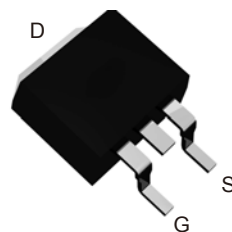
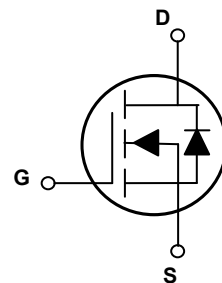


## Main Product Characteristics

|               |                     |
|---------------|---------------------|
| $V_{(BR)DSS}$ | 60V                 |
| $R_{DS(ON)}$  | 16m $\Omega$ (Max.) |
| $I_D$         | 60A                 |



TO-263 (D²PAK)



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 GSFT6016 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 ( $T_C=25^\circ\text{C}$ unless otherwise specified)

| Parameter                                                                        | Symbol          | Max.        | Unit                |
|----------------------------------------------------------------------------------|-----------------|-------------|---------------------|
| Drain-Source Voltage                                                             | $V_{DS}$        | 60          | V                   |
| Gate-to-Source Voltage                                                           | $V_{GS}$        | $\pm 20$    | V                   |
| Continuous Drain Current, @ Steady-State ( $T_C=25^\circ\text{C}$ ) <sup>1</sup> | $I_D$           | 60          | A                   |
| Continuous Drain Current, @ Steady-State ( $T_C=100^\circ\text{C}$ )             |                 | 42          | A                   |
| Pulsed Drain Current <sup>2</sup>                                                | $I_{DM}$        | 240         | A                   |
| Power Dissipation ( $T_C=25^\circ\text{C}$ )                                     | $P_D$           | 60          | W                   |
| Linear Derating Factor ( $T_C=25^\circ\text{C}$ )                                |                 | 0.48        | W/ $^\circ\text{C}$ |
| Single Pulse Avalanche Energy <sup>3</sup>                                       | $E_{AS}$        | 49          | mJ                  |
| Thermal Resistance, Junction-to-Case                                             | $R_{\theta JC}$ | 2.10        | $^\circ\text{C/W}$  |
| Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State) <sup>4</sup> | $R_{\theta JA}$ | 62.0        | $^\circ\text{C/W}$  |
| Operating Junction and Storage Temperature Range                                 | $T_J/T_{STG}$   | -55 to +150 | $^\circ\text{C}$    |

