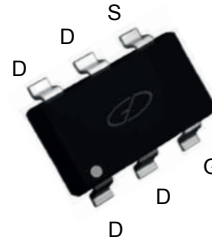
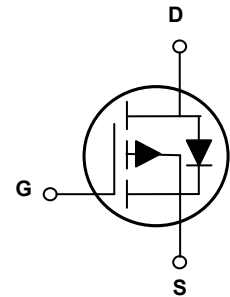


## Main Product Characteristics

|               |             |
|---------------|-------------|
| $V_{(BR)DSS}$ | -30V        |
| $R_{DS(ON)}$  | 57mΩ (Max.) |
| $I_D$         | -4.8A       |



SOT-23-6L



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
- AEC-Q101 qualified



## Description

The GSFR3157AU 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 ( $T_A=25^\circ\text{C}$ unless otherwise specified)

| Parameter                                                                        | Symbol          | Max.        | Unit                |
|----------------------------------------------------------------------------------|-----------------|-------------|---------------------|
| Drain-Source Voltage                                                             | $V_{DS}$        | -30         | V                   |
| Gate-to-Source Voltage                                                           | $V_{GS}$        | $\pm 20$    | V                   |
| Continuous Drain Current, @ Steady-State ( $T_A=25^\circ\text{C}$ ) <sup>1</sup> | $I_D$           | -4.8        | A                   |
| Continuous Drain Current, @ Steady-State ( $T_A=100^\circ\text{C}$ )             |                 | -3.4        | A                   |
| Pulsed Drain Current <sup>2</sup>                                                | $I_{DM}$        | -15         | A                   |
| Power Dissipation ( $T_A=25^\circ\text{C}$ )                                     | $P_D$           | 1.2         | W                   |
| Linear Derating Factor ( $T_A=25^\circ\text{C}$ )                                |                 | 0.0096      | W/ $^\circ\text{C}$ |
| Thermal Resistance Junction-to-Ambient (PCB Mounted, Steady-State) <sup>3</sup>  | $R_{\theta JA}$ | 105         | $^\circ\text{C/W}$  |
| Operating Junction and Storage Temperature Range                                 | $T_J/T_{STG}$   | -55 to +150 | $^\circ\text{C}$    |

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

| Parameter                                       | Symbol        | Conditions                                                     | Min. | Typ. | Max. | Unit       |
|-------------------------------------------------|---------------|----------------------------------------------------------------|------|------|------|------------|
| <b>On / Off Characteristics</b>                 |               |                                                                |      |      |      |            |
| Drain-to-Source Breakdown Voltage               | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=-250\mu A$                                     | -30  | -    | -    | V          |
| Drain-to-Source Leakage Current                 | $I_{DSS}$     | $V_{DS}=-30V, V_{GS}=0V$                                       | -    | -    | -1   | $\mu A$    |
|                                                 |               | $T_J=125^\circ\text{C}$                                        | -    | -    | -50  |            |
| Gate-to-Source Forward Leakage                  | $I_{GSS}$     | $V_{GS}=20V$                                                   | -    | -    | 100  | nA         |
|                                                 |               | $V_{GS}=-20V$                                                  | -    | -    | -100 |            |
| Static Drain-to-Source On-Resistance            | $R_{DS(on)}$  | $V_{GS}=-10V, I_D=-4A$                                         | -    | 44   | 57   | m $\Omega$ |
|                                                 |               | $V_{GS}=-4.5V, I_D=-3.5A$                                      | -    | 62   | 81   |            |
| Gate Threshold Voltage                          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=-250\mu A$                                 | -1.0 | -1.6 | -2.8 | V          |
| Forward Transconductance                        | $g_{fs}$      | $V_{DS}=-5V, I_D=-3.0A$                                        | -    | 11   | -    | S          |
| <b>Dynamic and Switching Characteristics</b>    |               |                                                                |      |      |      |            |
| Input Capacitance                               | $C_{iss}$     | $V_{GS}=0V, V_{DS}=-15V, f=1\text{MHz}$                        | -    | 580  | -    | pF         |
| Output Capacitance                              | $C_{oss}$     |                                                                | -    | 98   | -    |            |
| Reverse Transfer Capacitance                    | $C_{rss}$     |                                                                | -    | 74   | -    |            |
| Total Gate Charge                               | $Q_g$         | $I_D=-4.1A, V_{DS}=-15V, V_{GS}=-10V$                          | -    | 6.8  | -    | nC         |
| Gate-to-Source Charge                           | $Q_{gs}$      |                                                                | -    | 1.0  | -    |            |
| Gate-to-Drain ("Miller") Charge                 | $Q_{gd}$      |                                                                | -    | 1.4  | -    |            |
| Turn-on Delay Time                              | $t_{d(on)}$   | $V_{GS}=-10V, V_{DS}=-15V, I_D=-1A, R_{GEN}=2.5\Omega$         | -    | 14   | -    | nS         |
| Rise Time                                       | $t_r$         |                                                                | -    | 61   | -    |            |
| Turn-Off Delay Time                             | $t_{d(off)}$  |                                                                | -    | 19   | -    |            |
| Fall Time                                       | $t_f$         |                                                                | -    | 10   | -    |            |
| Gate Resistance                                 | $R_g$         | $f=1\text{MHz}$                                                | -    | 4.2  | -    | $\Omega$   |
| <b>Source-Drain Ratings and Characteristics</b> |               |                                                                |      |      |      |            |
| Continuous Source Current (Body Diode)          | $I_S$         | MOSFET symbol showing the integral reverse p-n junction diode. | -    | -    | -4.8 | A          |
| Pulsed Source Current (Body Diode)              | $I_{SM}$      |                                                                | -    | -    | -15  | A          |
| Diode Forward Voltage                           | $V_{SD}$      | $I_S=-2A, V_{GS}=0V$                                           | -    | -0.8 | -1.2 | V          |
| Reverse Recovery Time                           | $T_{rr}$      | $T_J=25^\circ\text{C}, I_F=-4A, di/dt=-100A/\mu s$             | -    | 10.3 | -    | nS         |
| Reverse Recovery Charge                         | $Q_{rr}$      |                                                                | -    | 4.4  | -    | 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. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Electrical and Thermal Characteristic Curves

