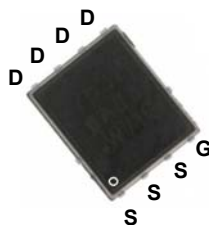
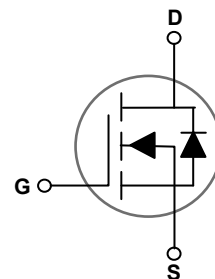


Main Product Characteristics

| | |
|---------------|-------------------------|
| $V_{(BR)DSS}$ | 30V |
| $R_{DS(ON)}$ | $4m\Omega @ V_{GS}=10V$ |
| I_D | 90A |



PPAK5X6



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



Description

The SSFP3094 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise specified)

| Parameter | Symbol | Rating | Unit |
|--|-----------|-------------|---------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current – Continuous ($T_C=25^\circ C$) | I_D | 90 | A |
| Drain Current – Continuous ($T_C=100^\circ C$) | | 57 | A |
| Drain Current – Pulsed ¹ | I_{DM} | 360 | A |
| Single Pulse Avalanche Energy ² | E_{AS} | 125 | mJ |
| Single Pulse Avalanche Current ² | I_{AS} | 50 | A |
| Power Dissipation ($T_C=25^\circ C$) | P_D | 115 | W |
| Power Dissipation – Derate above $25^\circ C$ | | 0.77 | W/ $^\circ C$ |
| Storage Temperature Range | T_{STG} | -55 to +175 | $^\circ C$ |
| Operating Junction Temperature Range | T_J | -55 to +175 | $^\circ C$ |

Thermal Characteristics

| Parameter | Symbol | Typ. | Max. | Unit |
|--|-----------------|------|------|--------------|
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | --- | 62 | $^\circ C/W$ |
| Thermal Resistance Junction to Case | $R_{\theta JC}$ | --- | 1.3 | $^\circ C/W$ |

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|--|------------------------------|--|------|------|-----------|---------------------|
| Static State Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 30 | --- | --- | V |
| BV_{DSS} Temperature Coefficient | $\Delta BV_{DSS}/\Delta T_J$ | Reference to 25°C , $I_D=1\text{mA}$ | --- | 0.04 | --- | $V/^\circ\text{C}$ |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$ | --- | --- | 10 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| Static Drain-Source On-Resistance ³ | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=20A$ | --- | 3 | 4 | $m\Omega$ |
| | | $V_{GS}=4.5V, I_D=10A$ | --- | 4.2 | 5.5 | $m\Omega$ |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1 | 1.6 | 2.5 | V |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}$ | | --- | -4 | --- | $mV/^\circ\text{C}$ |
| Forward Transconductance | g_{fs} | $V_{DS}=10V, I_D=12A$ | --- | 20 | --- | S |
| Dynamic Characteristics | | | | | | |
| Total Gate Charge ^{3, 4} | Q_g | $V_{DS}=15V, V_{GS}=4.5V, I_D=20A$ | --- | 24 | --- | nC |
| Gate-Source Charge ^{3, 4} | Q_{gs} | | --- | 4.2 | --- | |
| Gate-Drain Charge ^{3, 4} | Q_{gd} | | --- | 13 | --- | |
| Turn-On Delay Time ^{3, 4} | $T_{d(on)}$ | $V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=15A$ | --- | 12.6 | --- | nS |
| Rise Time ^{3, 4} | T_r | | --- | 19.5 | --- | |
| Turn-Off Delay Time ^{3, 4} | $T_{d(off)}$ | | --- | 42.8 | --- | |
| Fall Time ^{3, 4} | T_f | | --- | 13.2 | --- | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$ | --- | 2200 | --- | pF |
| Output Capacitance | C_{oss} | | --- | 475 | --- | |
| Reverse Transfer Capacitance | C_{rss} | | --- | 340 | --- | |
| Gate Resistance | R_g | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | --- | 2 | --- | Ω |
| Guaranteed Avalanche Energy | | | | | | |
| Single Pulse Avalanche Energy | EAS | $V_{DD}=25V, L=0.1\text{mH}, I_{AS}=25A$ | 31 | --- | --- | mJ |
| Drain-Source Diode Characteristics | | | | | | |
| Continuous Source Current | I_S | $V_G=V_D=0V, \text{Force Current}$ | --- | --- | 90 | A |
| Pulsed Source Current ³ | I_{SM} | | --- | --- | 360 | A |
| Diode Forward Voltage ³ | V_{SD} | $V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$ | --- | --- | 1 | V |
| Reverse Recovery Time | t_{rr} | $V_{GS}=30V, I_S=1A, di/dt=100A/\mu S, T_J=25^\circ\text{C}$ | --- | 258 | --- | nS |
| Reverse Recovery Charge | Q_{rr} | | --- | 324 | --- | nC |

