

Description

The PNM6N30V6A uses advanced trench technology to provide excellent $R_{DS(on)}$, low gate charge. This device is suitable for use as a load switch or in PWM applications.

MOSFET Product Summary

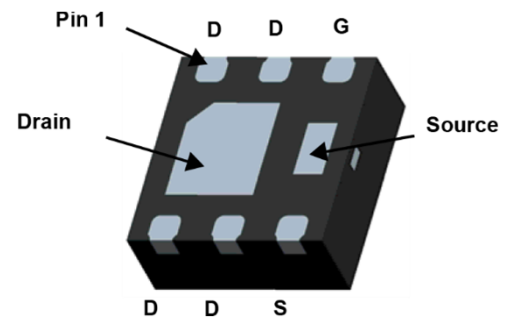
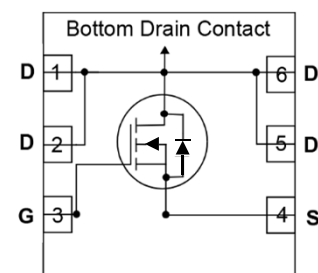
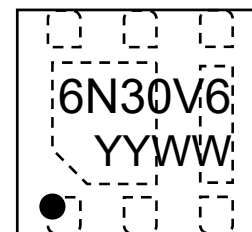
| $V_{DS}(V)$ | $R_{DS(on)}(m\Omega)$ | $I_D(A)$ |
|-------------|-----------------------|----------|
| 30 | 24.5@ $V_{GS} = 10V$ | 6.0 |
| | 28@ $V_{GS} = 4.5V$ | |
| | 34@ $V_{GS} = 2.5V$ | |

Feature

- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

Applications

- PWM applications
- Load switch
- Power management
- DC-DC Converters
- Wireless Chargers


Bottom View

Circuit Diagram

Marking (Top View)

Absolute maximum rating@25°C

| Rating | Symbol | Value | Units |
|--|-----------------|-------------------|--------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Drain Current-Continuous ¹⁾ | I_D | $T_C=25^\circ C$ | 6.0 |
| | | $T_C=100^\circ C$ | 3.75 |
| Pulsed Drain Current ²⁾ | I_{DM} | 36.4 | A |
| Total Power Dissipation ³⁾ | P_D | 1.9 | W |
| Avalanche Current ⁴⁾ | I_{AS} | 15.67 | A |
| Avalanche Energy ⁴⁾ | E_{AS} | 12.29 | mJ |
| Thermal Resistance, Junction-case ⁵⁾ | $R_{\theta JC}$ | 11.17 | $^\circ C/W$ |
| Thermal Resistance Junction-to-Ambient ⁵⁾ | $R_{\theta JA}$ | 66.29 | $^\circ C/W$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55~+150 | $^\circ C$ |

Electrical characteristics per line@25°C (unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|--------------|---|------|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 24V, V_{GS} = 0V$ | - | - | 1.0 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS} = \pm 12V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 0.5 | 1.0 | 1.5 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 5A$ | - | 24.5 | 40 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 4A$ | - | 28 | 42 | |
| | | $V_{GS} = 2.5V, I_D = 3A$ | - | 34 | 52 | |
| Dynamic Characteristics⁶⁾ | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0MHz$ | - | 575 | - | pF |
| Output Capacitance | C_{oss} | | - | 46 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 41 | - | |
| Switching Characteristics⁶⁾ | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS} = 5V, V_{GS} = 4.5V,$ $R_G = 10\Omega, I_D = 4A$ | - | 3.03 | - | ns |
| Turn-on Rise Time | t_r | | - | 9.8 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 26.1 | - | |
| Turn-Off Fall Time | t_f | | - | 13.2 | - | |
| Total Gate Charge | Q_g | $V_{DS} = 15V, V_{GS} = 4.5V,$ $I_D = 4A$ | - | 6.4 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 0.8 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 1.6 | - | |
| Gate Resistance | R_g | $V_{GS}=0V, V_{DS}=0V, f=1MHz$ | - | 1.93 | - | Ω |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS} = 0V, I_S = 3A$ | - | 0.83 | 1.3 | V |

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse width limited by maximum junction temperature($T_{J_Max}=150^\circ C$).
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. This single-pulse measurement was taken under the following condition ($L=100uH, V_{GS}=10V, V_{DS}=50V$)while it's value is limited by $T_{J_Max}=150^\circ C$.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
6. Guaranteed by design, not subject to production.

