LCD TV Inverter & AD/DC Inverter Systems.
- ●Backlight Inverter for LCD Display
- ●Load Switch
- ●CCFL Inverter

## ➢ Absolute Maximum Ratings

| Parameter | Symbol | Rating | Units |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current, $V_{GS}$ @ 10V[1] | $I_D$@$T_A$=25°C | 2.2 | A |
| Continuous Drain Current, $V_{GS}$ @ 10V[1] | $I_D$@$T_A$=70°C | 1.7 | A |
| Pulsed Drain Current[2] | $I_{DM}$ | 5.5 | A |
| Total Power Dissipation[3] | $P_D$@$T_A$=25°C | 1.5 | W |
| Storage Temperature Range | $T_{STG}$ | -55 to 150 | °C |
| Operating Junction Temperature Range | $T_J$ | -55 to 150 | °C |
| Thermal Resistance Junction-ambient [1] | $R_{\theta JA}$ | 85 | °C/W |
| Thermal Resistance Junction-Case[1] | $R_{\theta JC}$ | 36 | °C/W |

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V , $I_D$=250uA | 100 | --- | --- | V |
| BVDSS Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25°C , $I_D$=1mA | --- | 0.067 | --- | V/°C |
| Static Drain-Source On-Resistance2 | $R_{DS(ON)}$ | $V_{GS}$=10V , $I_D$=2A | --- | 260 | 310 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=1A | --- | 270 | 320 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.0 | 1.5 | 2.5 | V |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}$ | | --- | -4.2 | --- | mV/°C |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=25°C | --- | --- | 1 | uA |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=25°C | --- | --- | 5 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| Forward Transconductance | gfs | $V_{DS}$=5V , $I_D$=2A | --- | 5.4 | --- | S |
| Gate Resistance | $R_g$ | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 2.8 | 5.6 | Ω |
| Total Gate Charge (10V) | $Q_g$ | $V_{DS}$=50V , $V_{GS}$=10V , $I_D$=2A | --- | 9.1 | 12.7 | nC |
| Gate-Source Charge | $Q_{gs}$ | | --- | 2 | 2.8 | |
| Gate-Drain Charge | $Q_{gd}$ | | --- | 1.4 | 2.0 | |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{DD}$=50V , $V_{GS}$=10V , $R_G$=3.3Ω$I_D$=2A | --- | 2 | 4 | ns |
| Rise Time | $T_r$ | | --- | 21.6 | 39 | |
| Turn-Off Delay Time | $T_{d(off)}$ | | --- | 11.2 | 22 | |
| Fall Time | $T_f$ | | --- | 18.8 | 37.6 | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 508 | 711 | pF |
| Output Capacitance | $C_{oss}$ | | --- | 29 | 41 | |
| Reverse Transfer Capacitance | $C_{rss}$ | | --- | 16.4 | 33 | |

## ➢ Diode Characteristics

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Continuous Source Current1,4 | $I_S$ | $V_G$=$V_D$=0V , Force Current | --- | --- | 2.2 | A |
| Pulsed Source Current2,4 | $I_{SM}$ | | --- | --- | 5.5 | A |
| Diode Forward Voltage2 | $V_{SD}$ | $V_{GS}$=0V , $I_S$=1A , $T_J$=25°C | --- | --- | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | IF=2A , dI/dt=100A/μs , $T_J$=25°C | --- | 17.5 | --- | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | --- | 14 | --- | nC |

Note :
1.Pulse width limited by maximum junction temperature.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.Ensure that the channel temperature does not exceed 150°C.
4.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

