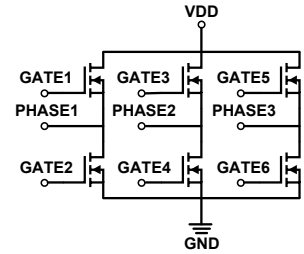
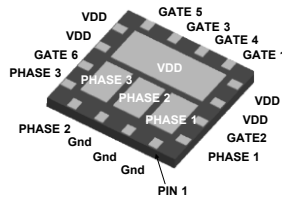


Main Product Characteristics

| | |
|--------------|-------------|
| BV_{DSS} | 30V |
| $R_{DS(ON)}$ | 18mΩ (max.) |
| I_D | 23A |



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 GSMP0324 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 ($T_c=25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Max. | Unit |
|--|-----------------|-------------|------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Drain Current-Continuous ($T_c=25^\circ\text{C}$) | I_D | 23 | A |
| Drain Current-Continuous ($T_c=100^\circ\text{C}$) | | 14.5 | |
| Drain Current-Pulsed ¹ | I_{DM} | 92 | A |
| Single Pulse Avalanche Energy ² | E_{AS} | 18 | mJ |
| Single Pulse Avalanche Current ² | I_{AS} | 19 | A |
| Power Dissipation ($T_c=25^\circ\text{C}$) | P_D | 15.4 | W |
| Power Dissipation-Derate above 25°C | | 0.12 | |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62 | °C/W |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 8.1 | °C/W |
| Operating Junction Temperature Range | T_J | -55 To +150 | °C |
| Storage Temperature Range | T_{STG} | -55 To +150 | °C |

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|------------------------------|---|------|------|-----------|------------------------|
| On/Off 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 , $I_D=1mA$ | - | 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 | |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Static Drain-Source On-Resistance ³ | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=12A$ | - | 13.5 | 18 | m Ω |
| | | $V_{GS}=4.5V, I_D=8A$ | - | 18.5 | 24 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.2 | 1.6 | 2.5 | V |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}$ | | - | -4 | - | mV/ $^{\circ}\text{C}$ |
| Forward Transconductance | g_{fs} | $V_{DS}=10V, I_D=6A$ | - | 8 | - | S |
| Dynamic and Switching Characteristics | | | | | | |
| Total Gate Charge ^{3,4} | Q_g | $V_{DS}=15V, I_D=10A,$ $V_{GS}=10V$ | - | 5.2 | 10 | nC |
| Gate-Source Charge ^{3,4} | Q_{gs} | | - | 0.6 | 1.2 | |
| Gate-Drain Charge ^{3,4} | Q_{gd} | | - | 2.0 | 4.0 | |
| Turn-On Delay Time ^{3,4} | $t_{d(on)}$ | $V_{DD}=15V, R_G=6\Omega,$ $V_{GS}=10V, I_D=1A$ | - | 2.8 | 5.0 | nS |
| Rise Time ^{3,4} | t_r | | - | 7.2 | 14 | |
| Turn-Off Delay Time ^{3,4} | $t_{d(off)}$ | | - | 15.8 | 30 | |
| Fall Time ^{3,4} | t_f | | - | 4.6 | 9 | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V,$ $F=1MHz$ | - | 370 | 740 | pF |
| Output Capacitance | C_{oss} | | - | 70 | 140 | |
| Reverse Transfer Capacitance | C_{rss} | | - | 50 | 100 | |
| Gate Resistance | R_g | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | - | 2.2 | 4.5 | Ω |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| Continuous Source Current | I_s | $V_G=V_D=0V, \text{Force Current}$ | - | - | 23 | A |
| Pulsed Source Current ³ | I_{SM} | | - | - | 46 | 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} | $V_{GS}=0V, I_s=10A,$ $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$ | - | - | - | nS |
| Reverse Recovery Charge | Q_{rr} | | - | - | - | nC |

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=35A, R_G=25\Omega$, starting $T_J=25^{\circ}\text{C}$.
3. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operation temperature.

