# PAN30TY06Y

**N-Ch 30V Fast Switching MOSFET**

**$V_{DS}$ = 30V, $I_D$=81A ,$R_{DS(ON)}$=5.5mΩ**

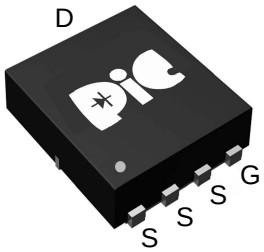
## ➢ General Description

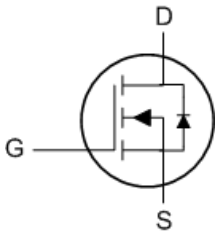
This PAN30TY06Y N-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent Rds(On) performance and efficiency for power switching and load switching application., this device also comply with the RoHS and Green Product requirement with full function reliability approved.

## ➢ Feature

- ●Super Low Gate Charge
- ●100% EAS Guaranteed
- ●Green Device Available
- ●Excellent CdV/dt effect decline
- ●Advanced high cell density Trench technology

## ➢ DFN5X6A-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℃ | 81 | A |
| Continuous Drain Current, $V_{GS}$ @ 10V[1] | $I_D$@$T_C$=100℃ | 51 | A |
| Continuous Drain Current, $V_{GS}$ @ 10V[1] | $I_D$@$T_A$=25℃ | 15 | A |
| Continuous Drain Current, $V_{GS}$ @ 10V[1] | $I_D$@$T_A$=70℃ | 12 | A |
| Pulsed Drain Current[2] | $I_{DM}$ | 160 | 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℃ | 59 | W |
| Total Power Dissipation[4] | $P_D$@$T_A$=25℃ | 2 | W |
| Storage Temperature Range | $T_{STG}$ | -55 to 150 | ℃ |
| Operating Junction Temperature Range | $T_J$ | -55 to 150 | ℃ |
| Thermal Resistance Junction-Ambient [1] | $R_{\theta JA}$ | 62 | ℃/W |
| Thermal Resistance Junction-Case[1] | $R_{\theta JC}$ | 2.1 | ℃/W |

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V , $I_D$=250uA | 30 | --- | --- | V |
| BVDSS Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25℃ , $I_D$=1mA | --- | 0.028 | --- | V/℃ |
| Static Drain-Source On-Resistance[2] | $R_{DS(ON)}$ | $V_{GS}$=10V , $I_D$=30A | --- | --- | 5.5 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=15A | --- | --- | 9 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.2 | --- | 2.5 | V |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}$ | | --- | -6.16 | --- | mV/℃ |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| Forward Transconductance | gfs | $V_{DS}$=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 , $R_G$=3.3Ω $I_D$=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[1,5] | $I_S$ | $V_G$=$V_D$=0V , Force Current | --- | --- | 81 | A |
| Pulsed Source Current[2,5] | $I_{SM}$ | | --- | --- | 160 | A |
| Diode Forward Voltage[2] | $V_{SD}$ | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$=30A , dI/dt=100A/μs , $T_J$=25℃ | --- | 14 | --- | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | --- | 5 | --- | nC |

Note :

1.Pulse width limited by maximum junction temperature.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 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°C.