## ➢ Typical Characteristics

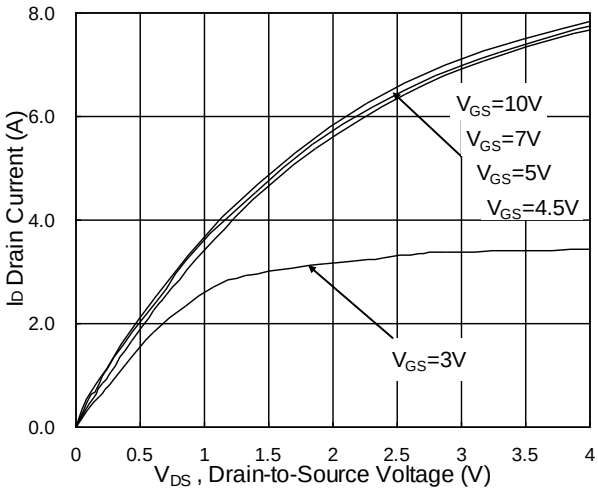



**Fig.1 Typical Output Characteristics**

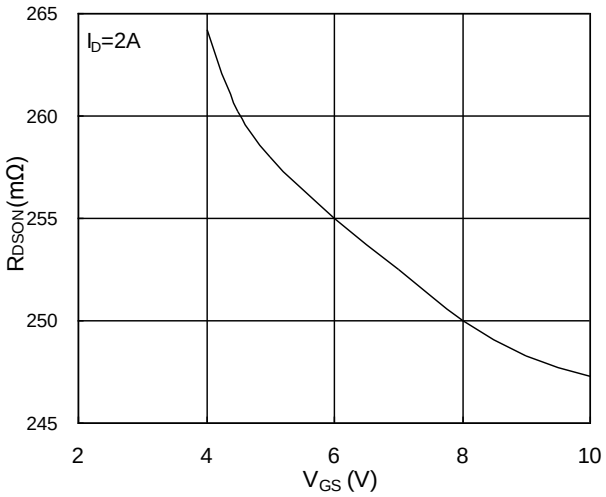



**Fig.2 On-Resistance vs. Gate-Source**

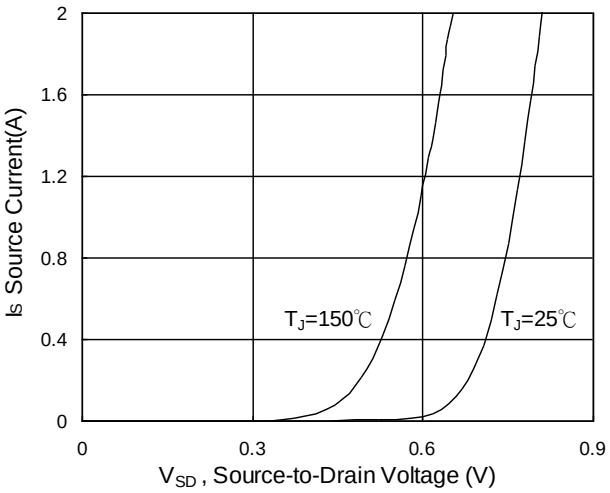



**Fig.3 Forward Characteristics of Reverse**

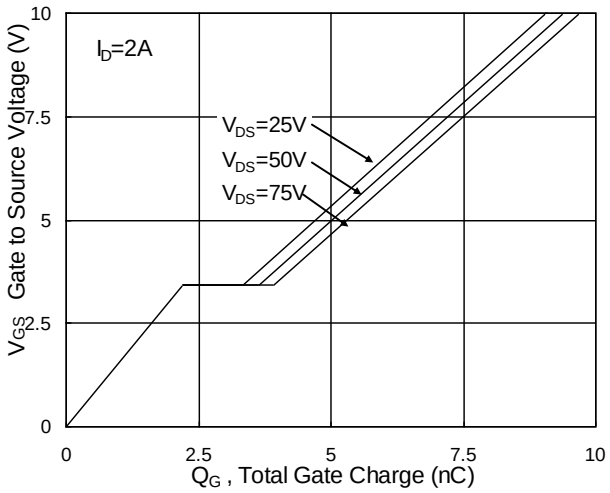



