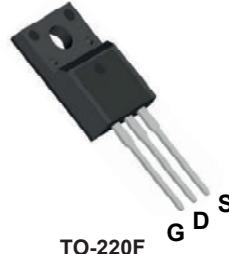
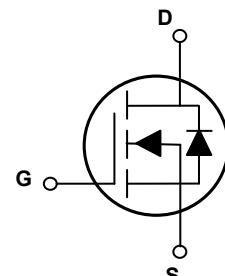


Main Product Characteristics

$V_{(BR)DSS}$	700V
$R_{DS(ON)}$	0.60Ω (max.)
I_D	7A



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 GSFU70R600 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	Parameter.	Unit
Drain-Source Voltage	V_{DS}	700	V
Gate-to-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current, @ Steady-State ($T_C=25^\circ\text{C}$)	I_D	7	A
Continuous Drain Current, @ Steady-State ($T_C=100^\circ\text{C}$)		4.4	A
Pulsed Drain Current	I_{DM}	28	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	31	W
		0.24	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy ¹	E_{AS}	259	mJ
Body Diode Reverse Voltage Slope ²	dv/dt	15	V/ns
MOS dv/dt Ruggedness ³	dv/dt	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction-to-Case	$R_{\theta JC}$	4.1	$^\circ\text{C}/\text{W}$
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
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	700	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=700\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=30\text{V}$	-	-	100	nA
		$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=-30\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=3.5\text{A}, T_J=25^\circ\text{C}$	-	0.52	0.60	Ω
		$V_{\text{GS}}=10\text{V}, I_D=3.5\text{A}, T_J=125^\circ\text{C}$	-	1.19	-	Ω
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=100\text{V}, F=1\text{MHz}$	-	695	-	pF
Output Capacitance	C_{oss}		-	30	-	
Reverse Transfer Capacitance	C_{rss}		-	0.62	-	
Total Gate Charge ^{4,5}	Q_g	$I_D=7\text{A}, V_{\text{DD}}=560\text{V}, V_{\text{GS}}=10\text{V}$	-	17.4	-	nC
Gate-to-Source Charge ^{4,5}	Q_{gs}		-	6.6	-	
Gate-to-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	7.2	-	
Turn-on Delay Time ^{4,5}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=350\text{V}, V_{\text{GS}}=10\text{V}, R_G=24\Omega, I_D=7\text{A}$	-	18	-	nS
Rise Time ^{4,5}	t_r		-	31	-	
Turn-Off Delay Time ^{4,5}	$t_{\text{d}(\text{off})}$		-	37	-	
Fall Time ^{4,5}	t_f		-	25	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	8.7	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	$T_C=25^\circ\text{C}$, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	7	A
Source Pulse Current	I_{SM}	-	-	28	A	
Diode Forward Voltage	V_{SD}	$I_S=7\text{A}, V_{\text{GS}}=0\text{V}$	-	-	1.4	V
Reverse Recovery Time ³	T_{rr}	$I_F=7\text{A}, V_{\text{GS}}=0\text{V}, dI_F/dt=100\text{A/us}$	-	251	-	nS
Reverse Recovery Charge ³	Q_{rr}		-	2.6	-	μC

Notes:

1. $L=79\text{mH}, I_{AS}=2.4\text{A}, V_{DD}=100\text{V}$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{\text{DS}}=0\text{-}400\text{V}, I_{SD}<=20\text{A}, T_J=25^\circ\text{C}$.
3. $V_{\text{DS}}=0\text{-}480\text{V}$.
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