5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

## ➢ Typical Characteristics

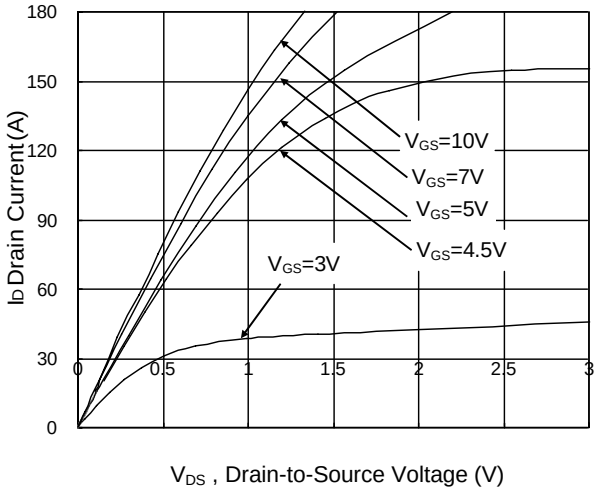



**Fig.1 Typical Output Characteristics**

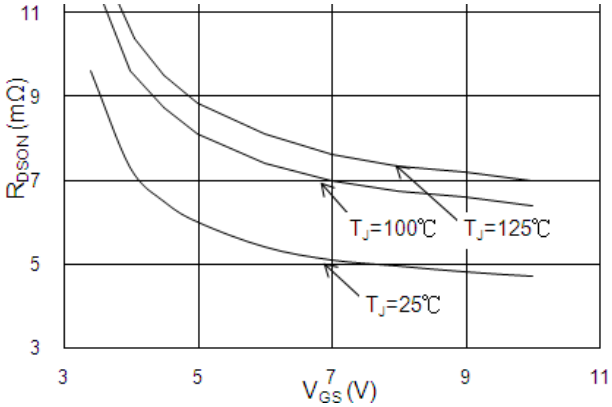



**Fig.2 On-Resistance vs. G-S Voltage**

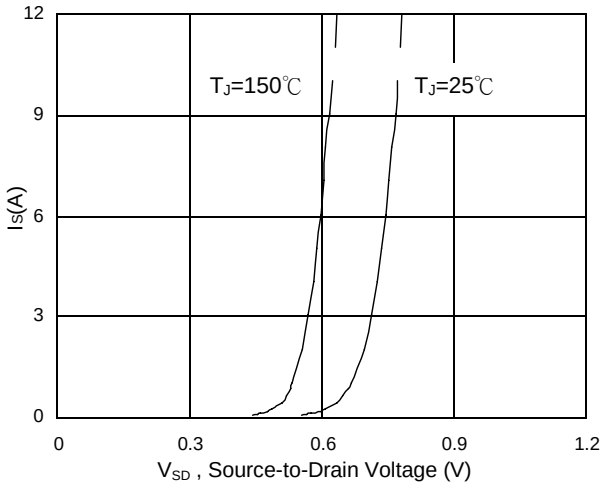