**Fig.4 Gate-Charge Characteristics**

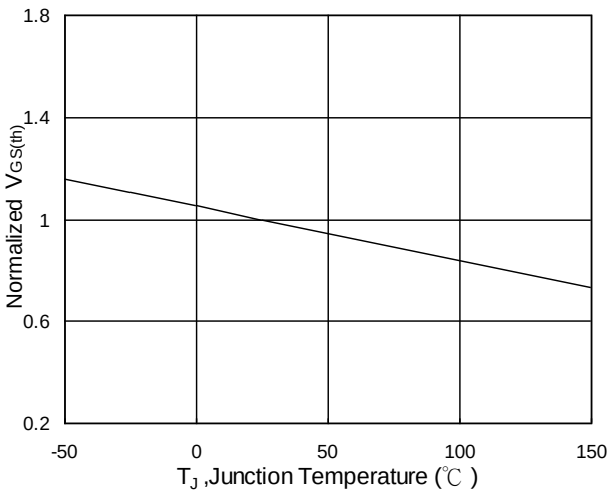



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

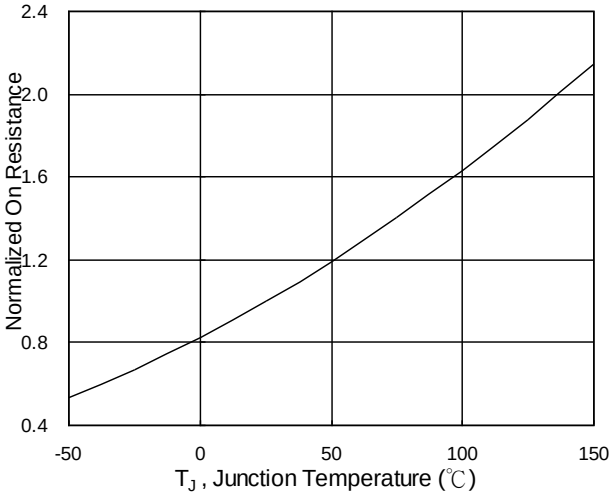



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

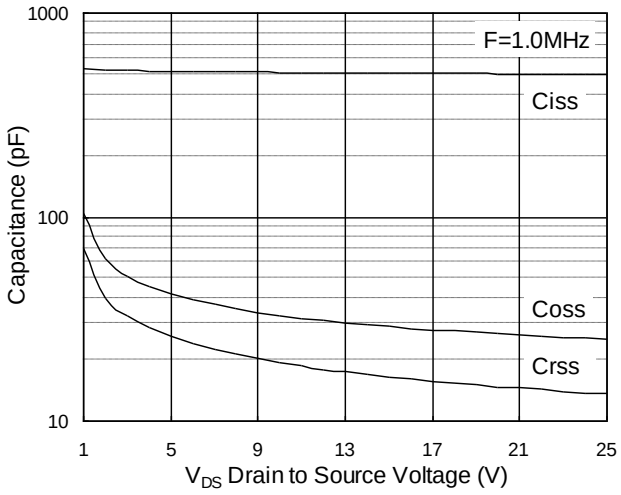



**Fig.7 Capacitance**

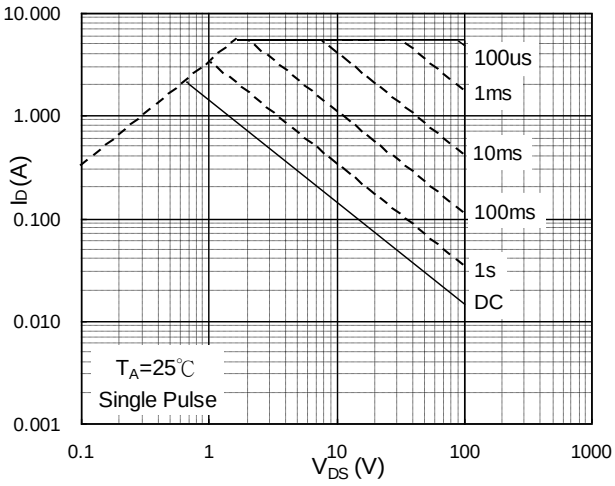



