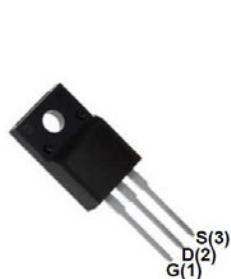
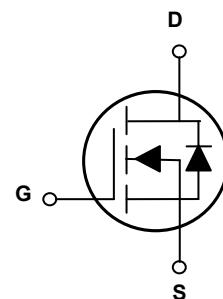


## Main Product Characteristics

$V_{(BR)DSS}$	200V
$R_{DS(ON)}$	0.15Ω (Max.)
$I_D$	18A



TO-220F



Schematic Diagram

## Features and Benefits

- Advanced MOSFET process technology
- **Low On-Resistance** ( $R_{DS(ON)} = 0.15\Omega$  Max.)
- **Fast Switching** and **Reverse Body Recovery**
- **RoHS Compliant**



## Description

The GSFU2016 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 ( $T_C=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current @ Steady-State <sup>1</sup> , $T_C=25^\circ C$	$I_D$	18	A
Continuous Drain Current @ Steady-State, $T_C=100^\circ C$		11	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	72	A
Single Pulsed Avalanche Energy <sup>3</sup>	$E_{AS}$	635	mJ
Power Dissipation, $T_C=25^\circ C$	$P_D$	50	W
Linear Derating Factor, $T_C=25^\circ C$		0.4	W/ $^\circ C$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	$^\circ C/W$
Junction to Ambient (PCB Mounted, Steady-State) <sup>4</sup>	$R_{\theta JA}$	62	$^\circ C/W$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ C$

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>On/Off Characteristic</b>						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	200	-	-	V
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=200\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	$\mu\text{A}$
		$T_J=125^\circ\text{C}$	-	-	50	
Gate to Source Forward Leakage	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm 20\text{V}$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	2.1	3	3.9	V
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}}=10\text{V}, I_D=9\text{A}$	-	0.12	0.16	$\Omega$
Gate Resistance	$R_g$	f=1.0MHz	-	6.6	-	$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, f=1.0\text{MHz}$	-	1108	-	pF
Output Capacitance	$C_{\text{oss}}$		-	160	-	pF
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	34	-	pF
Total Gate Charge	$Q_g$	$V_{\text{DS}}=160\text{V}, I_D=11\text{A}, V_{\text{GS}}=10\text{V}$	-	41	-	nC
Gate-Source Charge	$Q_{\text{gs}}$		-	6	-	nC
Gate-Drain("Miller") Charge	$Q_{\text{gd}}$		-	20	-	nC
<b>Switching Characteristics</b>						
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{\text{DS}}=100\text{V}, I_D=11\text{A}, R_G=2.5\Omega, V_{\text{GS}}=10\text{V}$	-	15	-	nS
Turn-On Rise Time	$t_r$		-	47	-	nS
Turn-Off Delay Time	$t_{d(\text{off})}$		-	110	-	nS
Turn-Off Fall Time	$t_f$		-	36	-	nS
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current (Body Diode)	$I_S$	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	18	A
Source Pulse Current (Body Diode)	$I_{\text{SM}}$	-	-	72	A	
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_S=11\text{A}$	-	-	1.4	V
Reverse Recovery Time	$t_{rr}$	$T_J=25^\circ\text{C}, I_F=11\text{A}, \frac{di}{dt}=100\text{A}/\mu\text{s}$	-	160	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	0.98	-	$\mu\text{C}$

Notes:

1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
2. Repetitive rating; pulse width limited by max. junction temperature.
3.  $L=30\text{mH}, V_{\text{DD}}=100\text{V}, T_J=25^\circ\text{C}$ .
4. Device mounted on FR-4 PCB, 1inch x 0.85inch x 0.062 inch.

