

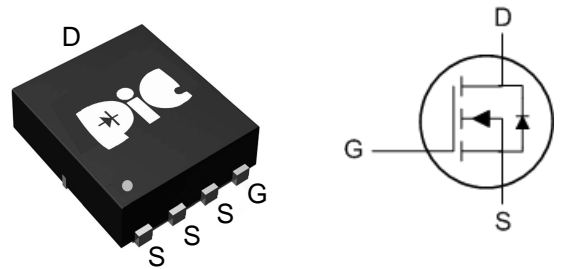
➤ General Description

This PAN30TV06V N-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent $R_{ds(On)}$ 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 Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

➤ DFN3X3A-EP1



➤ Application

- DC/DC Primary Side Switch
- Industrial Synchronous
- Rectification Load Switch
- DC/DC Converters

➤ Absolute Maximum Ratings

| Parameter | Symbol | Rating | Units |
|-------------------------------------------------------|-----------------------|------------|--------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current, V_{GS} @ 10V ₁ | $I_D@T_C=25^\circ C$ | 40 | A |
| Continuous Drain Current, V_{GS} @ 10V ₁ | $I_D@T_C=100^\circ C$ | 20 | A |
| Continuous Drain Current, V_{GS} @ 10V ₁ | $I_D@T_A=25^\circ C$ | 15 | A |
| Continuous Drain Current, V_{GS} @ 10V ₁ | $I_D@T_A=70^\circ C$ | 12 | A |
| Pulsed Drain Current ₂ | I_{DM} | 140 | A |
| Single Pulse Avalanche Energy ₃ | EAS | 115.2 | mJ |
| Avalanche Current | I_{AS} | 48 | A |
| Total Power Dissipation ₄ | $P_D@T_C=25^\circ C$ | 59 | W |
| Total Power Dissipation ₄ | $P_D@T_A=25^\circ C$ | 2 | W |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^\circ C$ |
| Operating Junction Temperature Range | T_J | -55 to 150 | $^\circ C$ |
| Thermal Resistance Junction-Ambient ₁ | $R_{\theta JA}$ | 62 | $^\circ C/W$ |
| Thermal Resistance Junction Case ₁ | $R_{\theta JC}$ | 2.1 | $^\circ C/W$ |

➤ Electrical Characteristics ($T_J=25^\circ C$ Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------------------------|--------------|--------------------------------------------------------------|------|------|-----------|------------|
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V$, $I_D=250\mu A$ | 30 | --- | --- | V |
| Static Drain-Source On-Resistance ² | $R_{DS(ON)}$ | $V_{GS}=10V$, $I_D=20A$ | --- | 4.8 | 5.5 | m Ω |
| | | $V_{GS}=4.5V$, $I_D=10A$ | --- | 6.5 | 9 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}$, $I_D=250\mu A$ | 1.2 | --- | 2.5 | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=24V$, $V_{GS}=0V$, $T_J=25^\circ C$ | --- | --- | 1 | uA |
| | | $V_{DS}=24V$, $V_{GS}=0V$, $T_J=55^\circ C$ | --- | --- | 5 | |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V$, $V_{DS}=0V$ | --- | --- | ± 100 | nA |
| Forward Transconductance | g_{fs} | $V_{DS}=5V$, $I_D=30A$ | --- | 43 | --- | S |
| Gate Resistance | R_g | $V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$ | --- | 1.7 | --- | Ω |
| Total Gate Charge (4.5V) | Q_g | $V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=15A$ | --- | 20 | --- | nC |
| Gate-Source Charge | Q_{gs} | | --- | 7.6 | --- | |
| Gate-Drain Charge | Q_{gd} | | --- | 7.2 | --- | |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{DD}=15V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=15A$ | --- | 7.8 | --- | ns |
| Rise Time | T_r | | --- | 15 | --- | |
| Turn-Off Delay Time | $T_{d(off)}$ | | --- | 37.3 | --- | |
| Fall Time | T_f | | --- | 10.6 | --- | |
| Input Capacitance | C_{iss} | $V_{DS}=15V$, $V_{GS}=0V$, $f=1MHz$ | --- | 2295 | --- | pF |
| Output Capacitance | C_{oss} | | --- | 267 | --- | |
| Reverse Transfer Capacitance | C_{rss} | | --- | 210 | --- | |