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

| Parameter                                       | Symbol        | Conditions                                                     | Min. | Typ. | Max. | Unit       |
|-------------------------------------------------|---------------|----------------------------------------------------------------|------|------|------|------------|
| <b>On / Off Characteristics</b>                 |               |                                                                |      |      |      |            |
| Drain-to-Source Breakdown Voltage               | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                                      | 60   | -    | -    | V          |
| Drain-to-Source Leakage Current                 | $I_{DSS}$     | $V_{DS}=60V, V_{GS}=0V$                                        | -    | -    | 1    | $\mu A$    |
|                                                 |               | $T_J=125^{\circ}\text{C}$                                      | -    | -    | 20   |            |
| Gate-to-Source Forward Leakage                  | $I_{GSS}$     | $V_{GS}=20V$                                                   | -    | -    | 100  | nA         |
|                                                 |               | $V_{GS}=-20V$                                                  | -    | -    | -100 |            |
| Static Drain-to-Source On-Resistance            | $R_{DS(ON)}$  | $V_{GS}=10V, I_D=20A$                                          | -    | 12   | 16   | m $\Omega$ |
|                                                 |               | $V_{GS}=4.5V, I_D=15A$                                         | -    | 15   | 22   |            |
| Gate Threshold Voltage                          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                                  | 1.1  | 1.6  | 2.9  | V          |
| <b>Dynamic and Switching Characteristics</b>    |               |                                                                |      |      |      |            |
| Input Capacitance                               | $C_{iss}$     | $V_{GS}=0V, V_{DS}=30V, f=1\text{MHz}$                         | -    | 2200 | -    | pF         |
| Output Capacitance                              | $C_{oss}$     |                                                                | -    | 140  | -    |            |
| Reverse Transfer Capacitance                    | $C_{rss}$     |                                                                | -    | 70   | -    |            |
| Total Gate Charge                               | $Q_g$         | $I_D=20A, V_{DS}=30V, V_{GS}=10V$                              | -    | 48   | -    | nC         |
| Gate-to-Source Charge                           | $Q_{gs}$      |                                                                | -    | 9.2  | -    |            |
| Gate-to-Drain ("Miller") Charge                 | $Q_{gd}$      |                                                                | -    | 10   | -    |            |
| Turn-On Delay Time                              | $t_{d(on)}$   | $V_{GS}=10V, V_{DS}=30V, I_D=20A, R_{GEN}=3\Omega$             | -    | 11   | -    | nS         |
| Rise Time                                       | $t_r$         |                                                                | -    | 26   | -    |            |
| Turn-Off Delay Time                             | $t_{d(off)}$  |                                                                | -    | 87   | -    |            |
| Fall Time                                       | $t_f$         |                                                                | -    | 75   | -    |            |
| Gate Resistance                                 | $R_g$         | $f=1\text{MHz}$                                                | -    | 2.2  | -    | $\Omega$   |
| <b>Drain-Source Ratings and Characteristics</b> |               |                                                                |      |      |      |            |
| Continuous Source Current (Body Diode)          | $I_S$         | MOSFET symbol showing the integral reverse p-n junction diode. | -    | -    | 60   | A          |
| Pulsed Source Current (Body Diode)              | $I_{SM}$      |                                                                | -    | -    | 240  | A          |
| Diode Forward Voltage                           | $V_{SD}$      | $I_S=20A, V_{GS}=0V$                                           | -    | 1.0  | 1.2  | V          |
| Reverse Recovery Time                           | $t_{rr}$      | $T_J=25^{\circ}\text{C}, I_F=20A, di/dt=100A/\mu s$            | -    | 14   | -    | nS         |
| Reverse Recovery Charge                         | $Q_{rr}$      |                                                                | -    | 16.5 | -    | nC         |

Notes:

1. Pulse test: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
2. Repetitive rating; pulse width limited by max. junction temperature.
3.  $L=0.5\text{mH}$ ,  $V_{DD}=30V$ ,  $R_G=25\Omega$ ,  $T_J=25^{\circ}\text{C}$ .
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Electrical and Thermal Characteristic Curves