**Fig.3 Forward Characteristics of Reverse**

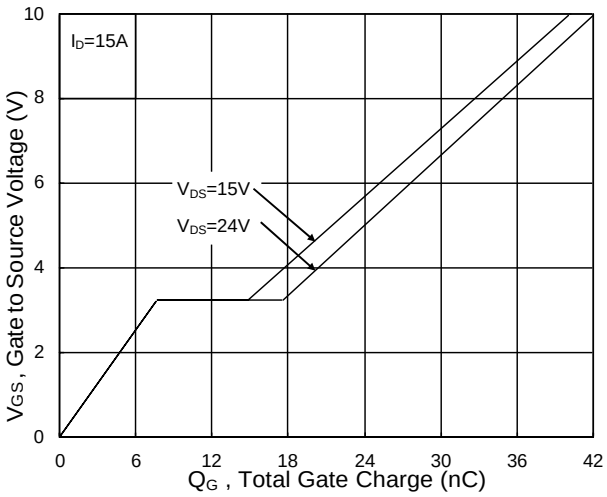



**Fig.4 Gate-Charge Characteristics**

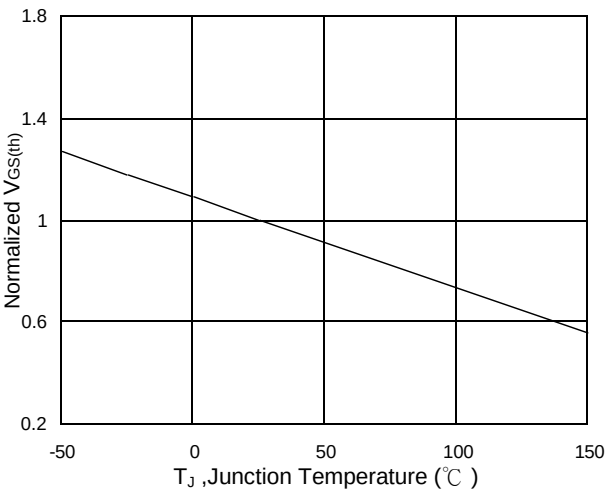



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

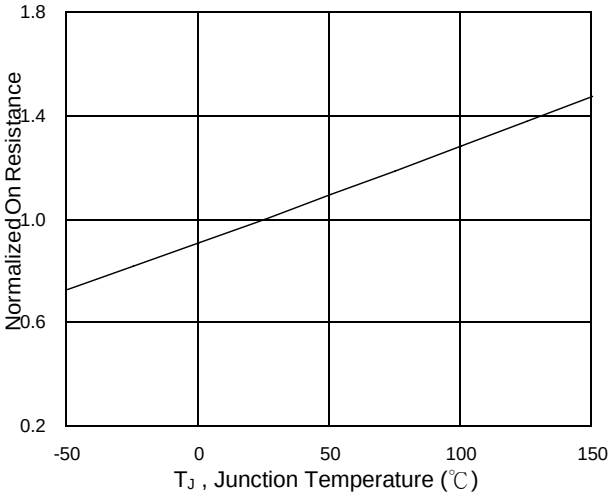



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

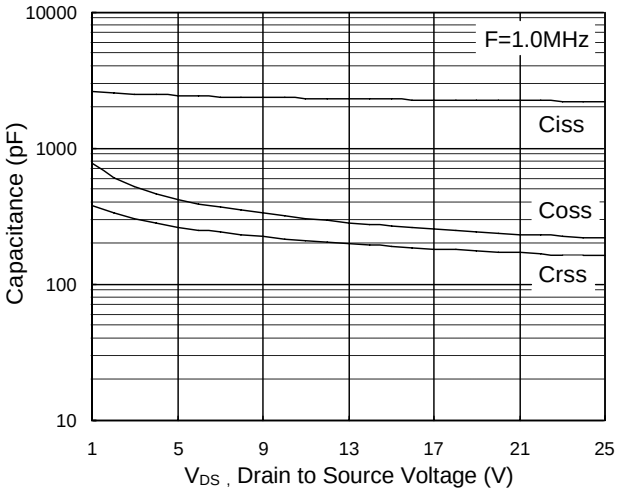



