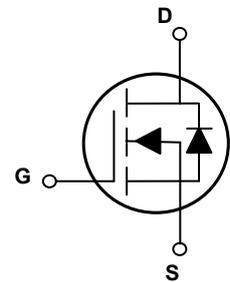


Main Product Characteristics

$V_{(BR)DSS}$	700V
$R_{DS(ON)}$	0.42Ω (max.)
I_D	11A



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 GSFU70R420 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	11	A
Continuous Drain Current, @ Steady-State ($T_C=100^{\circ}\text{C}$)		7.0	A
Pulsed Drain Current	I_{DM}	44	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	37	W
		0.30	W/°C
Single Pulse Avalanche Energy ¹	E_{AS}	576	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	°C/W
Junction-to-Case	$R_{\theta JC}$	3.38	°C/W
Operating Junction and Storage Temperature Range	T_J/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-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	700	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=700V, V_{GS}=0V$	-	-	1	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
		$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=5.5A, T_J=25^\circ\text{C}$	-	0.37	0.42	Ω
		$V_{GS}=10V, I_D=2A, T_J=125^\circ\text{C}$	-	0.82	-	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=100V, F=1\text{MHz}$	-	674	-	pF
Output Capacitance	C_{oss}		-	36	-	
Reverse Transfer Capacitance	C_{rss}		-	2.2	-	
Total Gate Charge ^{4,5}	Q_g	$I_D=11A, V_{DD}=560V, V_{GS}=10V$	-	24.2	-	nC
Gate-to-Source Charge ^{4,5}	Q_{gs}		-	5.3	-	
Gate-to-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	12.1	-	
Turn-on Delay Time ^{4,5}	$t_{d(on)}$	$V_{DD}=350V, V_{GS}=10V, R_G=24\Omega, I_D=11A$	-	14.3	-	nS
Rise Time ^{4,5}	t_r		-	37.5	-	
Turn-Off Delay Time ^{4,5}	$t_{d(off)}$		-	69.2	-	
Fall Time ^{4,5}	t_f		-	32.3	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	4.7	-	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.	-	-	11	A
Source Pulse Current	I_{SM}		-	-	44	A
Diode Forward Voltage	V_{SD}	$I_S=11A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time ³	T_{rr}	$I_F=11A, V_{GS}=0V, dI_F/dt=100A/\mu s$	-	372	-	nS
Reverse Recovery Charge ³	Q_{rr}		-	3.8	-	μC

Notes:

1. $L=79\text{mH}, I_{AS}=3.5A, V_{DD}=100V$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{DS}=0-400V, I_{SD}\leq 20A, T_J=25^\circ\text{C}$.
3. $V_{DS}=0-480V$.
4. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