Typical Characteristics

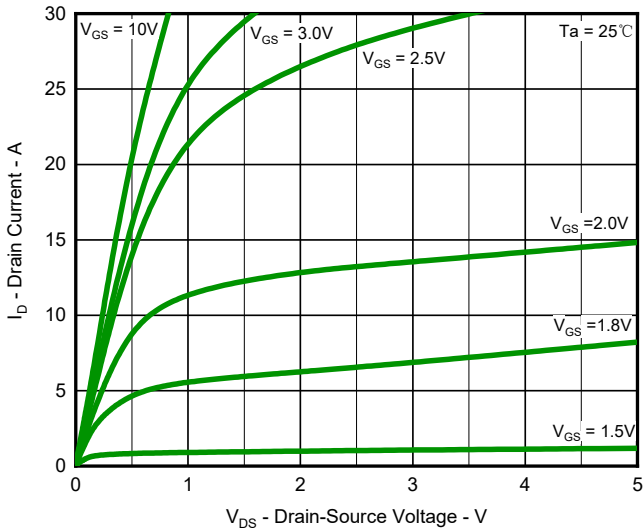


Fig.1 Output Characteristics

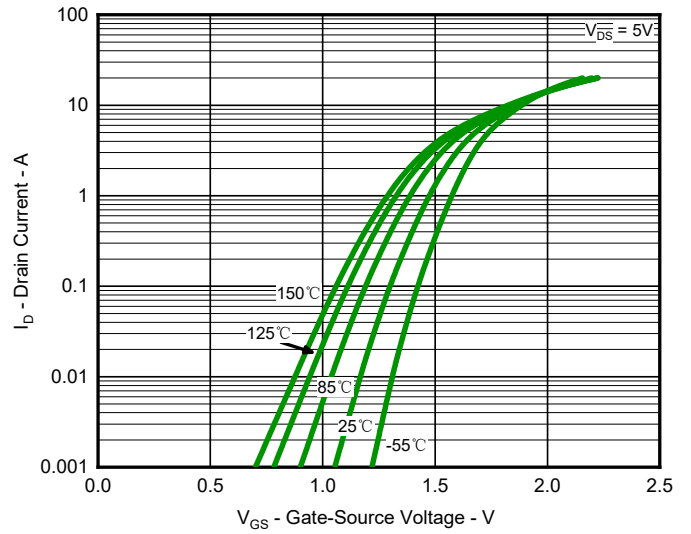


Fig.2 Typical Transfer Characteristic

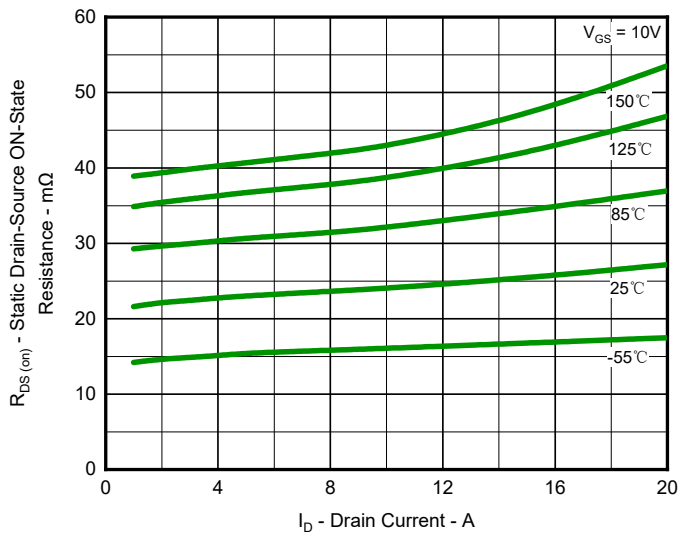


Fig.3 Typical On-Resistance vs Drain Current and Temperature

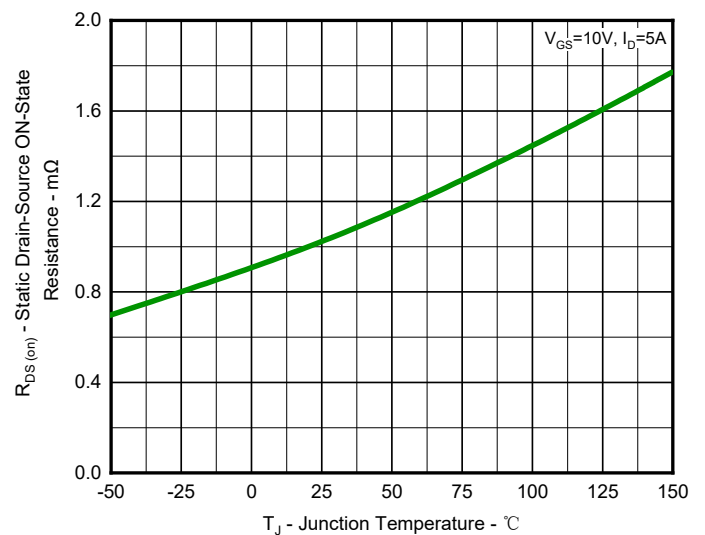


Fig.4 On-Resistance Variation with Temperature