➤ Diode Characteristics

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------------------|----------|-------------------------------------------|------|------|------|------|
| Continuous Source Current ^{1,6} | I_S | $V_G=V_D=0V$, Force Current | --- | --- | 40 | A |
| Pulsed Source Current ^{2,6} | I_{SM} | | --- | --- | 140 | A |
| Diode Forward Voltage ² | V_{SD} | $V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ C$ | --- | --- | 1 | V |
| Reverse Recovery Time | t_{rr} | $I_F=20A$, $di/dt=100A/\mu s$, | --- | 14 | --- | nS |
| Reverse Recovery Charge | Q_{rr} | $T_J=25^\circ C$ | --- | 5 | --- | nC |

Note :

1. Pulse width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=48A$
4. Ensure that the channel temperature does not exceed $150^\circ C$.
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

➤ Typical Characteristics

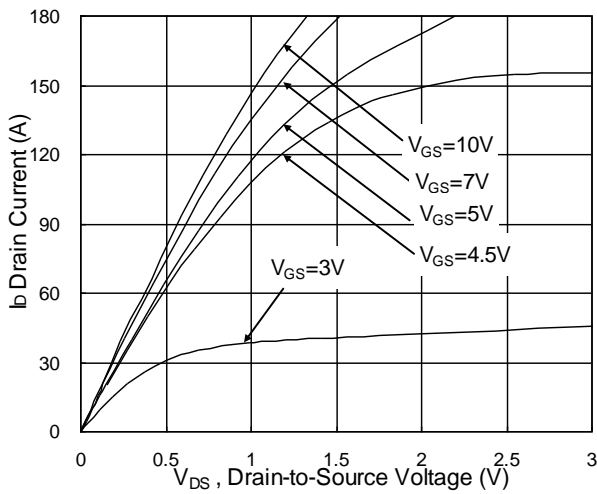