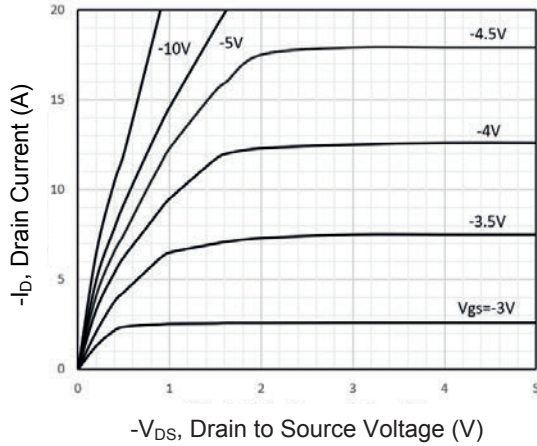


Figure 1. Typical Output Characteristics

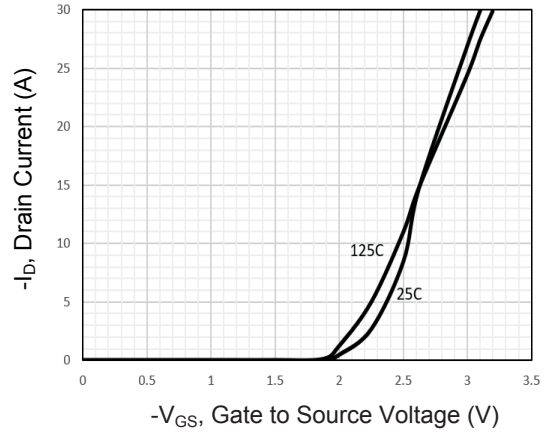


Figure 2. Typical Transfer Characteristics

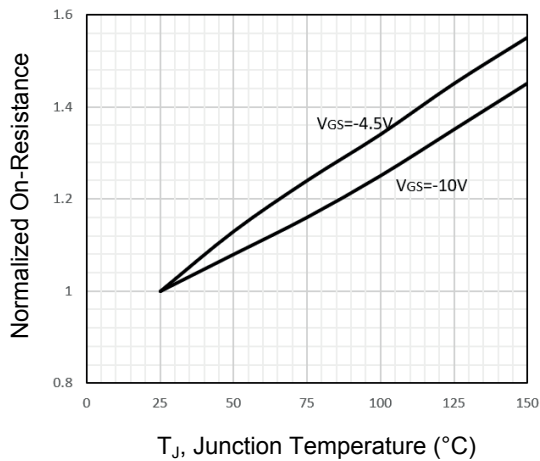


Figure 3. Normalized  $R_{DS(on)}$  vs.  $T_J$

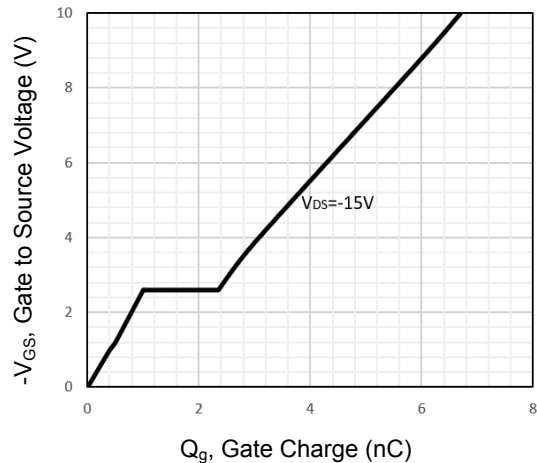


Figure 4. Gate Charge

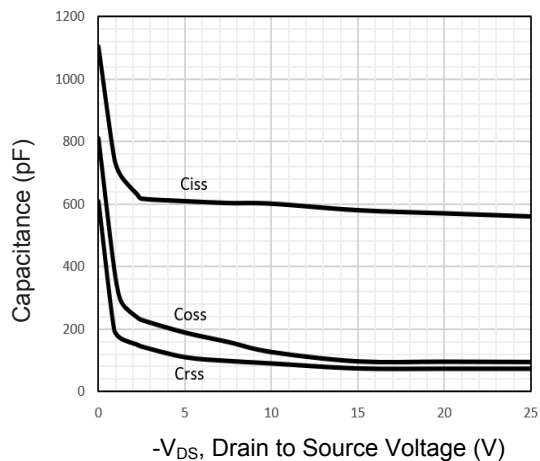


Figure 5. Typical Capacitance vs. Drain to Source Voltage

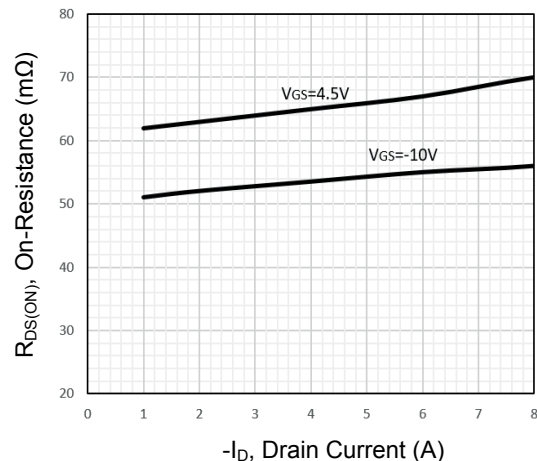
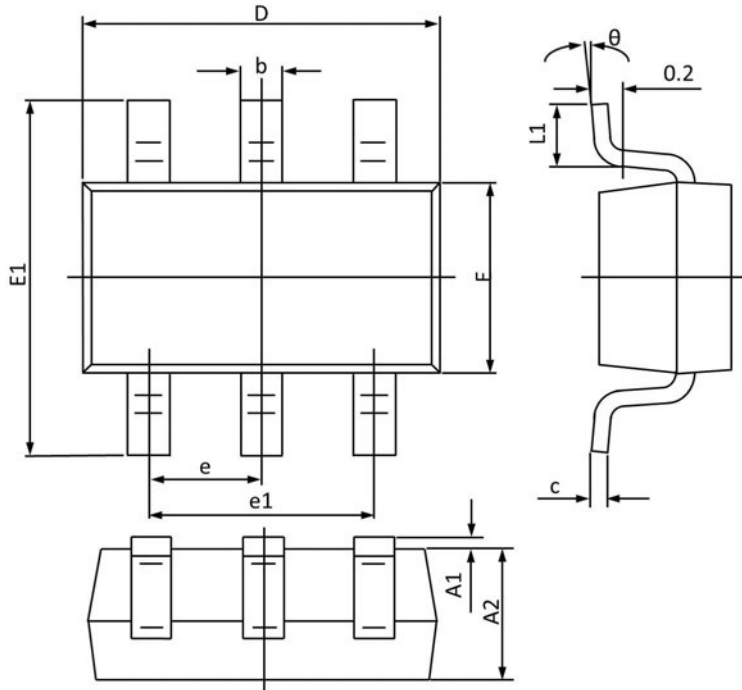


Figure 6. Typical Drain-Source On-Resistance

## Package Outline Dimensions (SOT-23-6L)



| Symbol | Dimensions In Millimeters |      | Dimensions In Inches |       |
|--------|---------------------------|------|----------------------|-------|
|        | Min                       | Max  | Min                  | Max   |
| A1     | -                         | 0.15 | -                    | 0.006 |
| A2     | 0.90                      | 1.30 | 0.035                | 0.051 |
| b      | 0.30                      | 0.50 | 0.012                | 0.019 |
| c      | 0.10                      | 0.20 | 0.004                | 0.008 |
| D      | 2.80                      | 3.05 | 0.110                | 0.120 |
| E1     | 2.60                      | 3.00 | 0.103                | 0.118 |
| F      | 1.50                      | 1.80 | 0.059                | 0.071 |
| e      | 0.95 TYP                  |      | 0.037 TYP            |       |
| e1     | 1.90 TYP                  |      | 0.075 TYP            |       |
| L1     | 0.25                      | 0.60 | 0.010                | 0.024 |
| θ      | 0°                        | 8°   | 0°                   | 8°    |