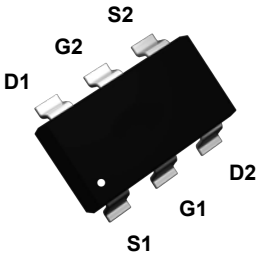
# GSFK0501E

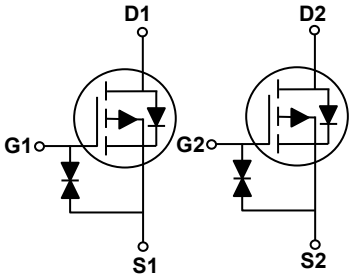
**50V Dual P-Channel MOSFETs**

## Main Product Characteristics

| | |
|---|---|
| $BV_{DSS}$ | -50V |
| $R_{DS(ON)}$ | 2.6Ω @-10V (Typ) |
| | 3.2Ω @-4.5V (Typ) |
| $I_D$ | -0.18A |



SOT-363



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 GSFK0501E 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 supplies and a wide variety of other applications.

## Absolute Maximum Ratings ($T_A$=25°C unless otherwise specified)

| Parameter | Symbol | Max. | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -50 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous ($T_A$=25°C) | $I_D$ | -0.18 | A |
| Drain Current-Continuous ($T_A$=70°C) | | -0.14 | |
| Drain Current-Pulsed ($T_A$=25°C)[1] | $I_{DM}$ | -1.2 | A |
| Power Dissipation ($T_A$=25°C) | $P_D$ | 0.3 | W |
| Power Dissipation ($T_A$=70°C) | | 0.24 | W |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 400 | °C/W |
| Operating Junction Temperature Range | $T_J$ | -50 To +150 | °C |
| Storage Temperature Range | $T_{STG}$ | -50 To +150 | °C |

## Electrical Characteristics ($T_J$=25°C unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250uA | -50 | - | - | V |
| Zero Gate Voltage Drain Current, $T_A$=25°C | $I_{DSS}$ | $V_{DS}$=-50V, $V_{GS}$=0V | - | - | -1 | uA |
| Zero Gate Voltage Drain Current, $T_A$=125°C | | $V_{DS}$=-40V, $V_{GS}$=0V | - | - | -100 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±10 | uA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$, $I_D$=-250uA | -1.0 | -2.0 | -3.0 | V |
| Drain-Source On-State Resistance[2] | $R_{DS(ON)}$ | $V_{GS}$=-10V, $I_D$=-0.15A | - | 2.6 | 4 | Ω |
| | | $V_{GS}$=-4.5V, $I_D$=-0.15A | - | 3.2 | 6 | Ω |
| **Dynamic and Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-30V, $V_{GS}$=-10V, $I_D$=-0.2A | - | 0.53 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 0.14 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 0.1 | - | |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{DD}$=-30V, $V_{GS}$=-10V, $R_G$=3.3Ω, $I_D$=-0.1A | - | 1.6 | - | nS |
| Rise Time | $T_r$ | | - | 5.2 | - | |
| Turn-Off Delay Time | $T_{d(off)}$ | | - | 12 | - | |
| Fall Time | $T_f$ | | - | 6.1 | - | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-25V, $V_{GS}$=0V, F=1MHz | - | 25.2 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 5.9 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 1.4 | - | |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| Source Drain Current (Body Diode) | $I_{SD}$ | $T_A$=25°C | - | - | -0.18 | A |
| Diode Forward Voltage[2] | $V_{SD}$ | $V_{GS}$=0V, $I_{SD}$=-0.1A, $T_J$=25°C | - | - | -1.2 | V |

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.