Fig.1 Typical Output Characteristics

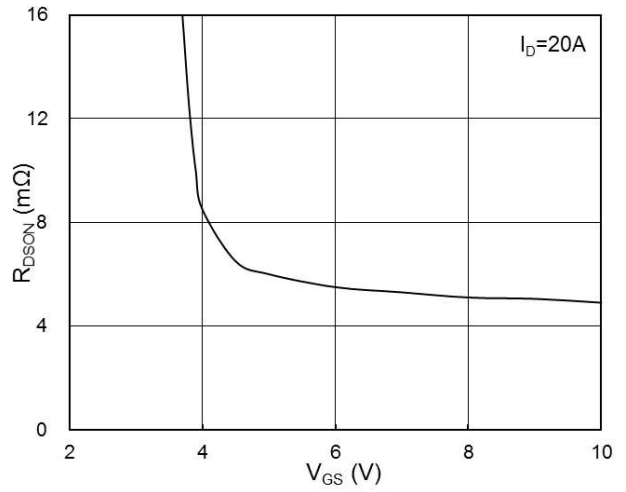


Fig.2 On-Resistance vs. G-S Voltage

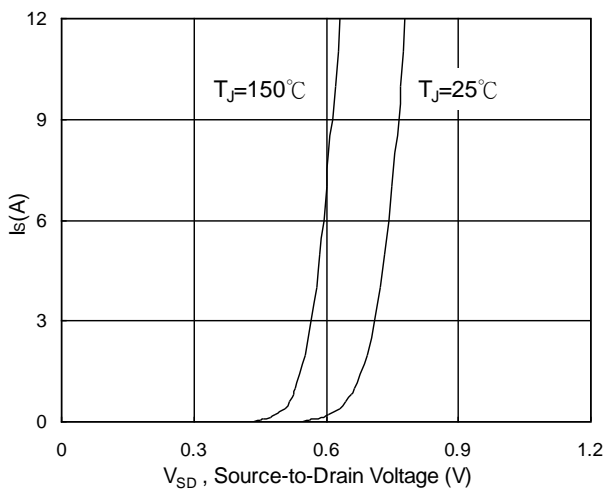


Fig.3 Forward Characteristics of Reverse

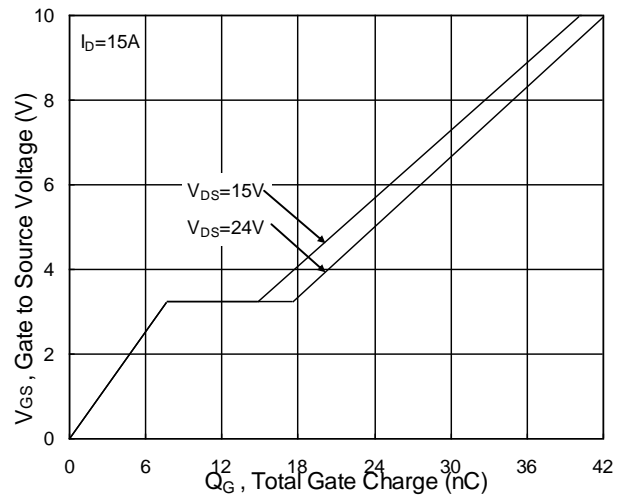


Fig.4 Gate-Charge Characteristics

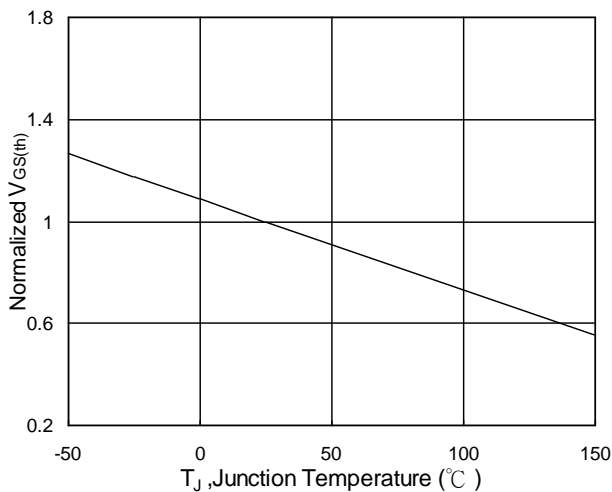


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

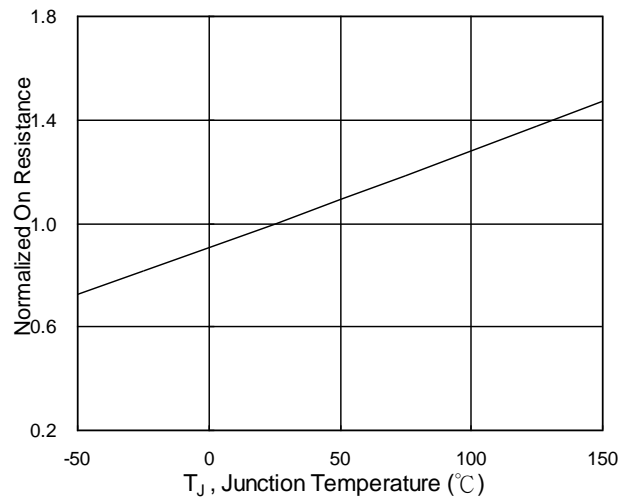


