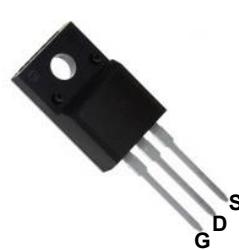
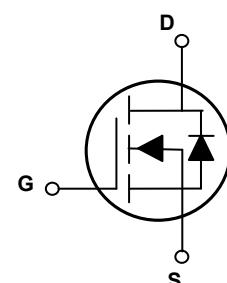


Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.11Ω (max.)
I_D	35A



TO-220F



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 GSFU65RF110 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}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous, at Steady-State, ($T_C=25^\circ\text{C}$)	I_D	35	A
Drain Current-Continuous, at Steady-State, ($T_C=100^\circ\text{C}$)		12	
Drain Current-Pulsed	I_{DM}	140	A
Single Pulse Avalanche Energy ¹	E_{AS}	1136	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	26	W
		0.21	W/°C
Body Diode Reverse Voltage Slope ²	dv/dt	50	V/ns
MOS dv/dt Ruggedness ³	dv/dt	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	4.8	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$	650	-	-	V
Drain-Source Leakage Current	I_{DSS}	$\text{V}_{\text{DS}}=650\text{V}, \text{V}_{\text{GS}}=0\text{V}$	-	-	1	μA
Gate-Source Forward Leakage	I_{GSS}	$\text{V}_{\text{GS}}=\pm 20\text{V}, \text{V}_{\text{DS}}=0\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=17\text{A}$	-	90	110	$\text{m}\Omega$
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	$\text{V}_{\text{GS}}=\text{V}_{\text{DS}}, \text{I}_D=250\mu\text{A}$	3.1	-	4.9	V
Gate Resistance	R_g	$f=1\text{MHz}$	-	1.82	-	Ω
Dynamic and Switching Characteristics						
Total Gate Charge ^{4,5}	Q_g	$\text{V}_{\text{DD}}=480\text{V}, \text{I}_D=19\text{A}, \text{V}_{\text{GS}}=10\text{V}$	-	81	-	nC
Gate-Source Charge ^{4,5}	Q_{gs}		-	28	-	
Gate-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	42	-	
Gate-to-Plateau Voltage ^{4,5}	$\text{V}_{\text{plateau}}$		-	8.4	-	V
Turn-On Delay Time ^{4,5}	$t_{d(\text{on})}$	$\text{V}_{\text{DD}}=400\text{V}, \text{R}_g=1.8\Omega, \text{V}_{\text{GS}}=10\text{V}, \text{I}_D=19\text{A}$	-	24	-	nS
Rise Time ^{4,5}	t_r		-	27	-	
Turn-Off Delay Time ^{4,5}	$t_{d(\text{off})}$		-	59	-	
Fall Time ^{4,5}	t_f		-	23	-	
Input Capacitance	C_{iss}	$\text{V}_{\text{DS}}=100\text{V}, \text{V}_{\text{GS}}=0\text{V}, f=1\text{MHz}$	-	3011	-	pF
Output Capacitance	C_{oss}		-	84	-	
Reverse Transfer Capacitance	C_{rss}		-	5.5	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_s	$T_c=25^\circ\text{C}$, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	35	A
Source Pulse Current	I_{SM}		-	-	140	A
Diode Forward Voltage	V_{SD}	$\text{V}_{\text{GS}}=0\text{V}, I_s=19\text{A}$	-	1.1	1.4	V
Reverse Recovery Time ²	t_{rr}	$\text{V}_{\text{DD}}=400\text{V}, I_F=19\text{A}, dI_F/dt=100\text{A}/\mu\text{s}$	-	104	-	nS
Reverse Recovery Charge ²	Q_{rr}		-	0.46	-	uC
Reverse Recovery Current ²	I_{rrm}		-	8	-	A

Note:

1. $L=79\text{mH}, V_{\text{DD}}=100\text{V}, R_g=25\Omega$, starting temperature $T_j=25^\circ\text{C}$.
2. $\text{V}_{\text{DS}}=0-400\text{V}, I_{\text{SD}} \leq I_s, T_j=25^\circ\text{C}$.
3. $\text{V}_{\text{DS}}=0-480\text{V}$.
4. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