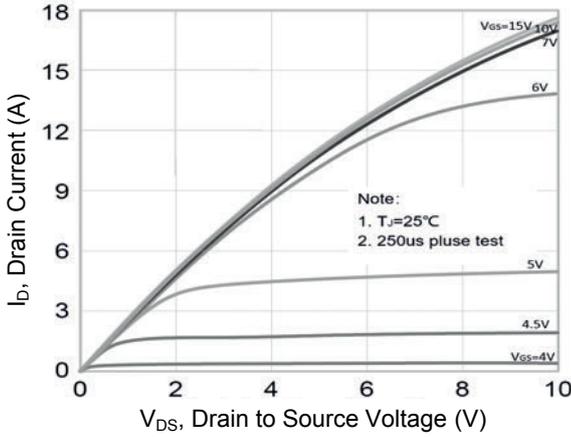


Figure 1. Typical Output Characteristics

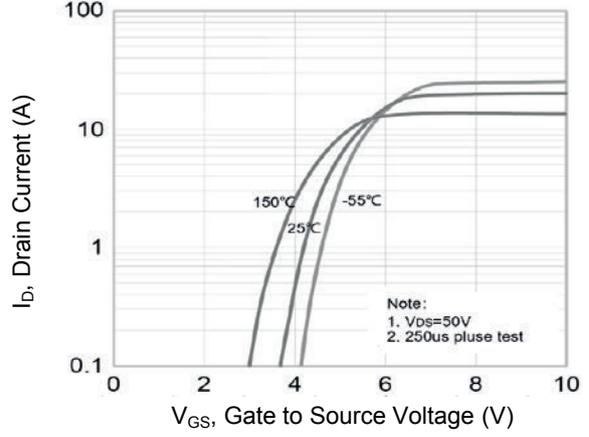


Figure 2. Transfer Characteristics

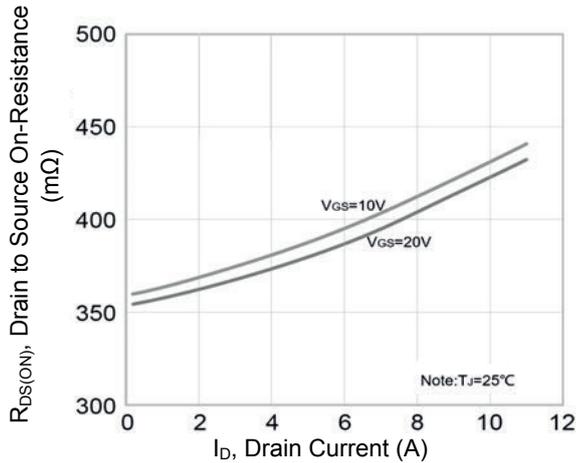


Figure 3. $R_{DS(ON)}$ Vs. Drain Current

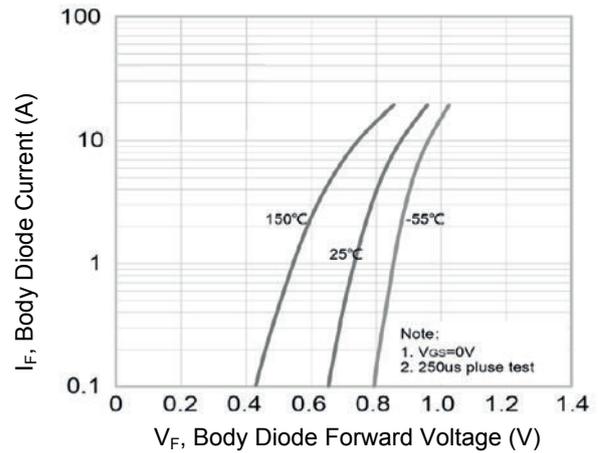


Figure 4. Body Diode Characteristics

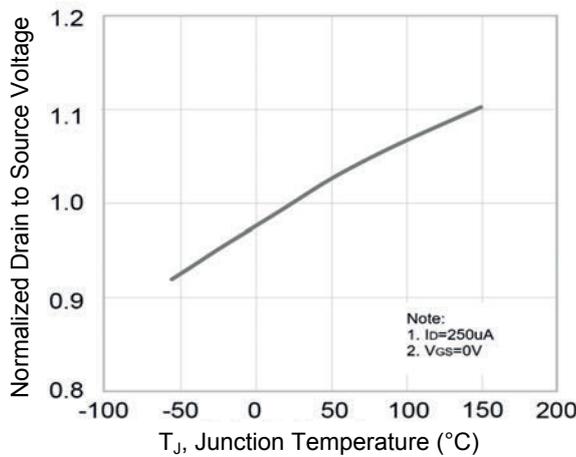


Figure 5. Normalized BV_{DSS} Vs. T_J

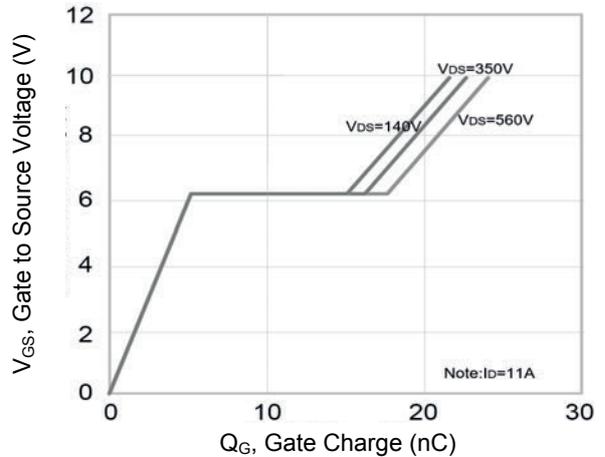


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

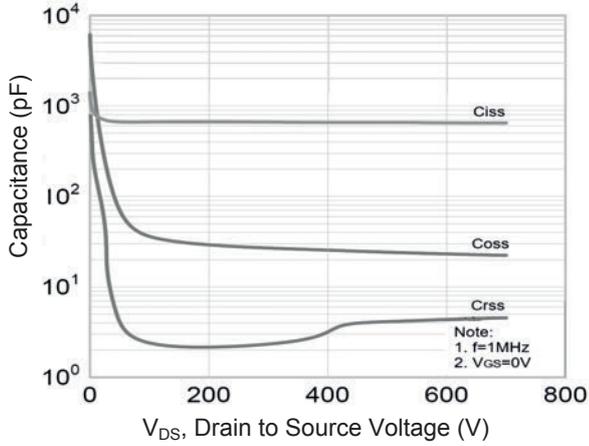