## Typical Electrical and Thermal Characteristic Curves

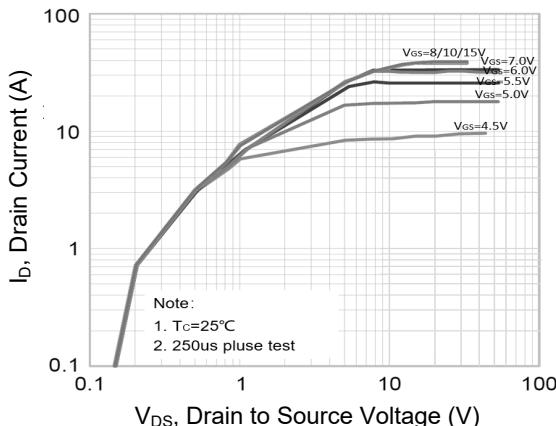


Figure 1. Output Characteristics

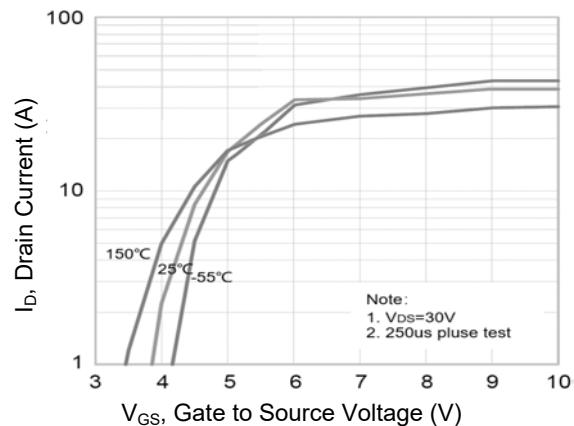


Figure 2. Transfer Characteristics

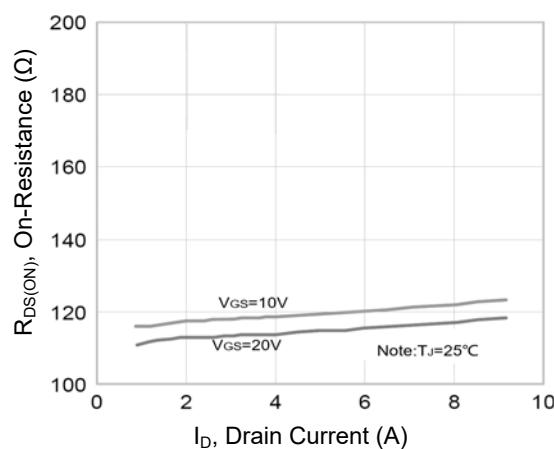


Figure 3.  $R_{DS(ON)}$  vs. Drain Current

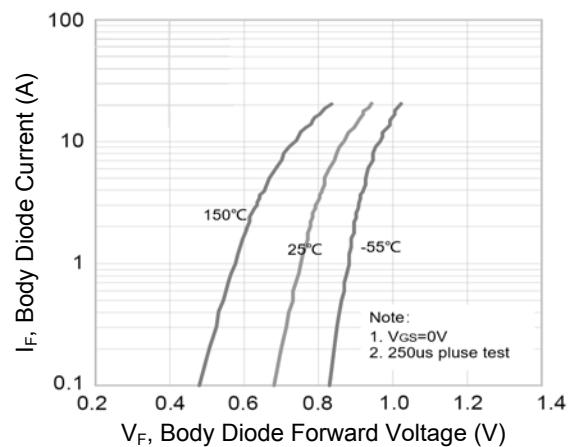


Figure 4. Body Diode Characteristics

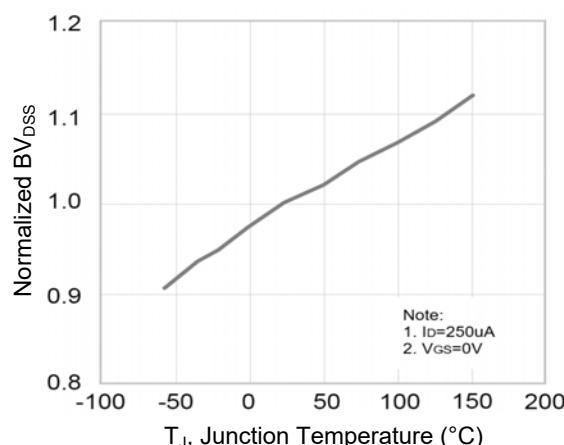


Figure 5. Normalized  $BV_{DSS}$  vs. Junction Temperature

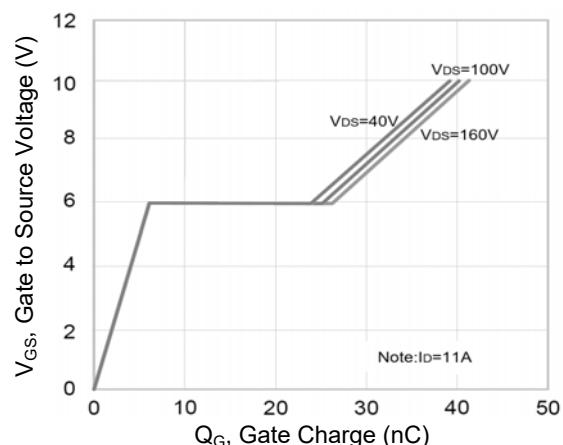
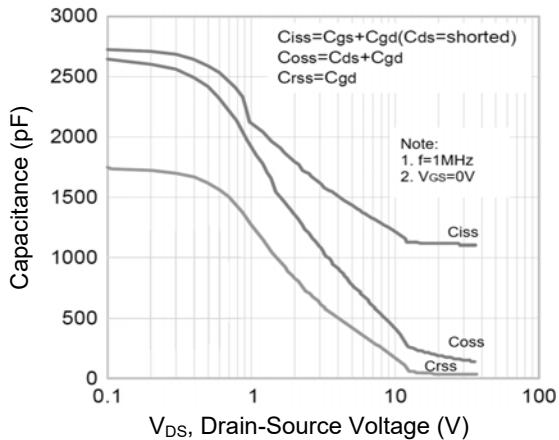
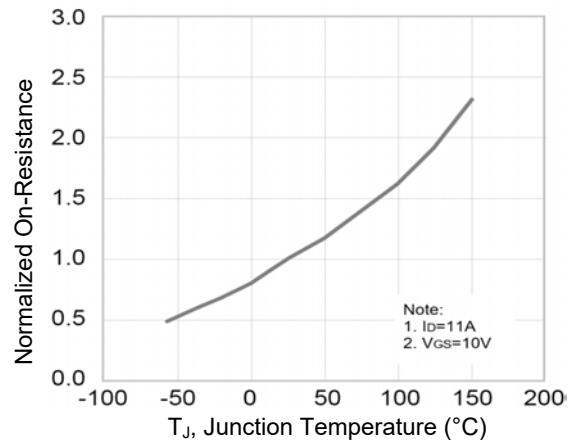


Figure 6. Gate Charge

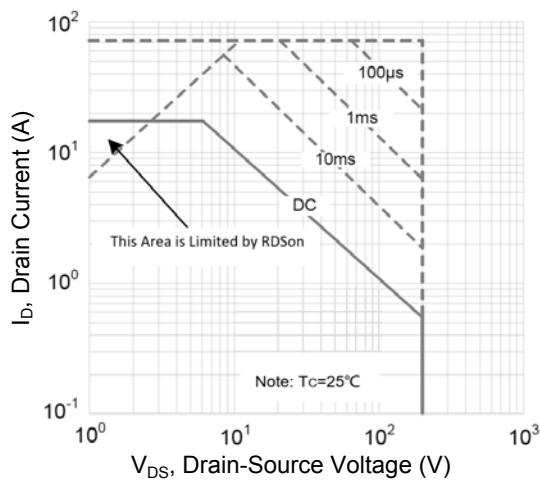