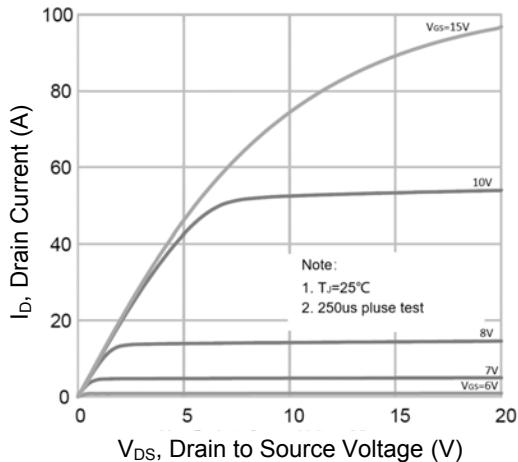


Figure 1. Typical Output Characteristics

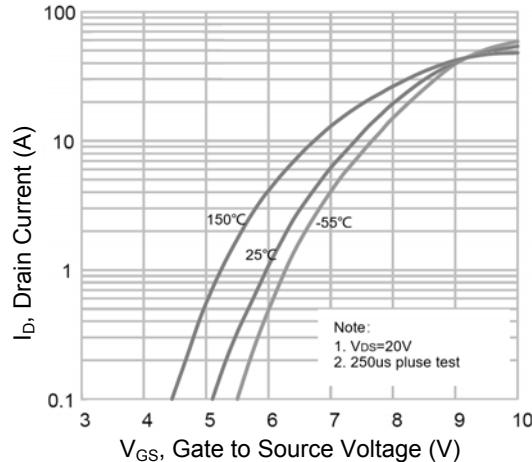


Figure 2. Transfer Characteristics

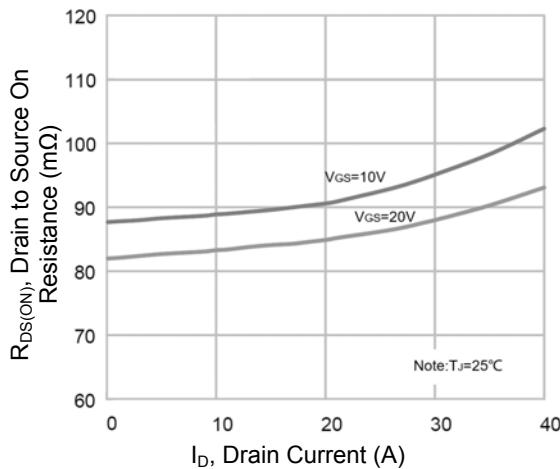


Figure 3. $R_{DS(ON)}$ vs. Drain Current

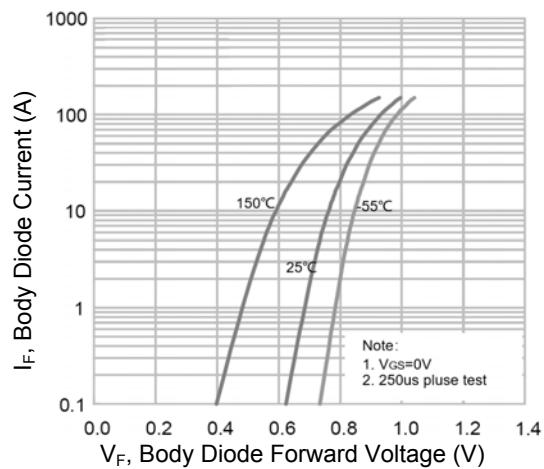


Figure 4. Body Diode Characteristics

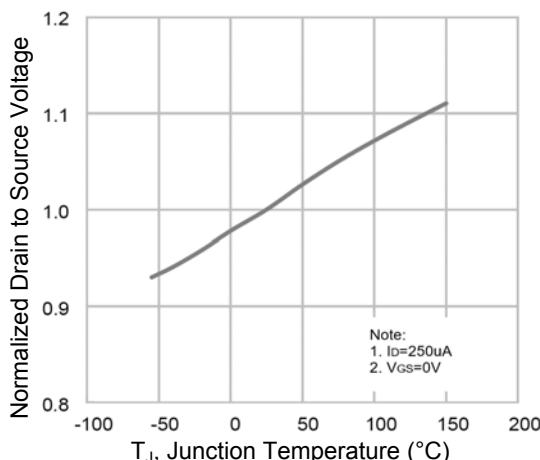


Figure 5. Normalized BV_{DSS} vs. T_J

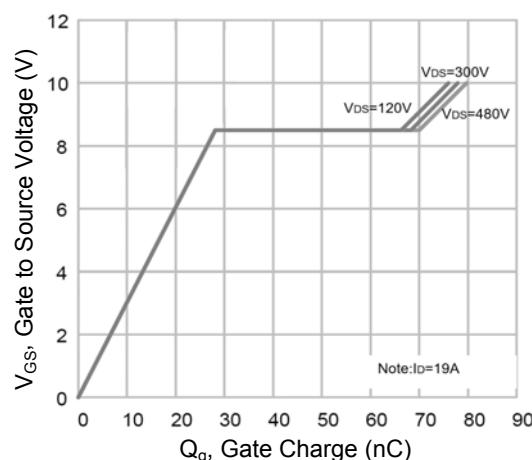


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

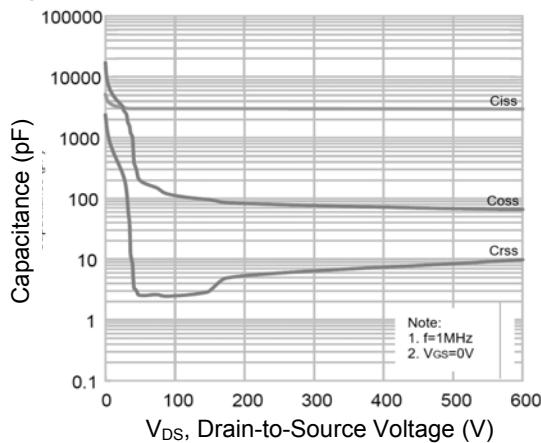


Figure 7. Capacitance Characteristics