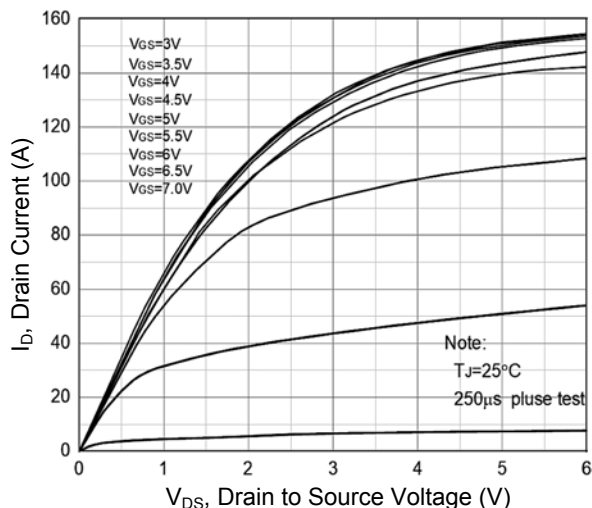


Figure 1. Output Characteristics

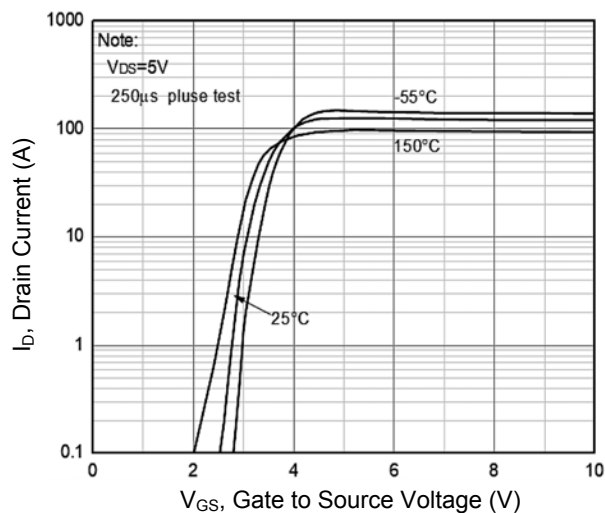


Figure 2. Transfer Characteristics

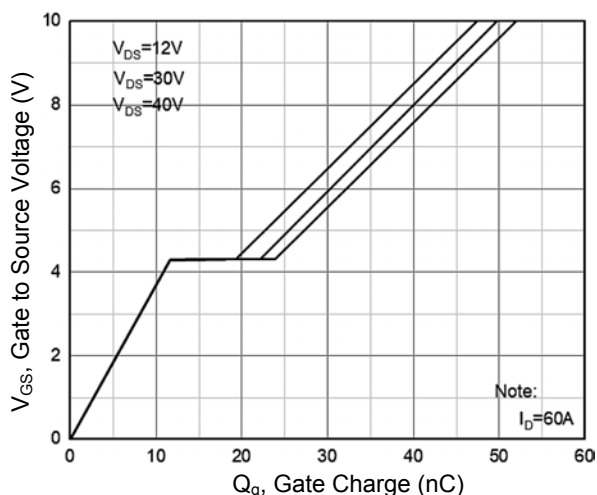


Figure 3. Gate Charge Characteristics

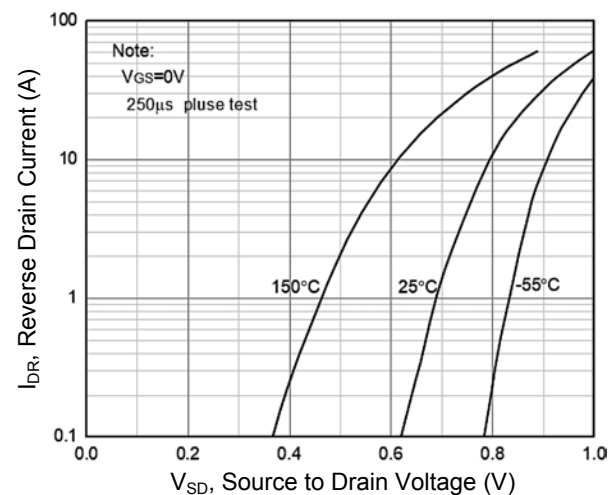


Figure 4. Body Diode Characteristics

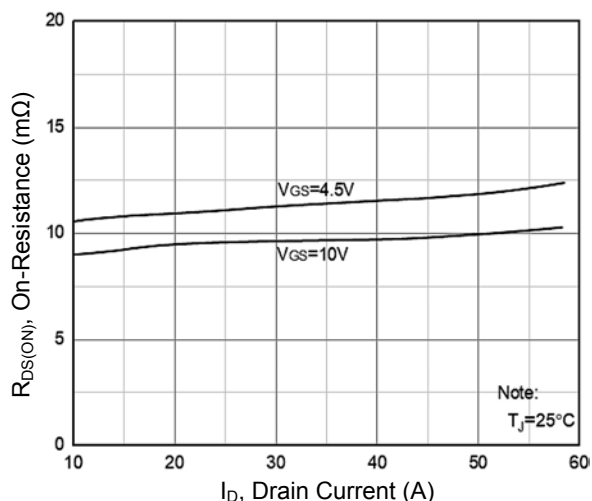


Figure 5. On-Resistance vs. Drain Current

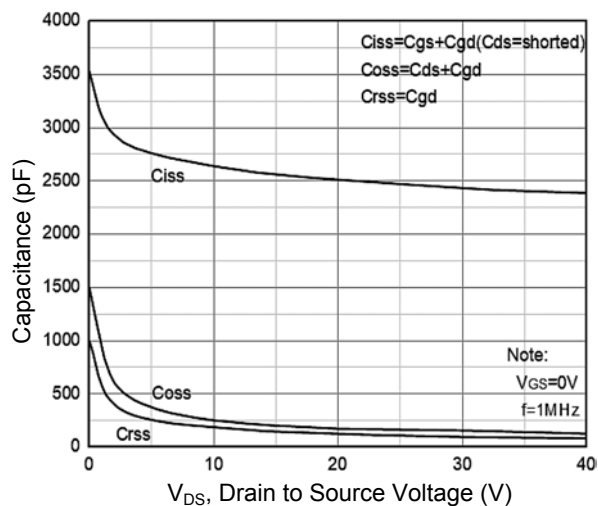


Figure 6. Capacitance Characteristics

## Typical Electrical and Thermal Characteristic Curves

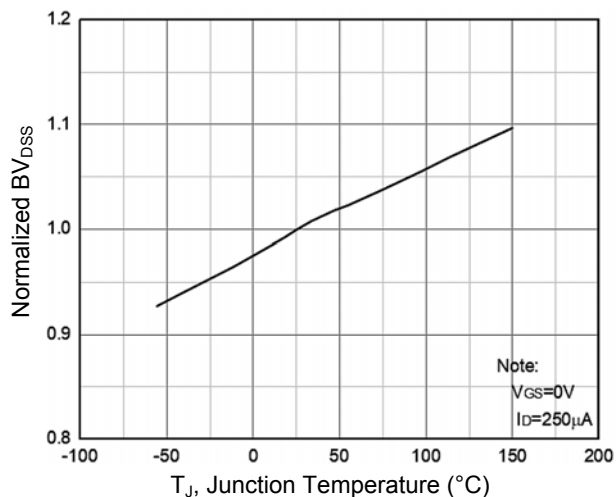


Figure 7. Normalized  $BV_{DSS}$  vs.  $T_J$

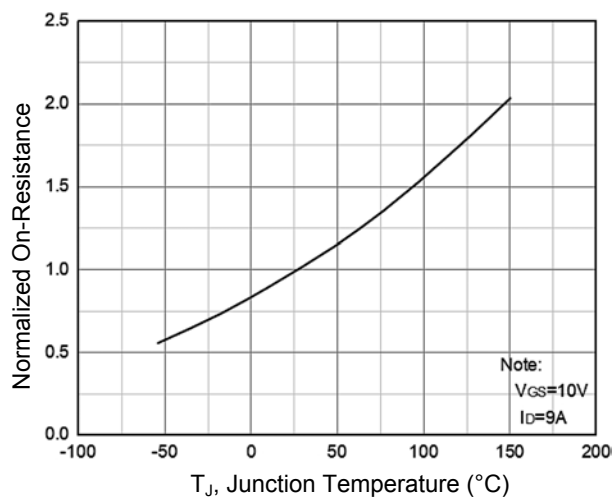


Figure 8. Normalized  $R_{DS(ON)}$  vs.  $T_J$