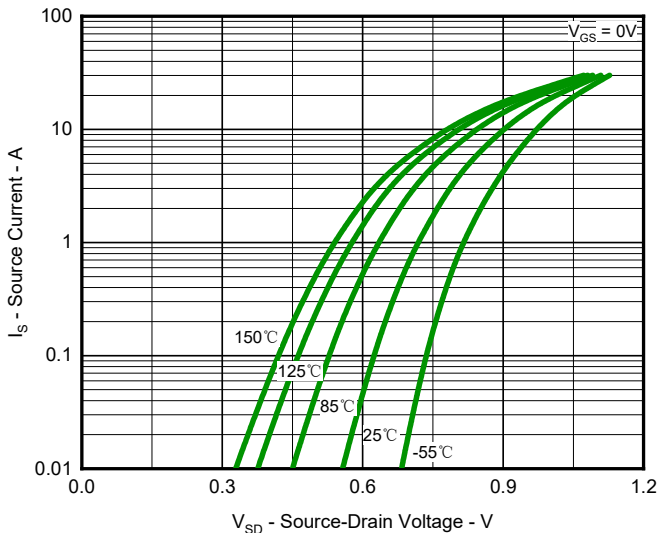


Fig.5 Diode Forward Voltage vs. Current

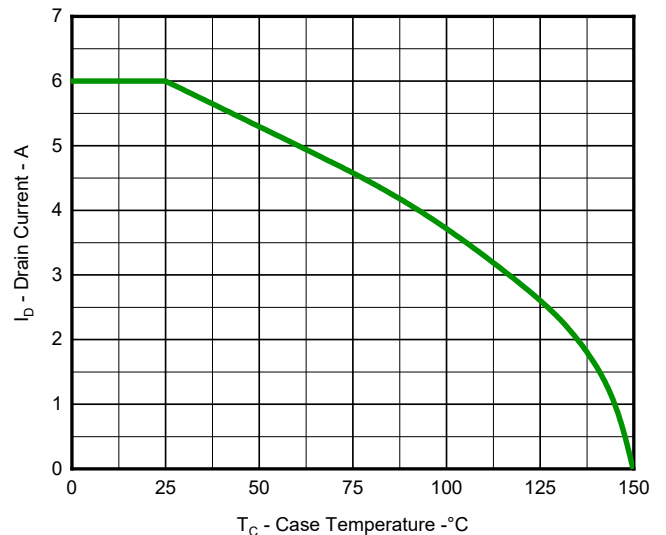


Fig.6 Maximum Drain Current vs. Case Temperature

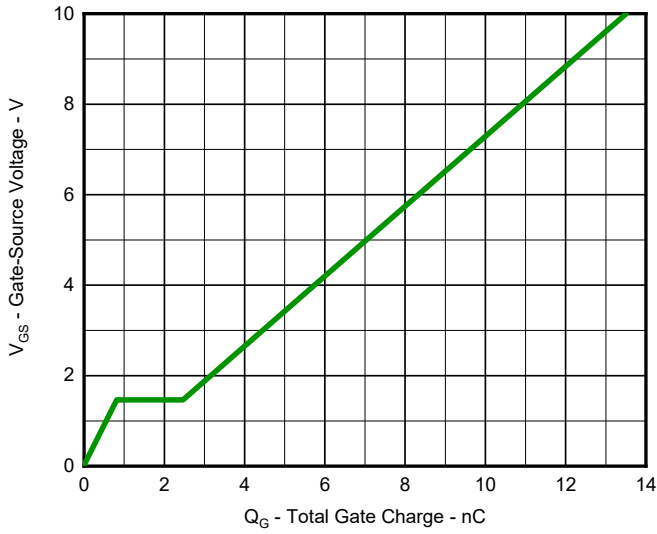


Fig.7 Gate Charge Characteristics

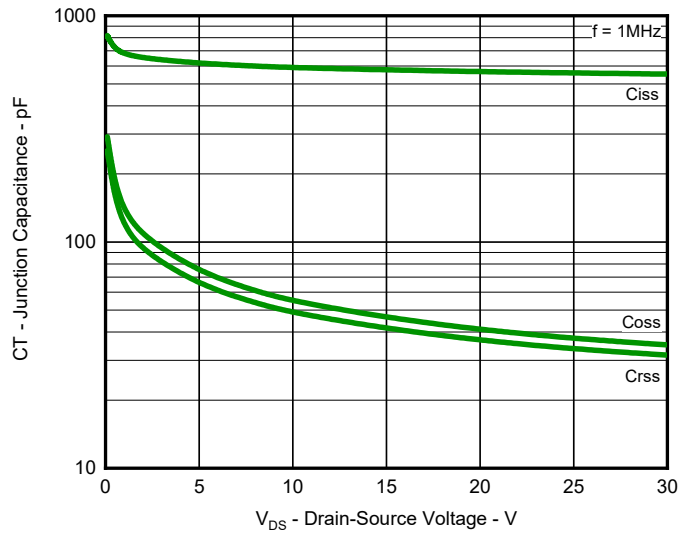


Fig.8 Typical Junction Capacitance