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

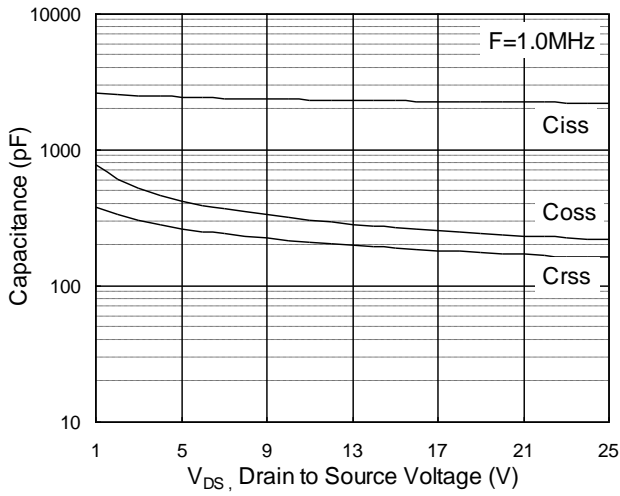


Fig.7 Capacitance

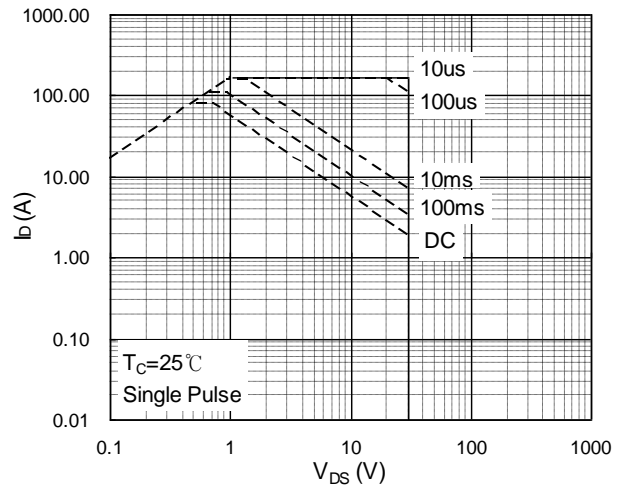


Fig.8 Safe Operating Area

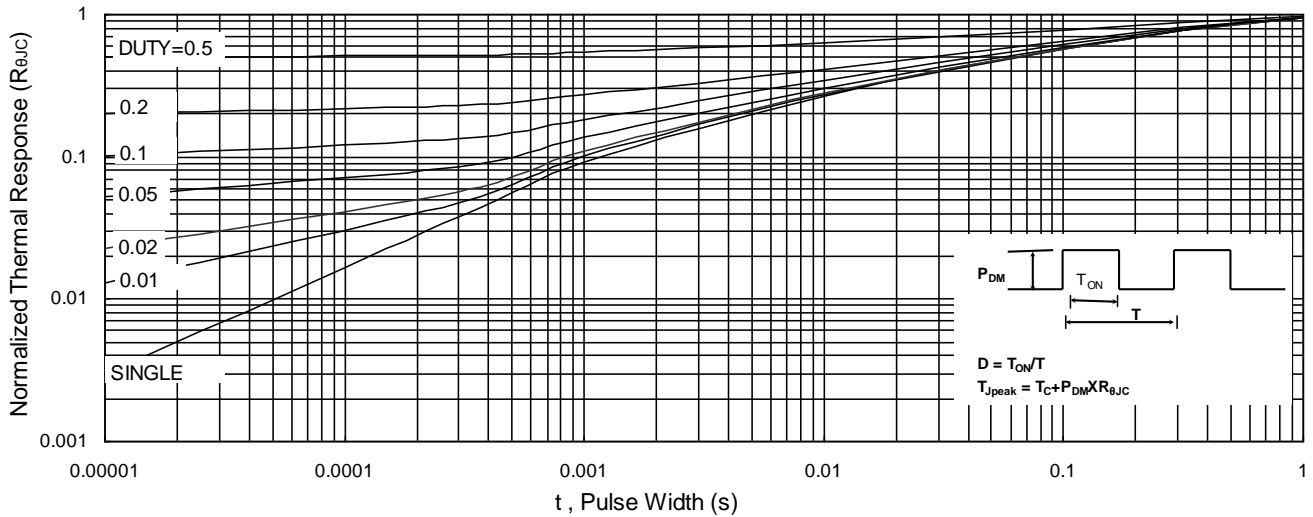


Fig.9 Normalized Maximum Transient Thermal Impedance

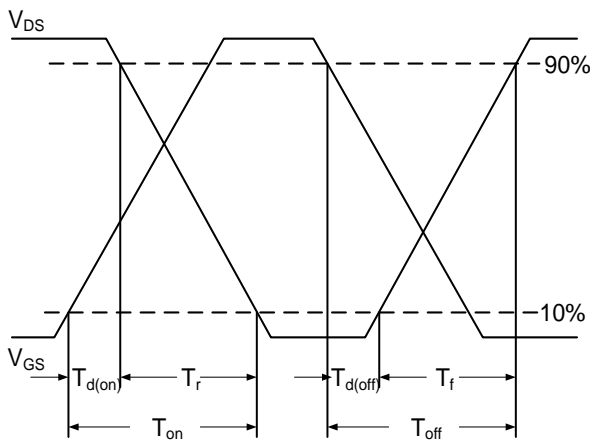


Fig.10 Switching Time Waveform

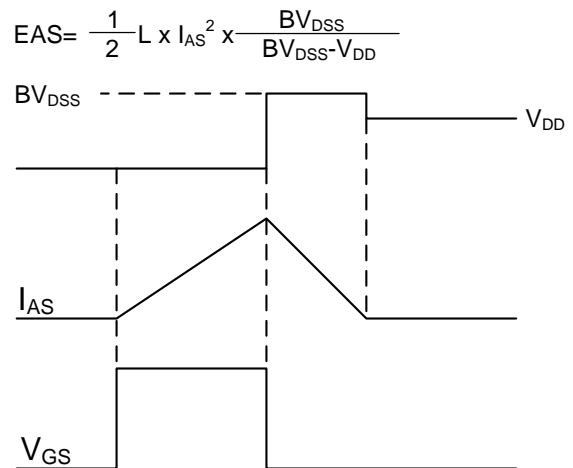
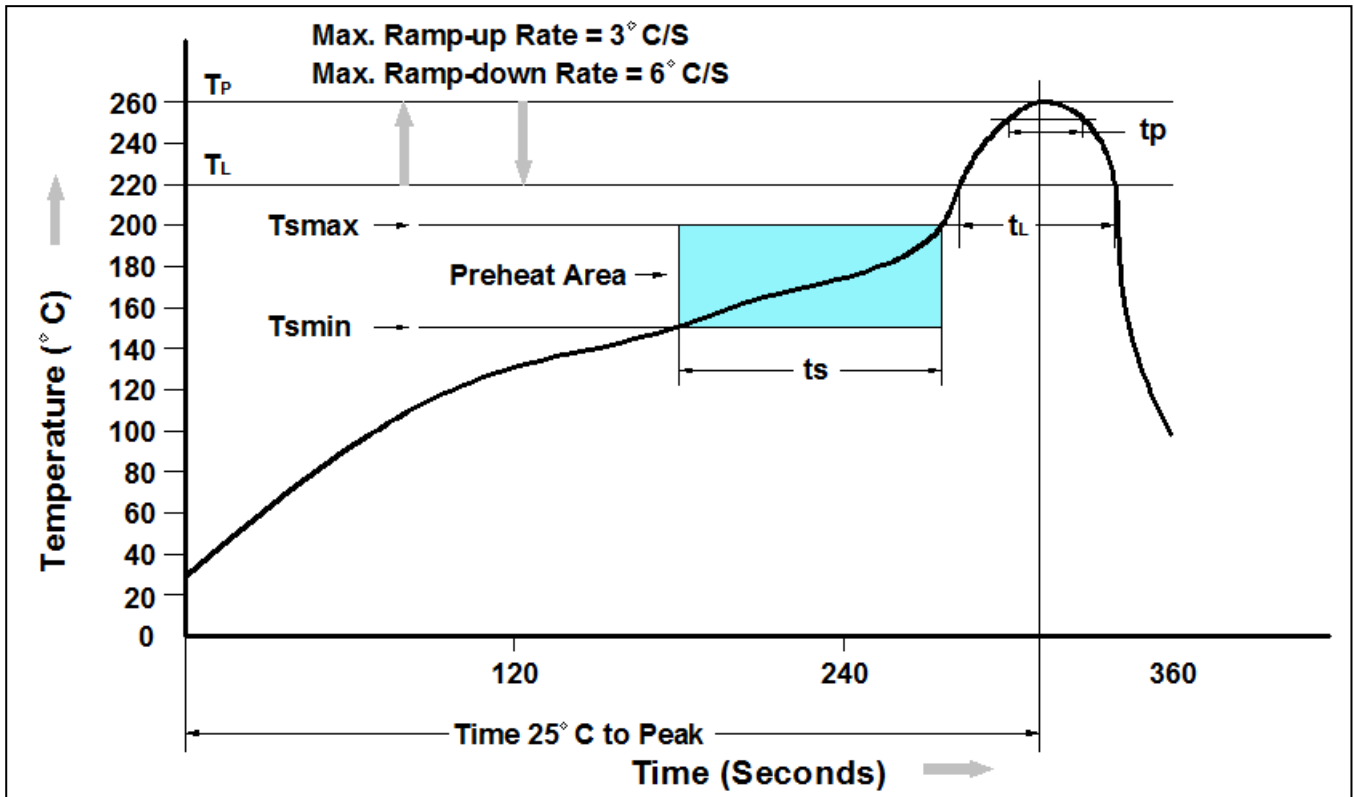