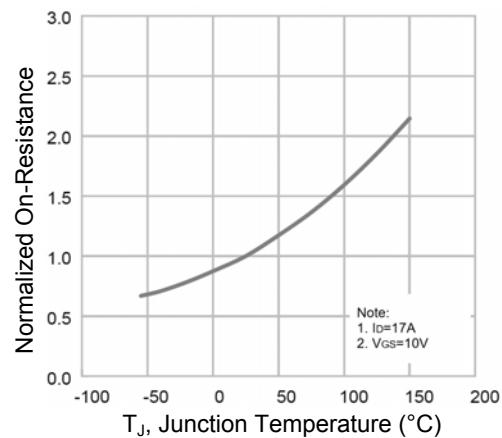


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

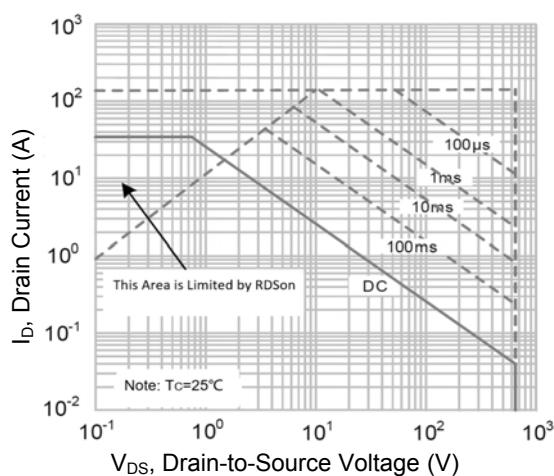
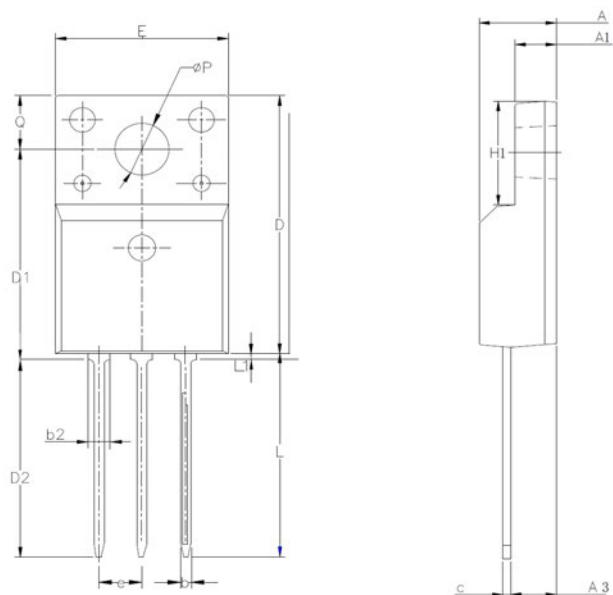


Figure 9. Safe Operation Area

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	0.800	0.022	0.031
b2	-	1.290	-	0.051
c	0.350	0.650	0.014	0.026
D	15.250	16.250	0.600	0.640
D1	12.870	13.270	0.507	0.522
D2	12.280	12.680	0.483	0.500
E	9.730	10.360	0.383	0.408
e	2.540 BSC		0.100 BSC	
H1	6.400	7.000	0.252	0.276
L	12.480	13.480	0.491	0.530
L1	-	0.850	-	0.033
ØP	3.000	3.400	0.118	0.134
Q	3.050	3.550	0.120	0.140