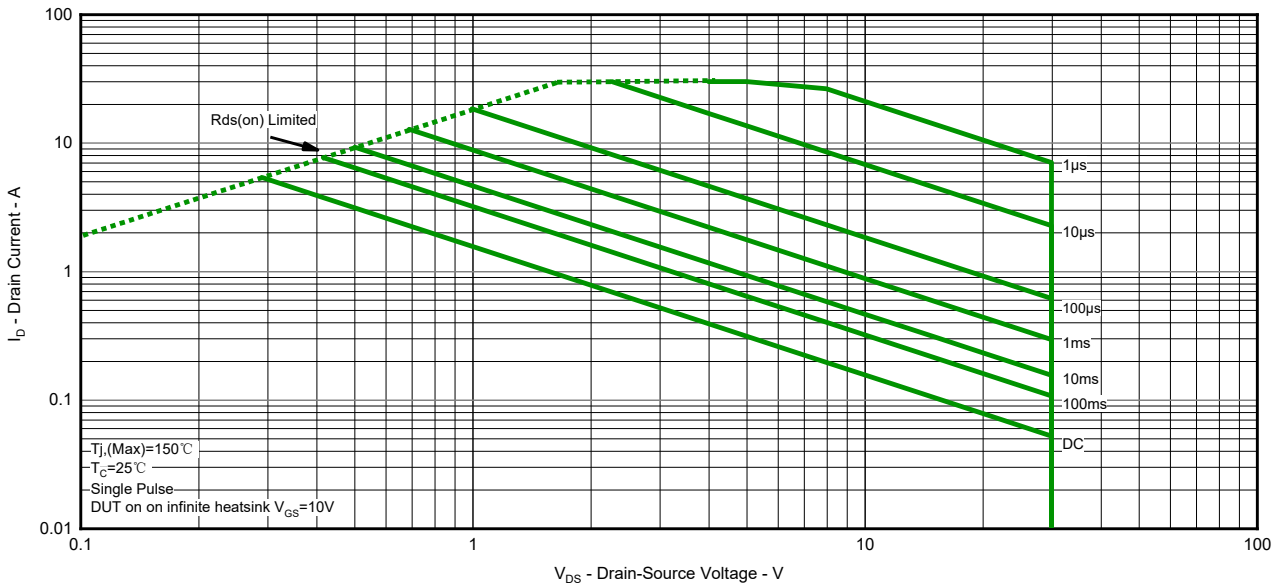


Fig.9 Safe Operation Area

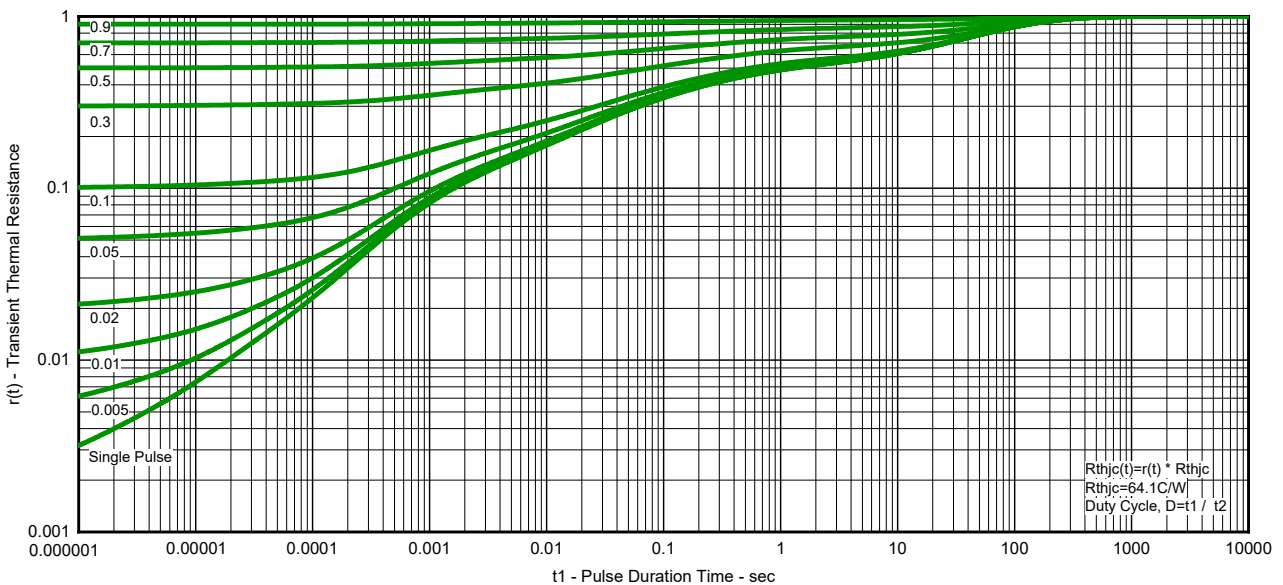
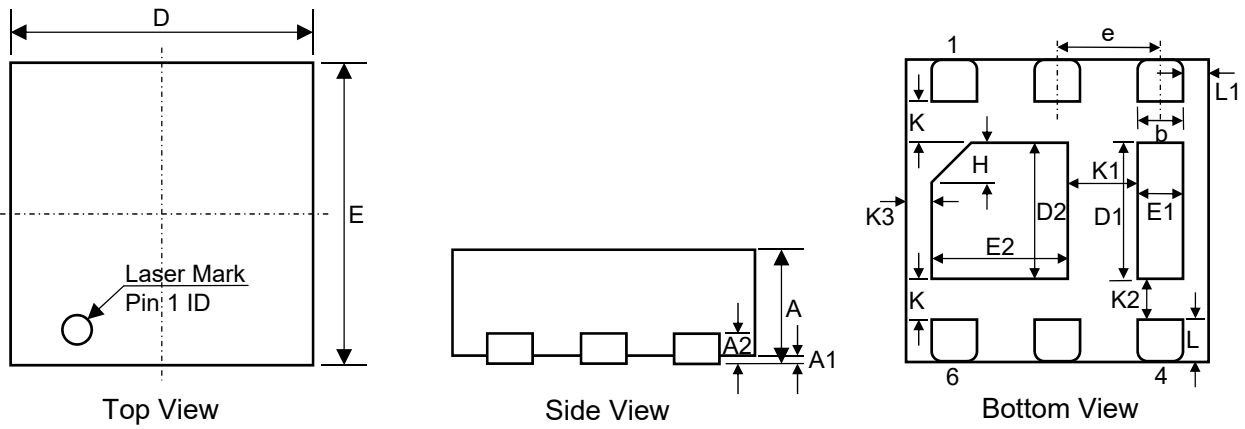
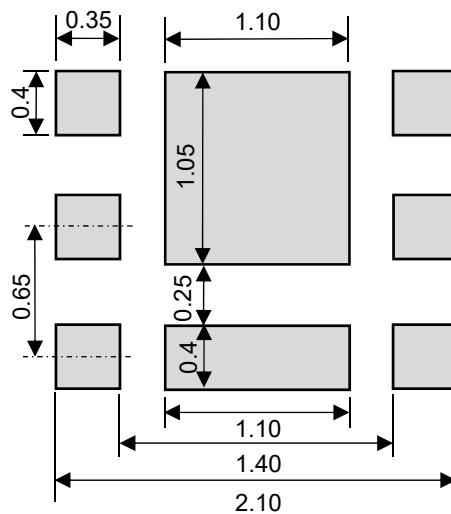


Fig.10 Transient Thermal Resistance

Product Dimension (DFN2020-6L)



| Dim | Millimeters | | Inches | | Dim | Millimeters | | Inches | |