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=50A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu S$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

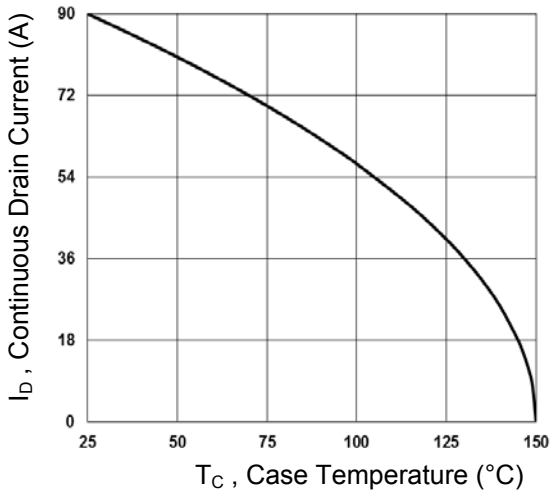


Fig.1 Continuous Drain Current vs. T_c

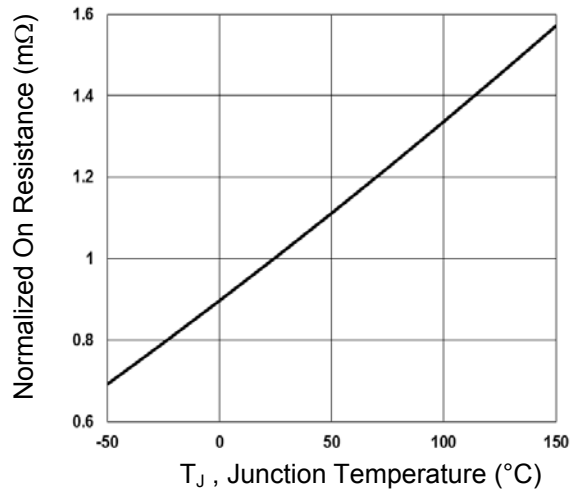


Fig.2 Normalized $R_{DS(ON)}$ vs. T_j

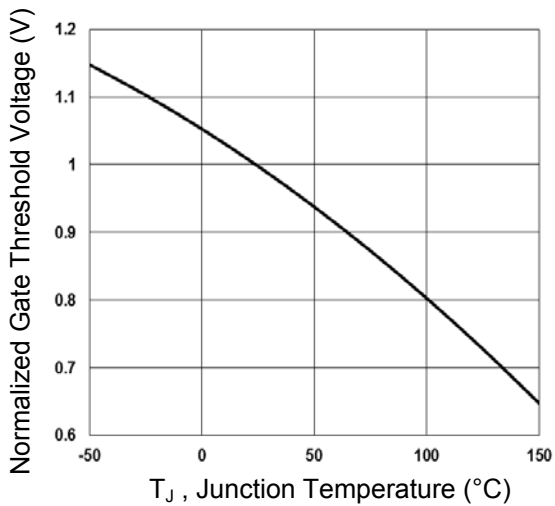


Fig.3 Normalized V_{th} vs. T_j

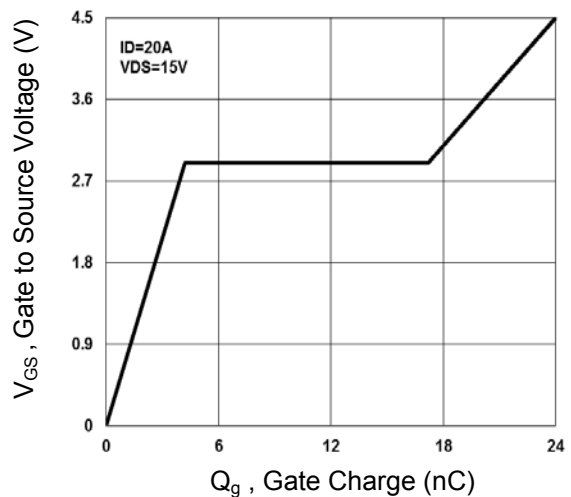