## Typical Electrical and Thermal Characteristic Curves



**Figure 7. Capacitance Characteristics**

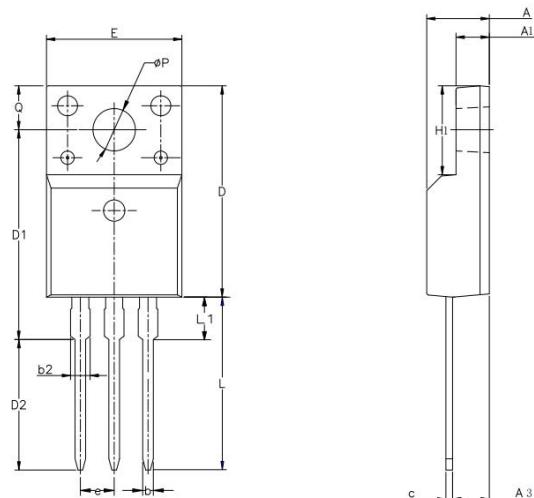


**Figure 8. Normalized  $R_{DS(ON)}$  vs. Junction Temperature**



**Figure 9. Safe Operation Area**

### Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.420	5.020	0.174	0.198
A1	2.300	2.800	0.091	0.110
A3	2.500	3.100	0.098	0.122
b	0.550	0.850	0.022	0.033
b2	-	1.290	-	0.051
c	0.350	0.650	0.014	0.026
D	15.250	16.250	0.600	0.640
D1	13.970	14.970	0.550	0.589
D2	10.580	11.580	0.417	0.456
E	9.730	10.360	0.383	0.408
e	2.540 BCS		0.100 BCS	
H1	6.400	7.000	0.252	0.276
L	12.480	13.480	0.491	0.531
L1	-	2.000	-	0.079
θP	3.000	3.400	0.118	0.134
Q	3.050	3.550	0.120	0.140