**Fig.8 Safe Operating Area**

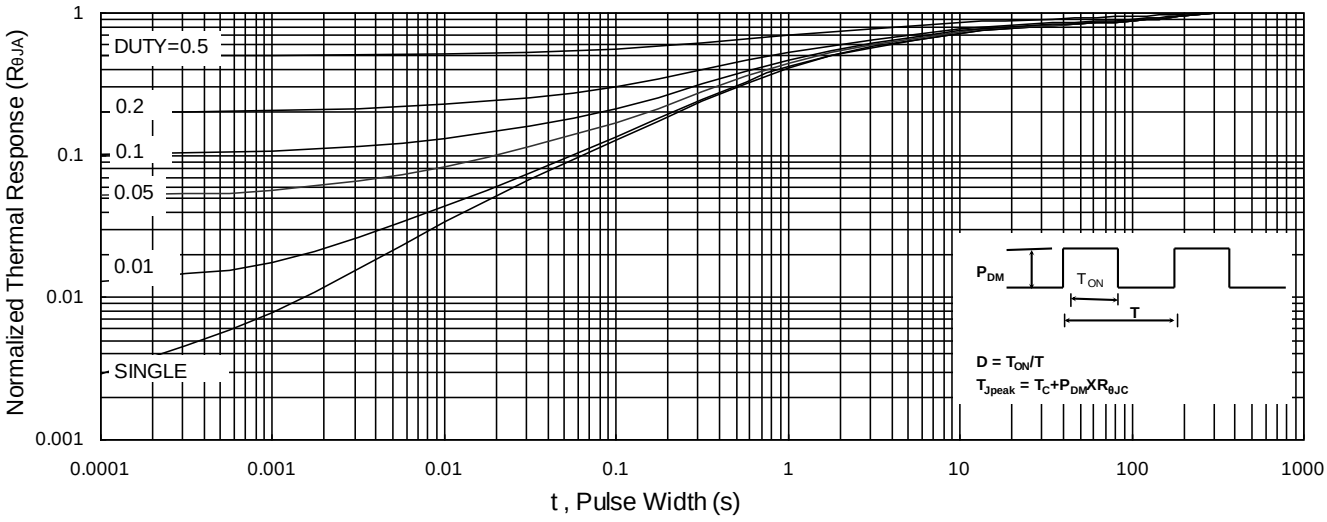



**Fig.9 Normalized Maximum Transient Thermal Impedance**

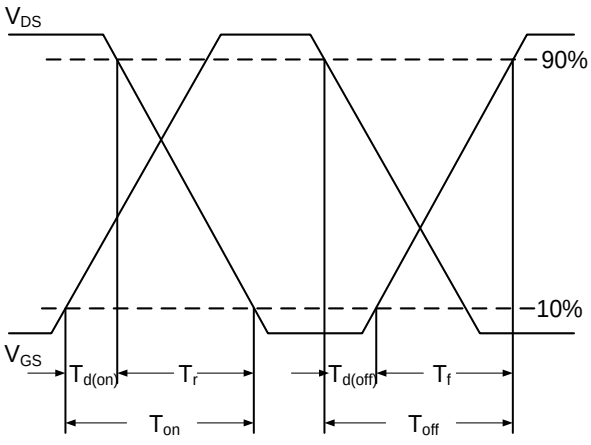



**Fig.10 Switching Time Waveform**

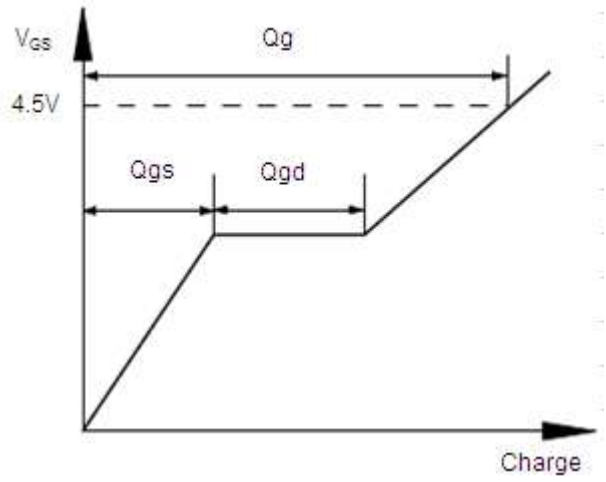
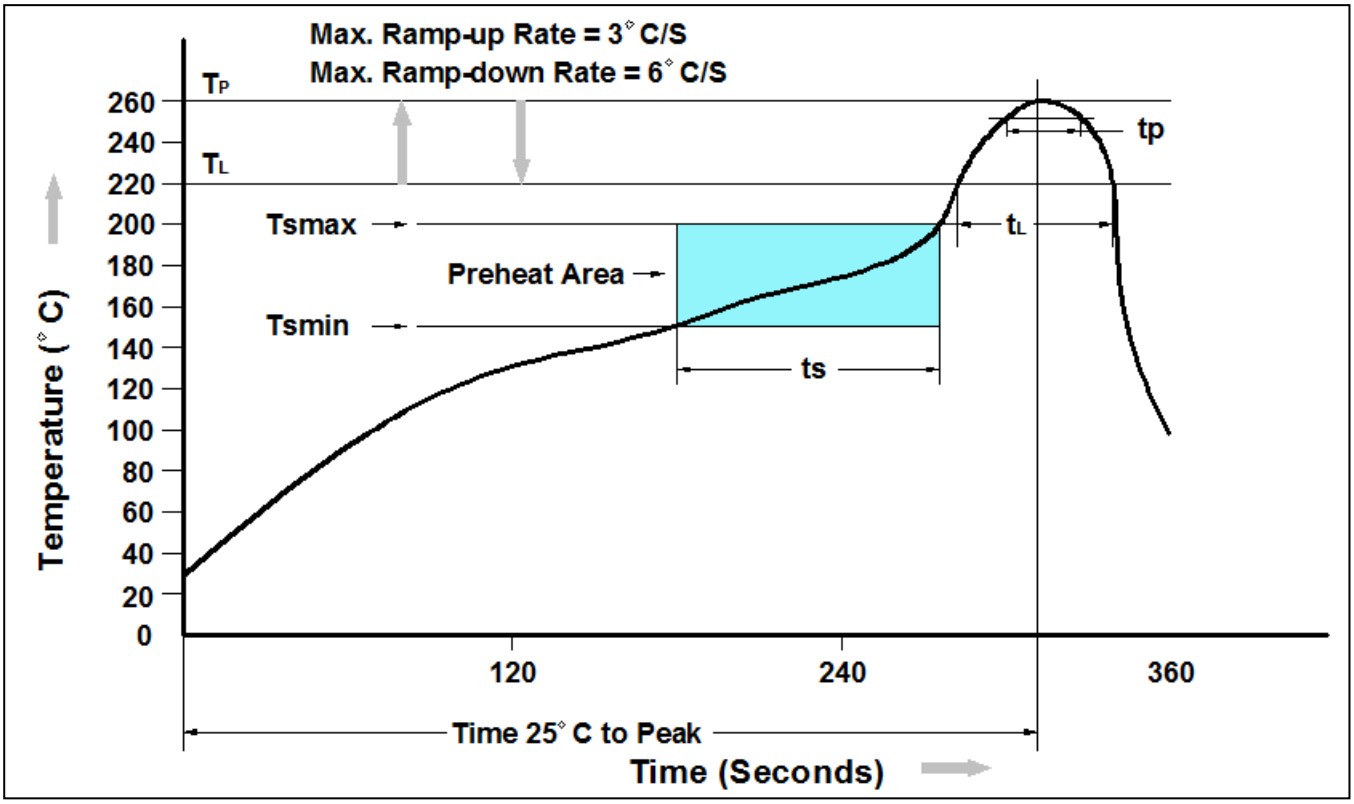