|-----|-------------|------|------------|-------|-----|-------------|------|------------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 0.70 | 0.80 | 0.028 | 0.031 | E2 | 0.85 | 1.05 | 0.033 | 0.041 |
| A1 | 0.00 | 0.05 | 0.000 | 0.002 | e | 0.65 BSC. | | 0.026 BSC. | |
| A2 | 0.203 Ref. | | 0.008 Ref. | | K | 0.25 Ref. | | 0.010 Ref. | |
| b | 0.25 | 0.35 | 0.010 | 0.014 | K1 | 0.35 Ref. | | 0.014 Ref. | |
| D | 1.90 | 2.10 | 0.075 | 0.083 | K2 | 0.25 Ref. | | 0.010 Ref. | |
| D1 | 0.70 | 0.90 | 0.028 | 0.035 | K3 | 0.20 Ref. | | 0.008 Ref. | |
| D2 | 0.70 | 0.90 | 0.028 | 0.035 | H | 0.25 Ref. | | 0.010 Ref. | |
| E | 1.90 | 2.10 | 0.075 | 0.083 | L | 0.30 | 0.40 | 0.012 | 0.016 |
| E1 | 0.20 | 0.40 | 0.008 | 0.016 | L1 | 0.20 Ref. | | 0.008 Ref. | |