Fig.4 Gate Charge Waveform

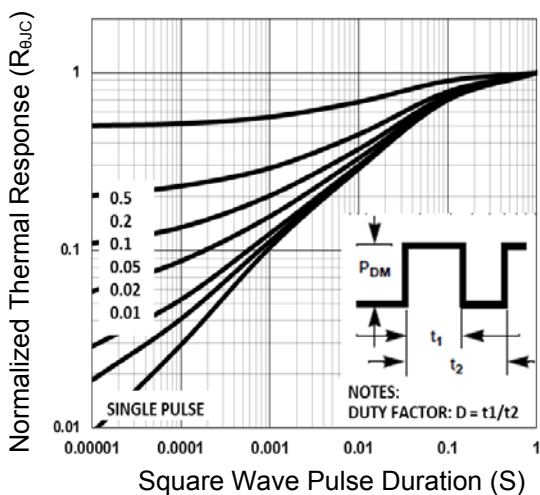


Fig.5 Normalized Transient Impedance

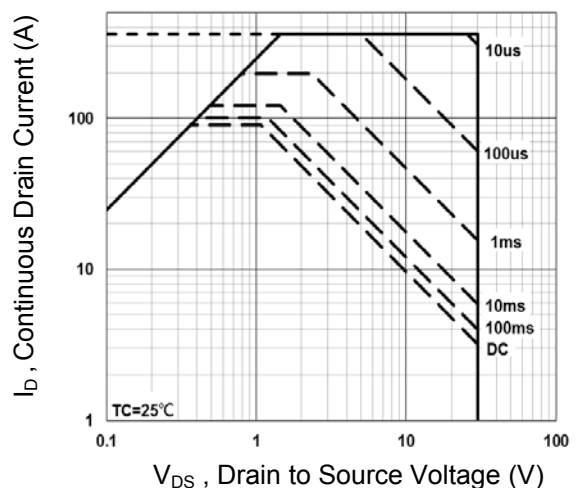


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

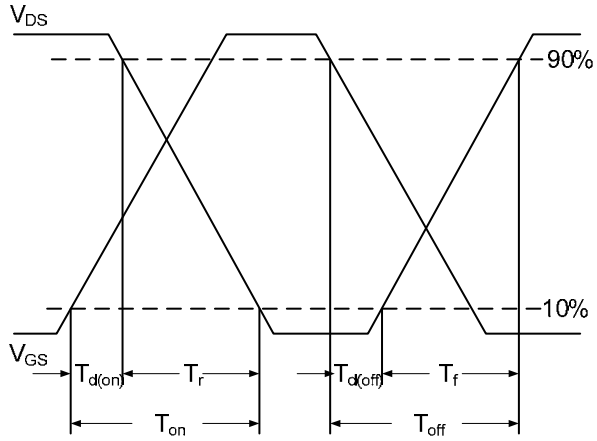


Fig.7 Switching Time Waveform

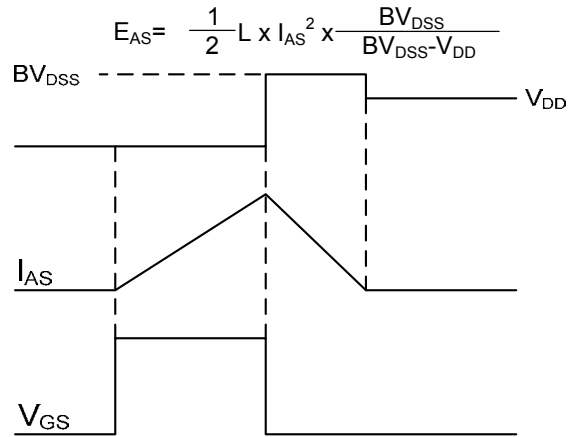
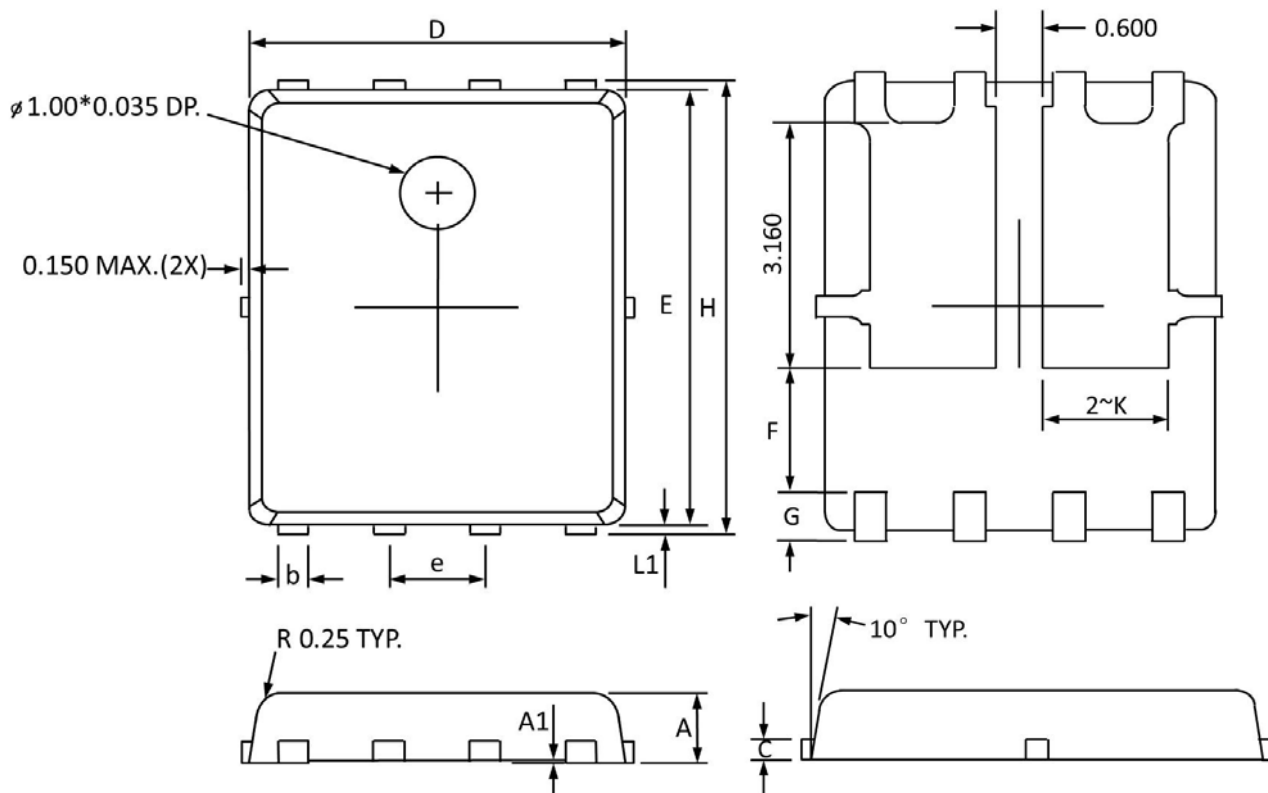


Fig.8 E_{AS} Waveform

Package Outline Dimensions

PPAK5X6



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.800 | 1.000 | 0.032 | 0.039 |
| A1 | 0.000 | 0.005 | 0.000 | 0.000 |
| b | 0.350 | 0.490 | 0.014 | 0.019 |
| C | 0.254 Ref | | 0.254 Ref | |
| D | 4.900 | 5.100 | 0.193 | 0.200 |
| E | 5.700 | 5.900 | 0.225 | 0.232 |
| e | 1.27 BSC | | 1.27 BSC | |
| F | 1.600 Ref | | 1.600 Ref | |
| G | 0.600 Ref | | 0.600 Ref | |
| H | 5.950 | 6.200 | 0.235 | 0.244 |
| L1 | 0.100 | 0.180 | 0.004 | 0.007 |
| K | 1.600 Ref | | 1.600 Ref | |