Fig.11 Unclamped Inductive Switching Waveform

➤ Recommend IR Reflow Soldering Thermal Profile

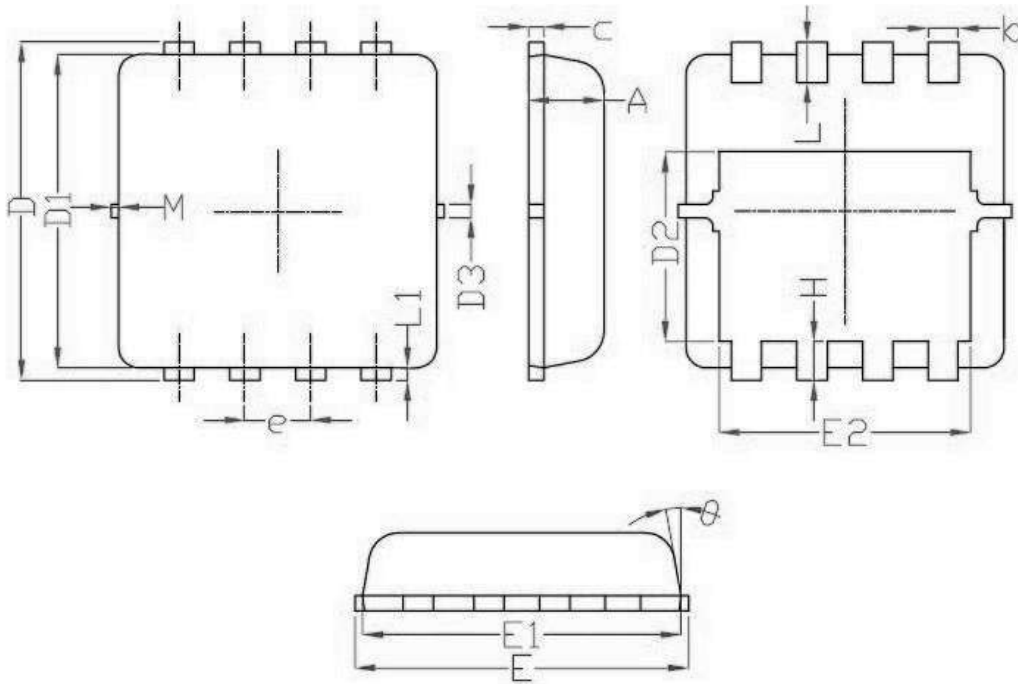


| Profile Feature | Pb-Free Assembly Profile |
|------------------------------------------------------|--------------------------|
| Temperature Min. (T_{smin}) | 150°C |
| Temperature Max. (T_{smax}) | 200°C |
| Time (t_s) from (T_{smin} to T_{smax}) | 60-120 seconds |
| Average Ramp-up Rate (t_L to t_P) | 3°C/second max. |
| Liquidous Temperature (T_L) | 217°C |
| Time (t_L) Maintained Above (T_L) | 60 – 150 seconds |
| Peak Temperature | 260°C +0°C / -5°C |
| Time (t_P) within 5°C of actual Peak Temperature | 30 seconds |
| Ramp-down Rate (T_P to T_L) | 6°C/second max |
| Time 25°C to Peak Temperature | 8 minutes max. |

➤ Ordering Information

| Part Number | Description | Quantity |
|-------------|------------------|----------|
| PAN30TV06V | DFN3X3A-EP1 Reel | 3000 pcs |

➤ Package Information (DFN3X3A-EP1)



| SYMBOLS | MILLIMETERS | | INCHES | |
|---------|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.70 | 0.85 | 0.027 | 0.034 |
| b | 0.20 | 0.40 | 0.007 | 0.016 |
| c | 0.10 | 0.25 | 0.004 | 0.010 |
| D | 3.15 | 3.45 | 0.124 | 0.136 |
| D1 | 2.90 | 3.20 | 0.114 | 0.126 |
| D2 | 1.54 | 1.98 | 0.060 | 0.080 |
| D3 | 0.10 | 0.30 | 0.004 | 0.012 |
| E | 3.15 | 3.45 | 0.124 | 0.136 |
| E1 | 3.00 | 3.25 | 0.118 | 0.128 |
| E2 | 2.29 | 2.65 | 0.090 | 0.104 |
| e | 0.65 BSC | | 0.025 BSC | |
| H | 0.28 | 0.65 | 0.011 | 0.026 |
| Θ | 0° | 14° | 0° | 14° |
| L | 0.30 | 0.50 | 0.012 | 0.020 |
| L1 | 0.13 | | 0.005 | |
| M | --- | 0.15 | --- | 0.006 |

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