Typical Electrical and Thermal Characteristic Curves

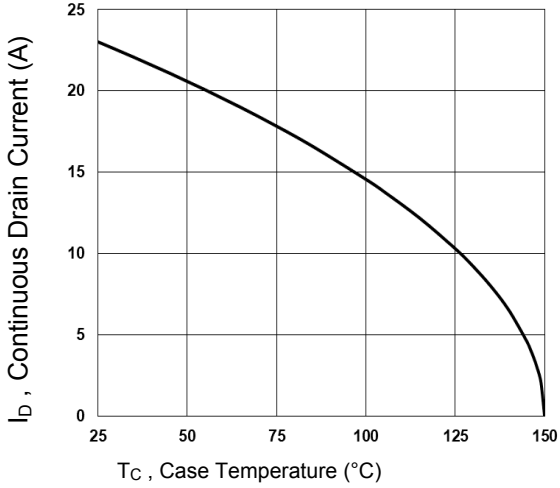


Fig.1 Continuous Drain Current vs. Tc

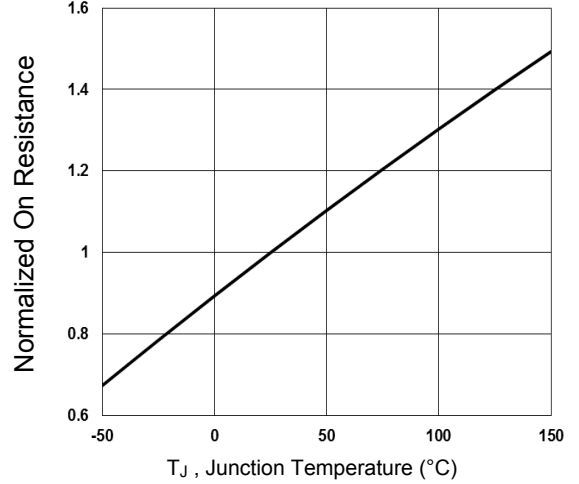


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

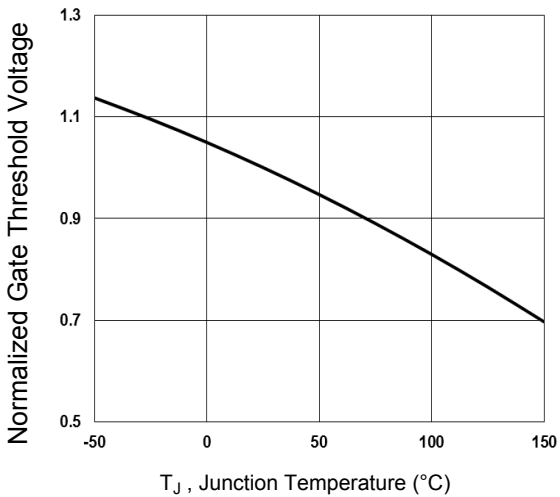


Fig.3 Normalized V_{th} vs. T_J

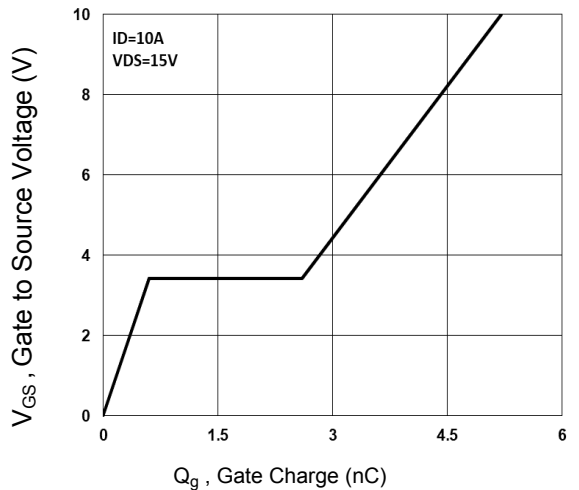


Fig.4 Gate Charge Waveform

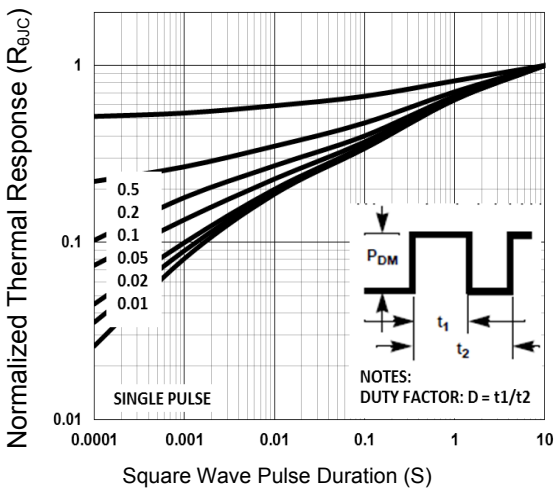


Fig.5 Normalized Transient Impedance

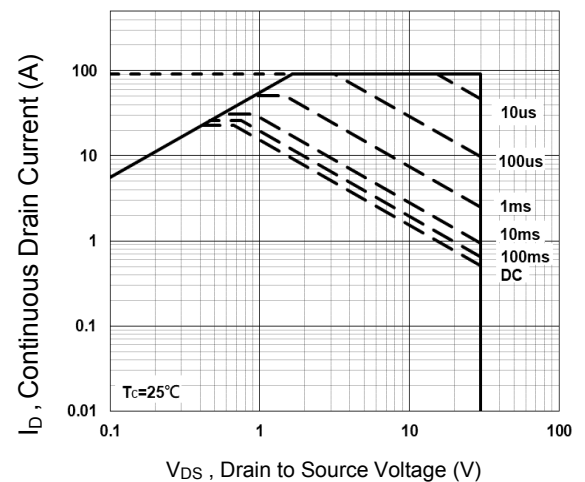


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