Figure 7. Capacitance Characteristics

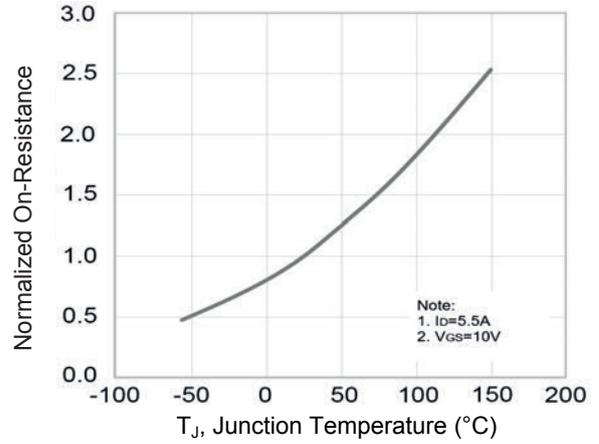


Figure 8. Normalized $R_{DS(ON)}$ Vs. T_J

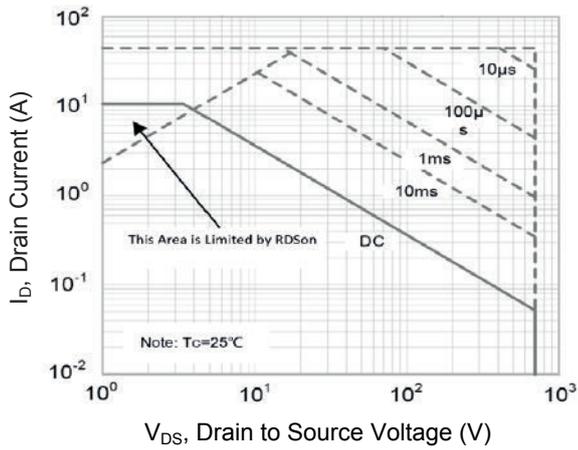
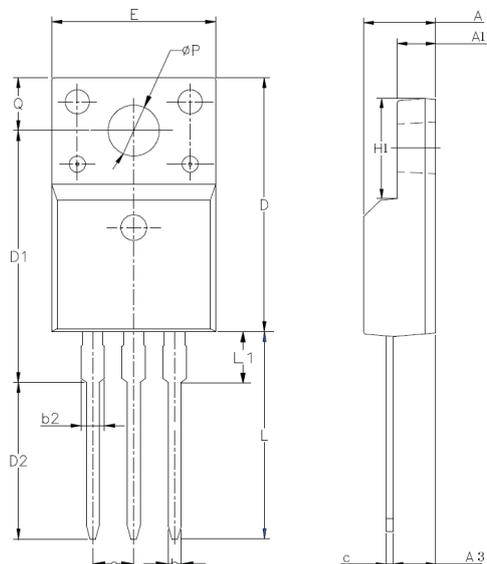


Figure 9. Safe Operation Area

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	0.70	0.90	0.028	0.035
b2	-	1.47	-	0.058
c	0.35	0.65	0.014	0.026
D	15.25	16.25	0.600	0.640
D1	15.30	16.30	0.366	0.642
D2	9.30	10.30	0.366	0.406
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	-	3.50	-	0.138
ΦP	3.00	3.40	0.118	0.134
Q	3.05	3.55	0.120	0.140