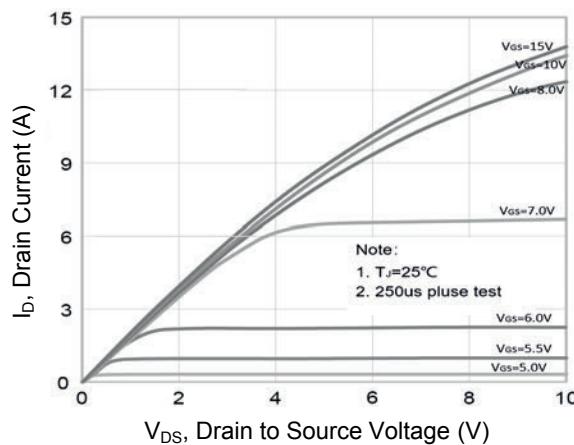


Figure 1. Typical Output Characteristics

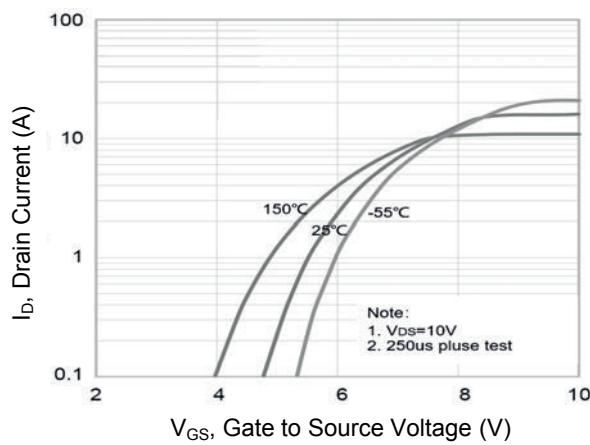


Figure 2. Transfer Characteristics

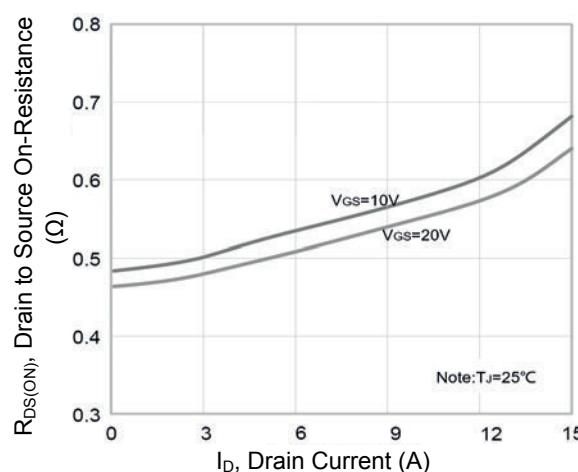


Figure 3. $R_{DS(ON)}$ Vs. Drain Current

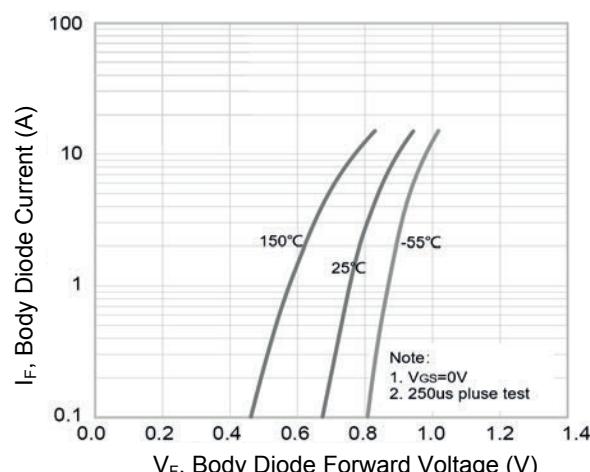


Figure 4. Body Diode Characteristics

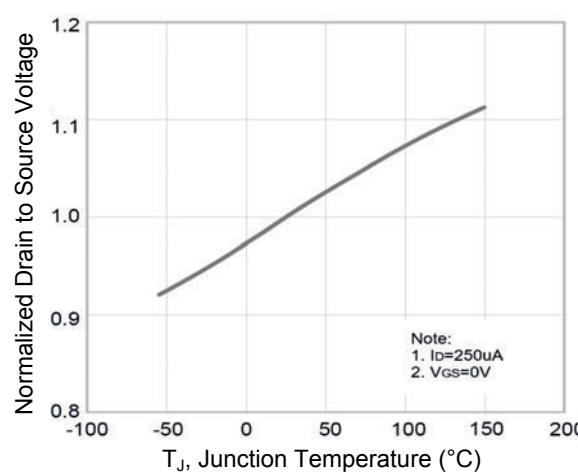


Figure 5. Normalized BV_{DSS} Vs. T_J

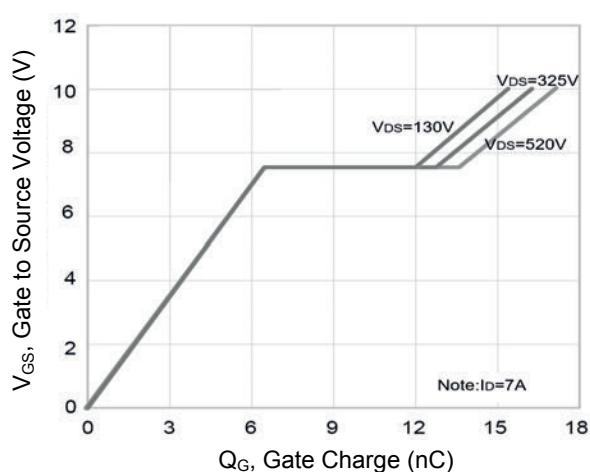


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

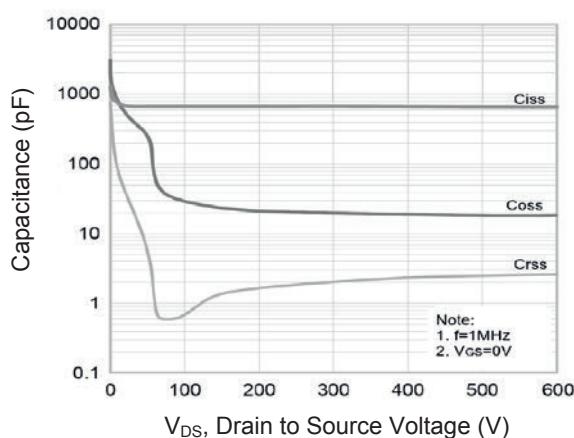


Figure 7. Capacitance Characteristics