**Fig.11 Gate Charge Waveform**

## ➢ Recommand IR Reflow Soldering Thermal Profile

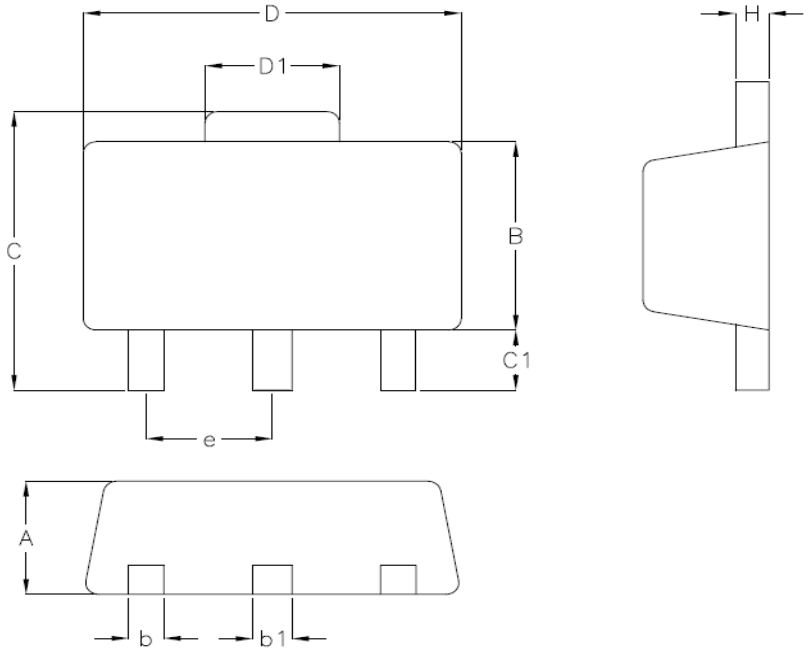



| Profile Feature | Pb-Free Assembly Profile |
|---|---|
| Temperature Min. (Tsmin) | 150°C |
| Temperature Max. (Tsmax) | 200°C |
| Time (ts) from (Tsmin to Tsmax) | 60-120 seconds |
| Average Ramp-up Rate (tL to tP) | 3°C/second max. |
| Liquidous Temperature (TL) | 217°C |
| Time (tL) Maintained Above (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 |
|---|---|---|
| PAN00TK08K | SOT-89-3L Reel | 1000 pcs |

## ➢ Package Information (SOT-89-3L)




| SYMBOLS | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 1.397 | 1.600 | 0.055 | 0.063 |
| b | 0.420 | 0.540 | 0.017 | 0.021 |
| b1 | 0.420 | 0.540 | 0.017 | 0.021 |
| B | 2.388 | 2.591 | 0.094 | 0.102 |
| C | 3.937 | 4.242 | 0.155 | 0.167 |
| C1 | 0.787 | 1.194 | 0.031 | 0.047 |
| D | 4.394 | 4.597 | 0.173 | 0.181 |
| D1 | 1.397 | 1.753 | 0.055 | 0.069 |
| e | 1.448 | 1.549 | 0.057 | 0.061 |
| H | 0.350 | 0.44 | 0.014 | 0.017 |

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