## Typical Electrical and Thermal Characteristic Curves

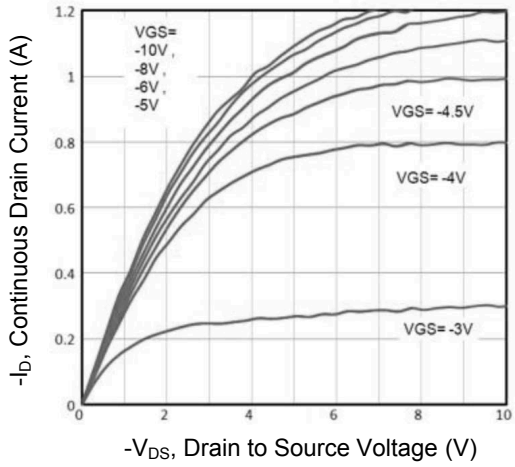



**Figure 1. Typical Output Characteristics**

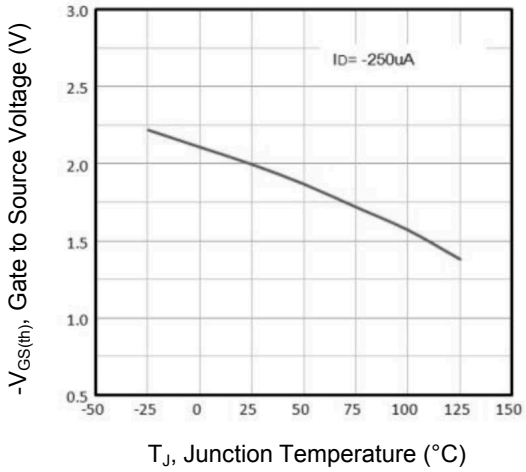



**Figure 2. Normalized Threshold Voltage vs. $T_J$**

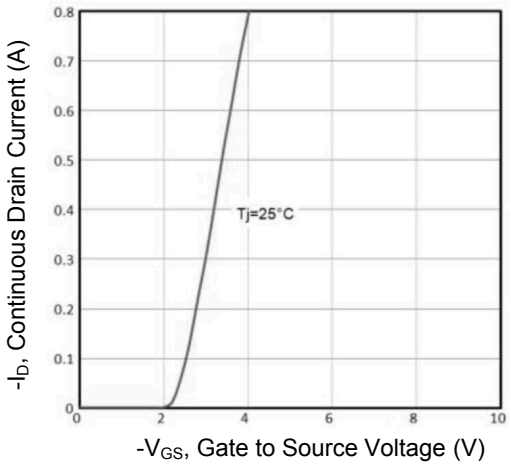



**Figure 3. Typical Transfer Characteristics**

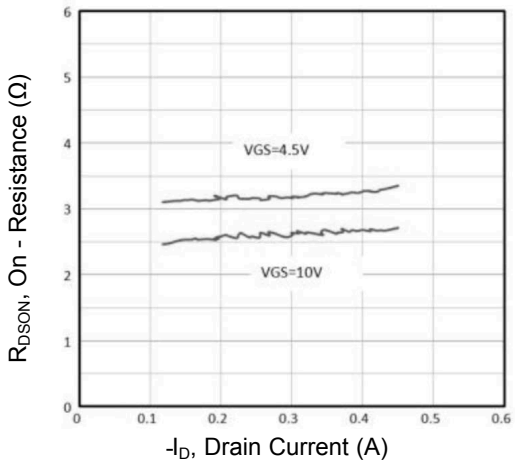



**Figure 4. On-Resistance vs. Drain Current**

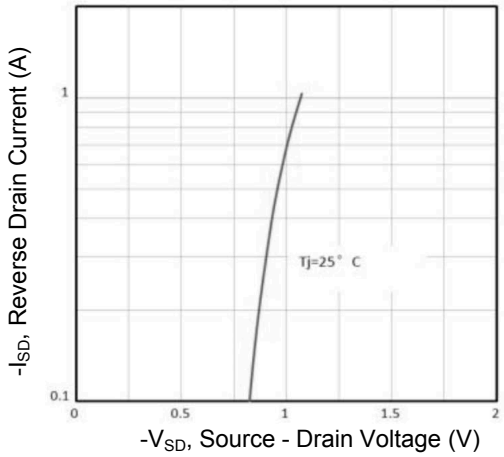



**Figure 5. Typical Source - Drain Diode Forward Voltage**

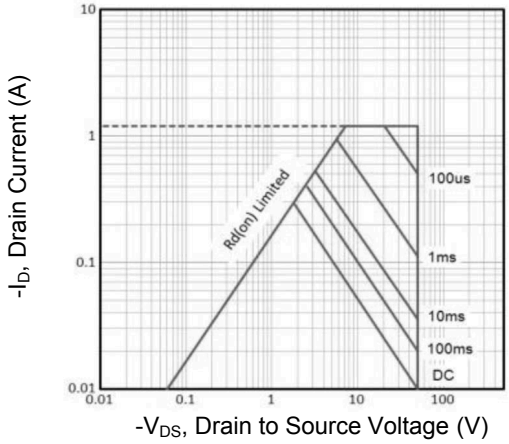