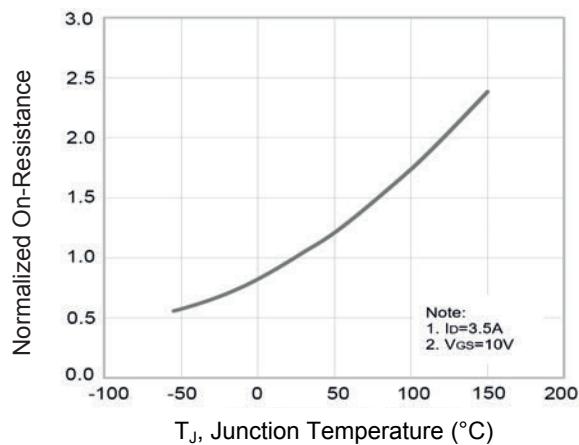


Figure 8. Normalized $R_{DS(ON)}$ Vs. T_J

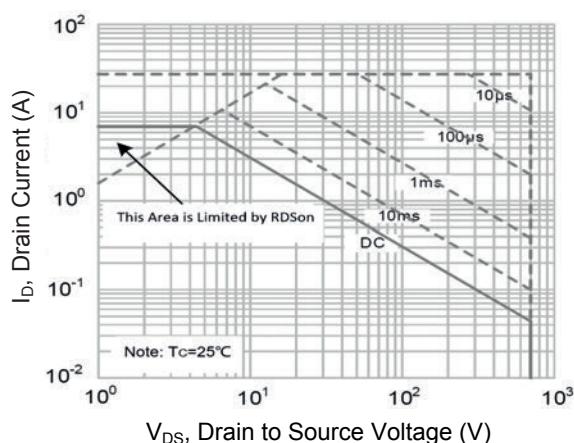
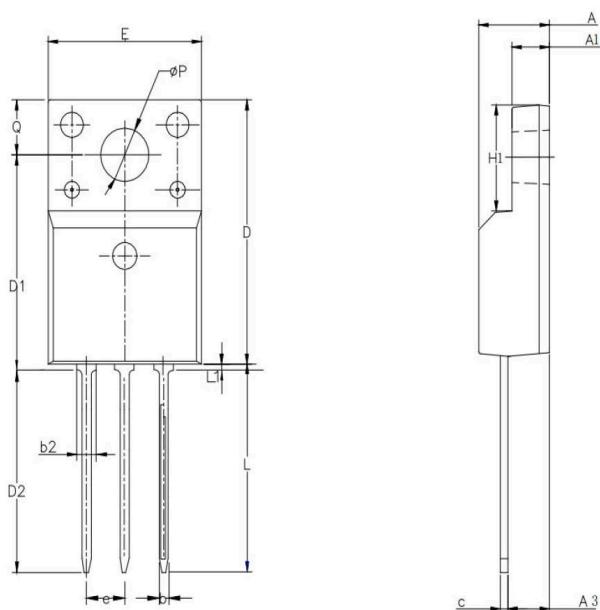


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.42	5.02	0.174	0.198
A1	2.30	2.80	0.091	0.110
A3	2.50	3.10	0.098	0.122
b	0.55	0.80	0.022	0.031
b2	-	1.29	-	0.051
c	0.35	0.65	0.014	0.026
D	15.25	16.25	0.600	0.640
D1	12.87	13.27	0.507	0.522
D2	12.28	12.68	0.483	0.499
E	9.73	10.36	0.383	0.408
e	2.54 BCS		0.10 BCS	
H1	6.40	7.00	0.252	0.276
L	12.48	13.48	0.491	0.531
L1	-	0.85	-	0.033
ΦP	3.00	3.40	0.118	0.134
Q	3.05	3.55	0.120	0.140