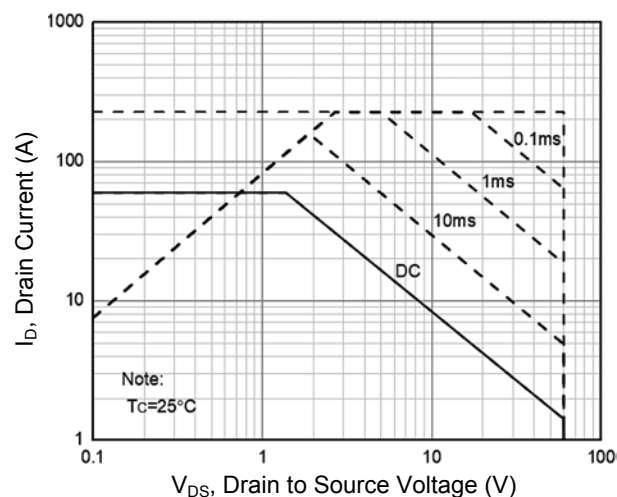
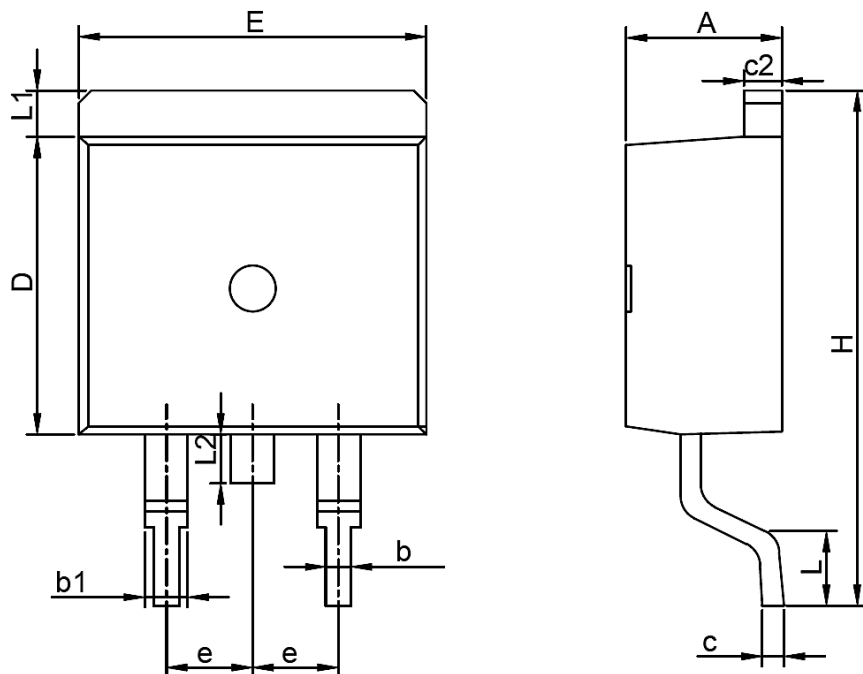


Figure 9. Maximum Safe Operating Area

## Package Outline Dimensions TO-263 (D<sup>2</sup>PAK)



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 4.30                      | 4.90  | 0.169                | 0.193 |
| b      | 0.70                      | 0.95  | 0.028                | 0.037 |
| b1     | 1.07                      | 1.50  | 0.042                | 0.059 |
| c      | 0.28                      | 0.60  | 0.011                | 0.024 |
| c2     | 1.17                      | 1.37  | 0.046                | 0.054 |
| D      | 8.40                      | 9.35  | 0.331                | 0.368 |
| E      | 9.80                      | 10.45 | 0.386                | 0.411 |
| e      | 2.54 BSC                  |       | 0.100 BSC            |       |
| H      | 14.70                     | 16.30 | 0.579                | 0.642 |
| L      | 2.00                      | 3.80  | 0.079                | 0.150 |
| L1     | 0.97                      | 1.42  | 0.038                | 0.056 |
| L2     | -                         | 1.75  | -                    | 0.069 |

## Order Information

| Device   | Package                     | Marking | Carrier     | Quantity       |
|----------|-----------------------------|---------|-------------|----------------|
| GSFT6016 | TO-263 (D <sup>2</sup> PAK) | T6016   | Tape & Reel | 800 Pcs / Reel |