**Fig.7 Capacitance**

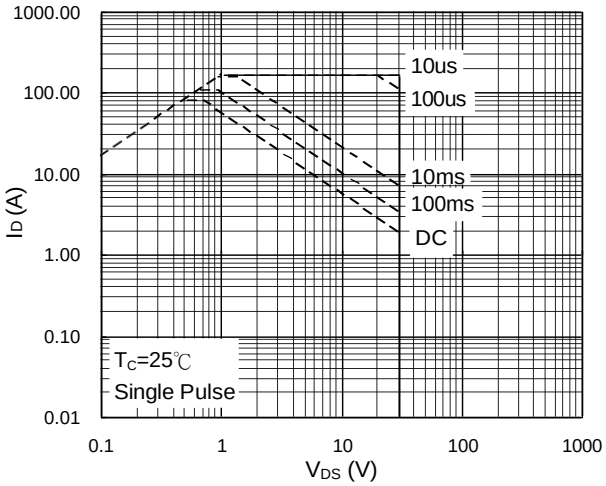



**Fig.8 Safe Operating Area**

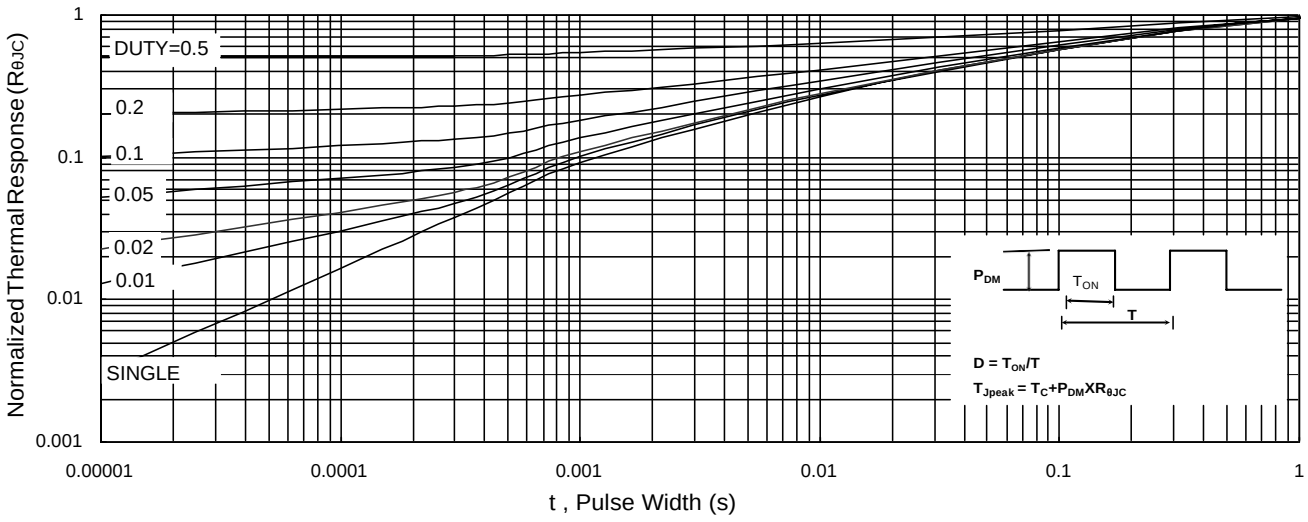



**Fig.9 Normalized Maximum Transient Thermal Impedance**

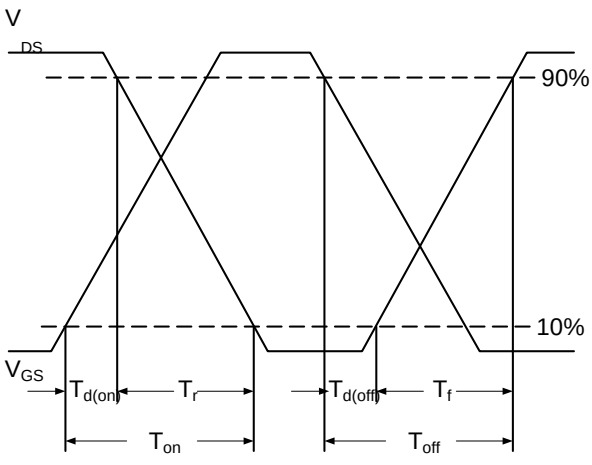



**Fig.10 Switching Time Waveform**

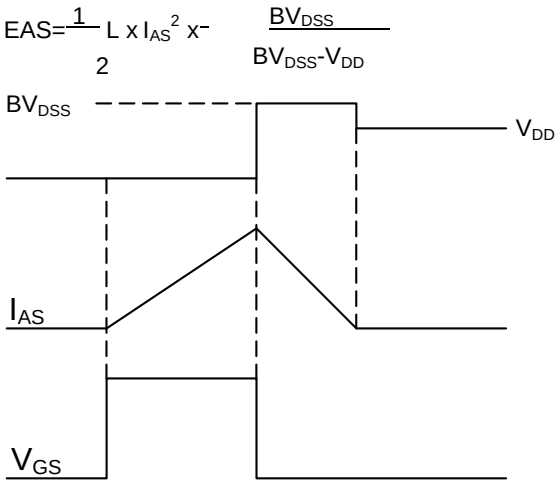
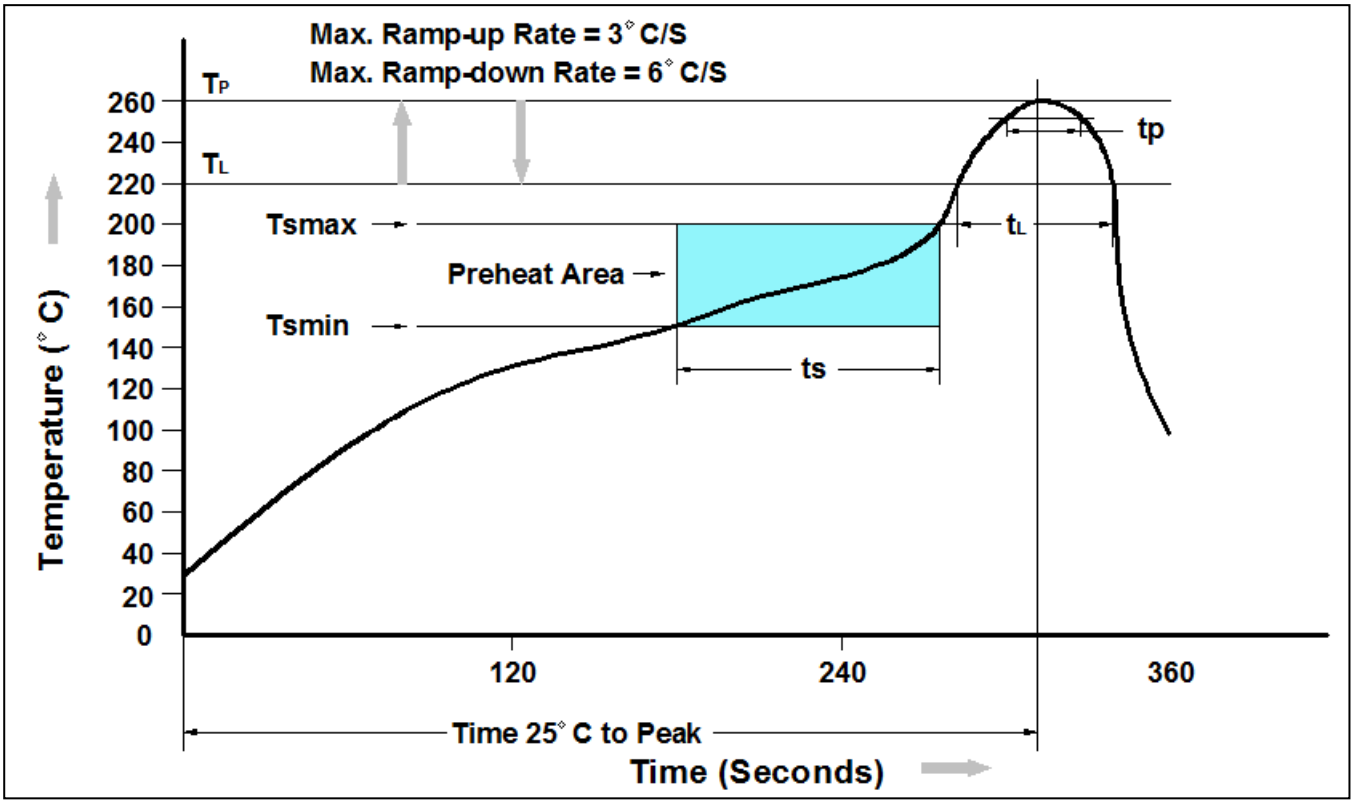