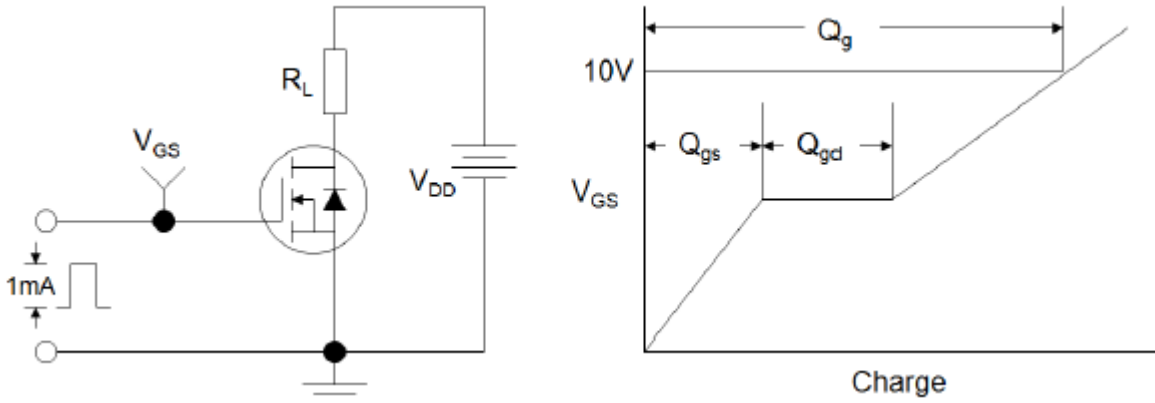


Figure 7. Gate Charge Test Circuit & Waveform

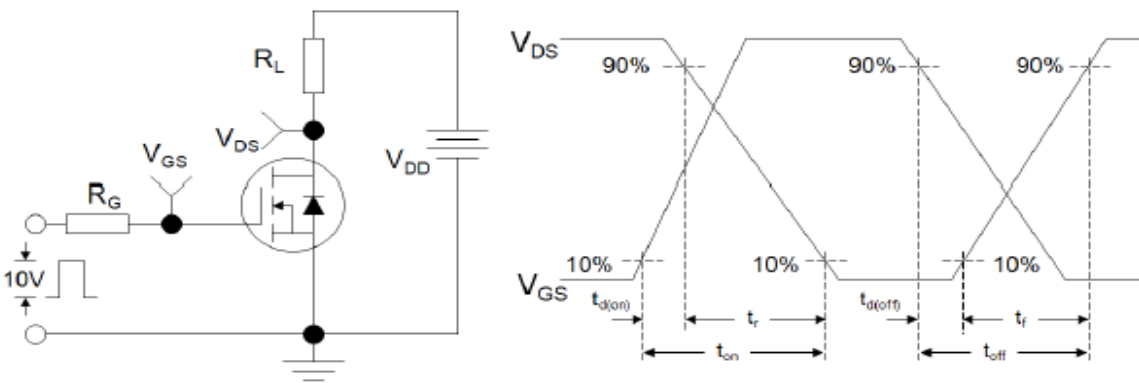


Figure 8. Resistive Switching Test Circuit & Waveforms

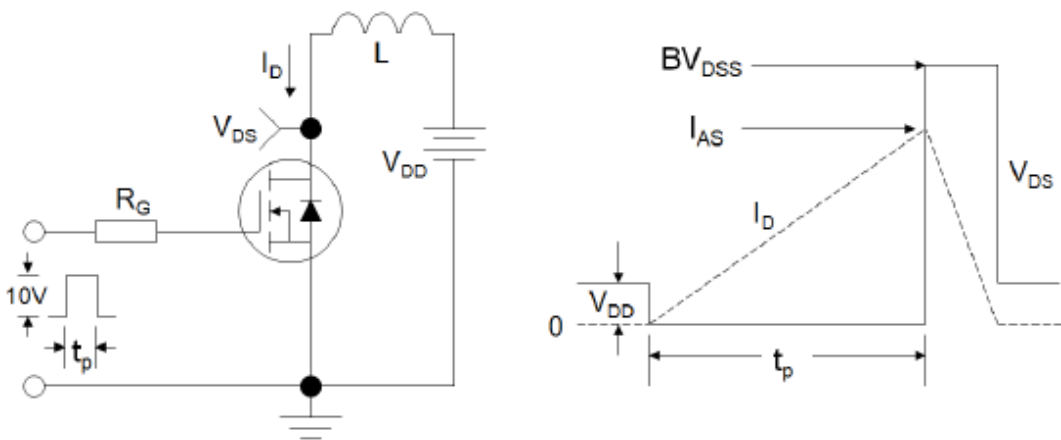
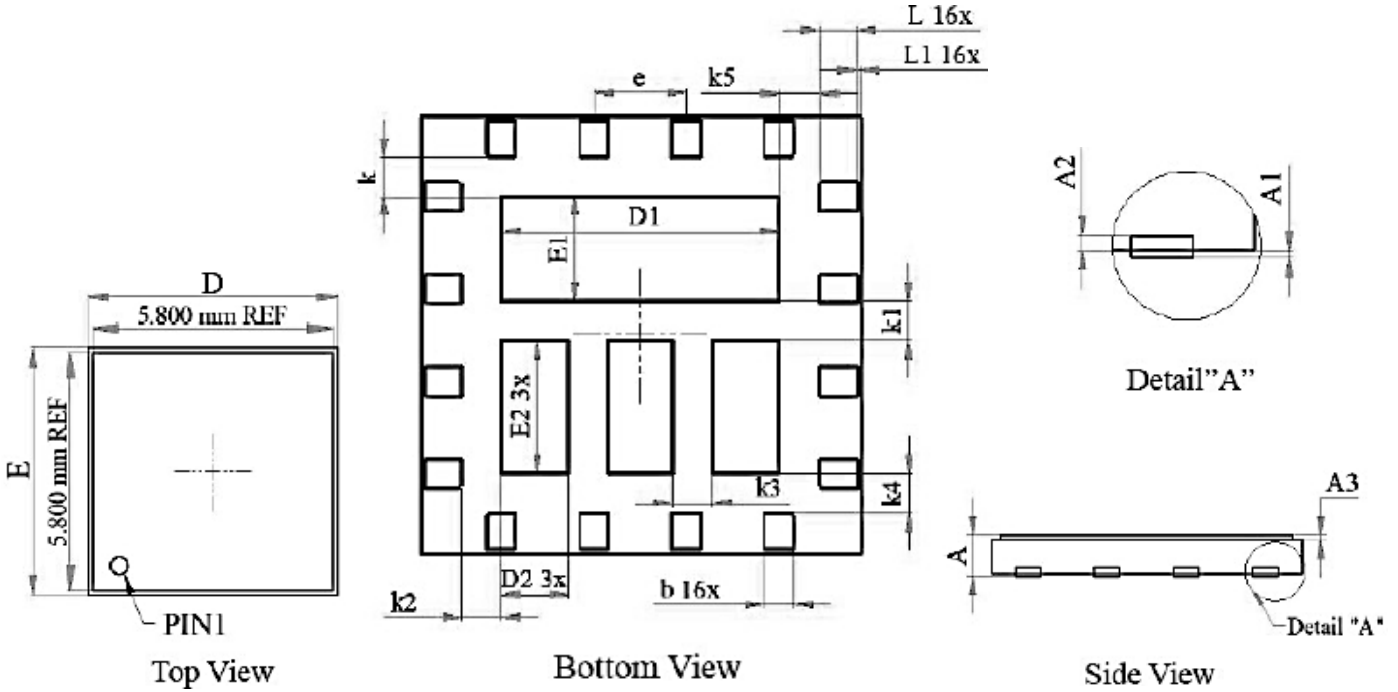


Figure 9. E_{AS} Circuit & Waveforms

Package Outline Dimensions

DFN6x6



| Symbol | Dimensions In Millimeters | | | Symbol | Dimensions In Millimeters | | |
|--------|---------------------------|--------|-------|--------|---------------------------|--------|-------|
| | MIN | Normal | MAX | | MIN | Normal | MAX |
| A | 0.530 | --- | 0.600 | b | 0.350 | 0.400 | 0.450 |
| A1 | --- | --- | 0.005 | L | 0.450 | 0.500 | 0.550 |
| A2 | 0.030 | --- | 0.100 | L1 | 0.010 | 0.050 | 0.090 |
| A3 | 0.050 | --- | 0.100 | k | 0.550 REF | | |
| D | 5.900 | 6.000 | 6.100 | k1 | 0.550 REF | | |
| E | 5.900 | 6.000 | 6.100 | k2 | 0.550 REF | | |
| D1 | 3.700 | 3.800 | 3.900 | k3 | 0.550 REF | | |
| E1 | 1.325 | 1.425 | 1.525 | k4 | 0.550 REF | | |
| D2 | 0.800 | 0.900 | 1.000 | k5 | 0.550 REF | | |
| E2 | 1.725 | 1.825 | 1.925 | e | 1.27 BSC | | |

Recommended Pad Layout

(Unit in MM)