**Figure 6. Maximum Safe Operating Area**

## Typical Electrical and Thermal Characteristic Curves

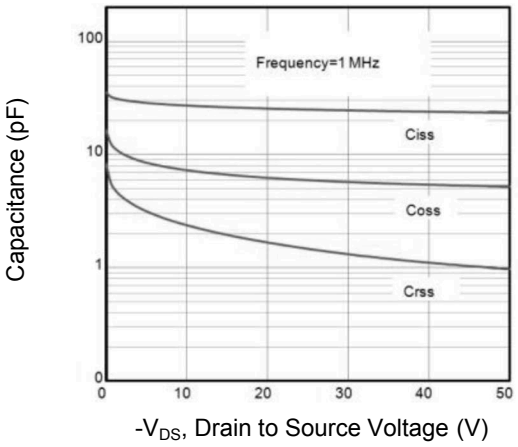



**Figure 7. Typical Capacitance vs. Drain - Source Voltage**

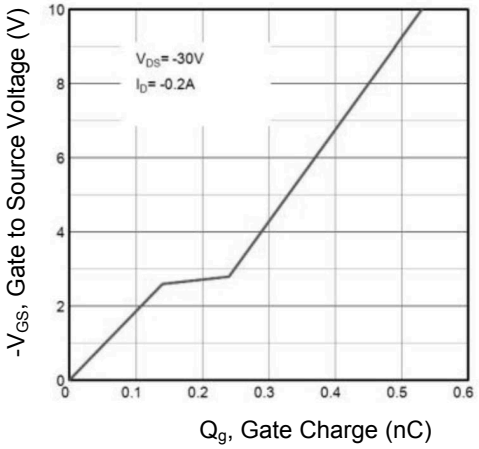



**Figure 8. Gate Charge Characteristics**

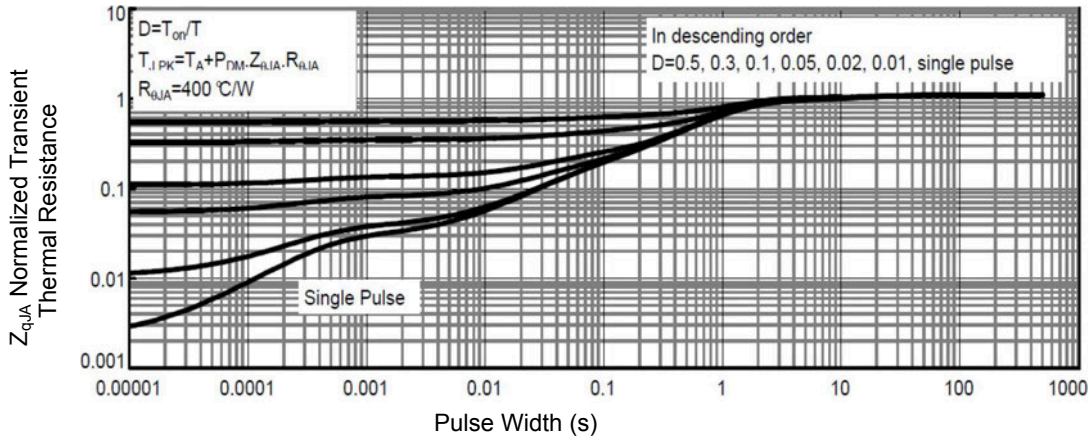



**Figure 9. Normalized Maximum Transient Thermal Impedance**

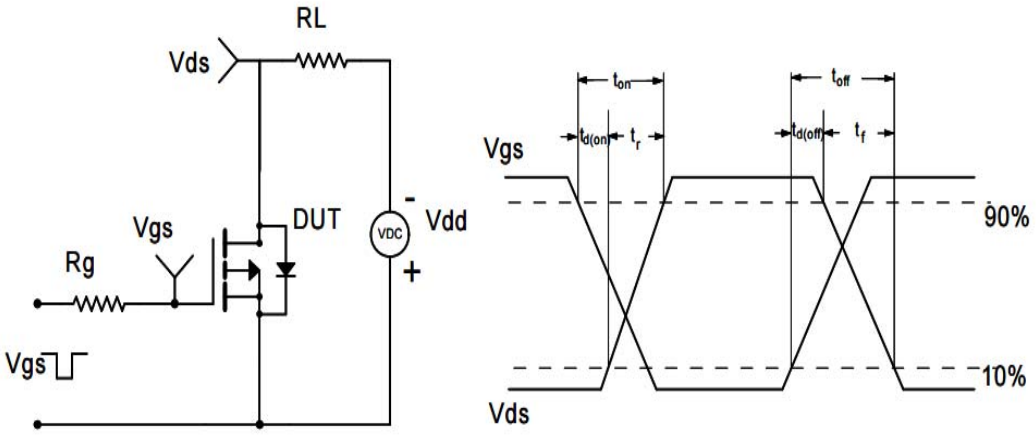
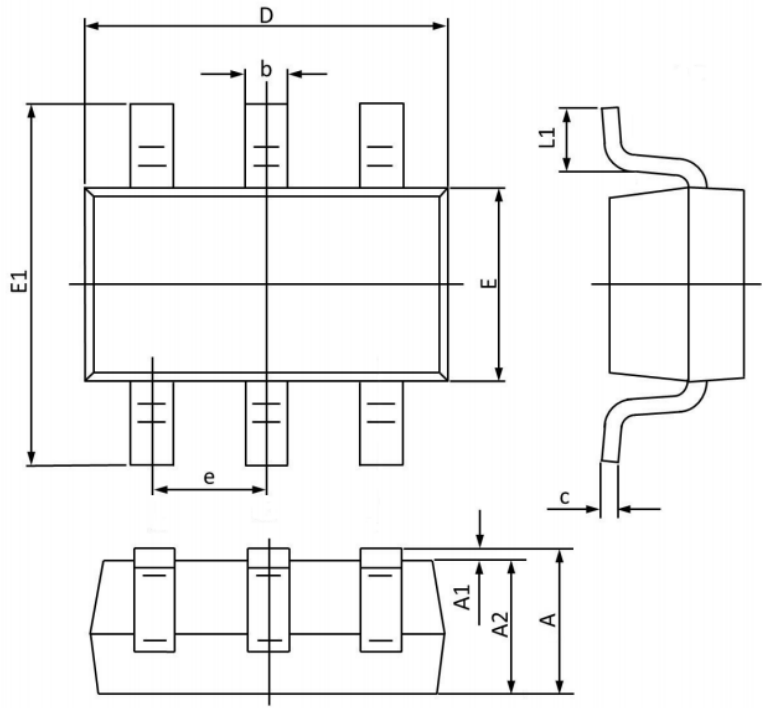



**Figure 10. Switching Time Test Circuit and Waveforms**

## Package Outline Dimensions SOT-363




| Symbol | Dimensions in Milimeters | | Dimensions in Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.800 | 1.100 | 0.031 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.800 | 1.000 | 0.031 | 0.039 |
| b | 0.100 | 0.330 | 0.004 | 0.013 |
| c | 0.100 | 0.250 | 0.004 | 0.010 |
| D | 1.800 | 2.200 | 0.071 | 0.087 |
| E | 1.150 | 1.350 | 0.045 | 0.053 |
| E1 | 1.800 | 2.400 | 0.071 | 0.094 |
| e | 0.65 BSC | | 0.026 BSC | |
| L1 | 0.100 | 0.350 | 0.004 | 0.014 |

## Order Information

| Device | Package | Marking Code | Quantity | HSF Status |
|---|---|---|---|---|
| GSFK0501E | SOT-363 | 84K | 3000 pcs / Reel | RoHS Compliant |