**Fig.11 Unclamped Inductive Switching Waveform**

## ➢ Recommand IR Reflow Soldering Thermal Profile

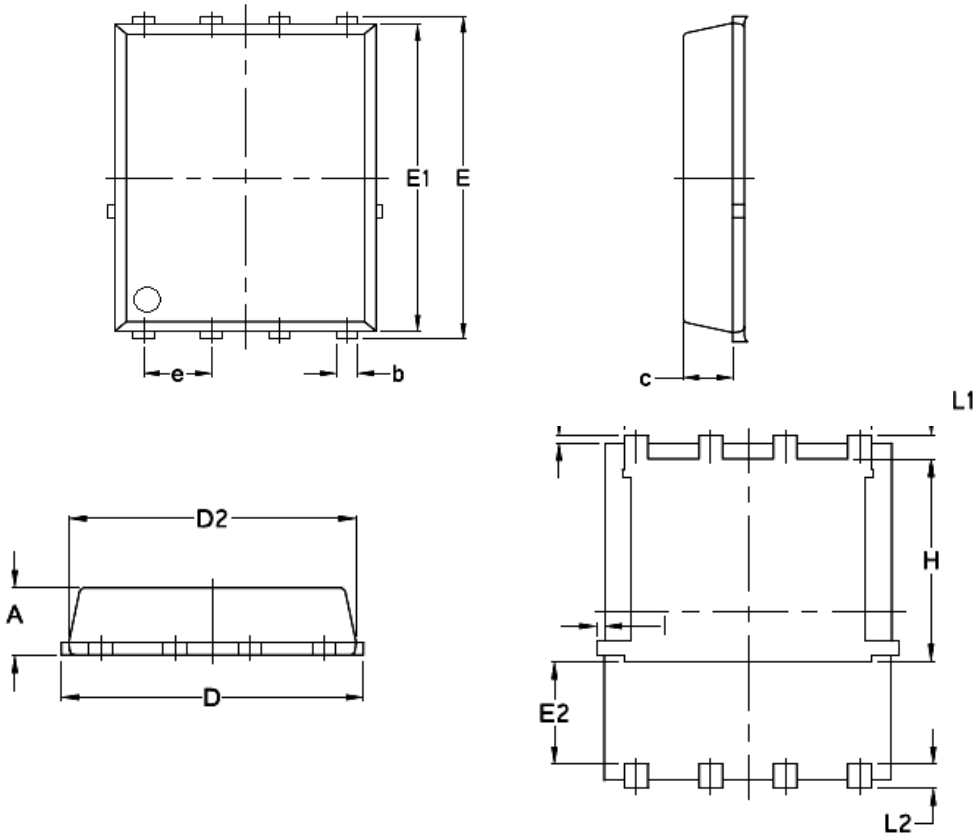



| Profile Feature | Pb-Free Assembly Profile |
|---|---|
| Temperature Min. (Tsmin) | 150°C |
| Temperature Max. (Tsmax) | 200°C |
| Time (ts) from (Tsmin to Tsmax) | 60-120 seconds |
| Average Ramp-up Rate (tL to tP) | 3°C/second max. |
| Liquidous Temperature (TL) | 217°C |
| Time (tL) Maintained Above (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 |
|---|---|---|
| PAN30TY06Y | DFN5X6A-EP1 Reel | 3000 pcs |

## ➢ Package Information ( DFN5X6A-EP1 )




| SYMBOLS | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.970 | 0.0324 | 0.0382 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| I | --- | 0.18 | --- | 0.0070 |
| E | 5.90 | 6.15 | 0.2323 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.10 | --- | 0.0433 | --- |
| e | 1.27 BSC | | 0.05 BSC | |
| H | 3.30 | 3.78 | 0.1299 | 0.1488 |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.61 | 0.0150 | 0.0240 |
| L2 | 0.38 | 0.71 | 0.0150 | 0.0279 |

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