Unit:mm

Suggested PCB Layout

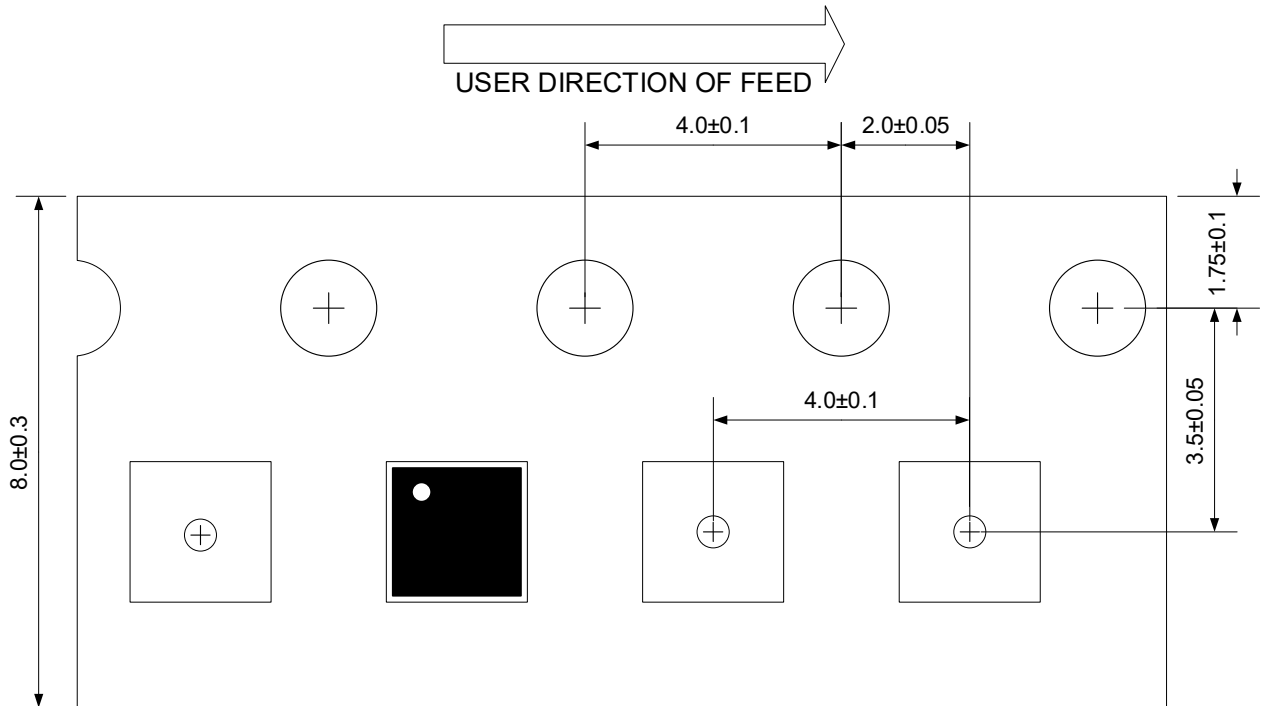
N-Channel MOSFET

PNM6N30V6A

Ordering Information


| Device | Package | Reel | Shipping |
|------------|----------------------|------|--------------------|
| PNM6N30V6A | DFN2020-6L (Pb-Free) | 7" | 3000 / Tape & Reel |

Load With Information



Unit:mm


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