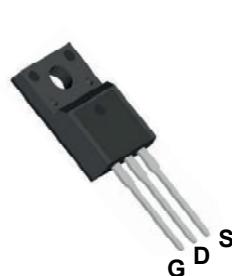
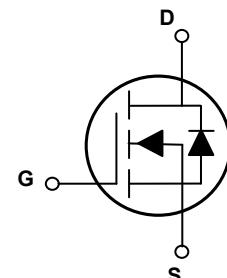


### Main Product Characteristics

$V_{(BR)DSS}$	800V
$R_{DS(ON)}$	1.3Ω (Max.)
$I_D$	4A



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 GSFU80R1K3 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	$V_{DS}$	800	V
Gate-to-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current, @ Steady-State ( $T_C=25^\circ\text{C}$ )	$I_D$	4	A
Continuous Drain Current, @ Steady-State ( $T_C=100^\circ\text{C}$ )		2.5	A
Pulsed Drain Current	$I_{DM}$	16	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	32	W
		0.26	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	210	mJ
Body Diode Reverse Voltage Slope <sup>2</sup>	$dv/dt$	48	V/ns
MOS $dv/dt$ Ruggedness <sup>3</sup>	$dv/dt$	100	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.0	$^\circ\text{C}/\text{W}$
Junction-to-Case	$R_{\theta JC}$	3.91	$^\circ\text{C}/\text{W}$
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
<b>On / Off Characteristics</b>						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	800	-	-	V
Drain-to-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=800\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	$\mu\text{A}$
Gate-to-Source Forward Leakage	$I_{\text{GSS}}$	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=30\text{V}$	-	-	100	nA
		$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=-30\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=2.0\text{A}$	-	1.1	1.3	$\Omega$
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
<b>Dynamic and Switching Characteristics</b>						
Input Capacitance	$C_{\text{iss}}$	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=100\text{V}, f=1\text{MHz}$	-	352	-	pF
Output Capacitance	$C_{\text{oss}}$		-	19	-	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	1.9	-	
Total Gate Charge <sup>4,5</sup>	$Q_g$	$I_D=4\text{A}, V_{\text{DD}}=640\text{V}, V_{\text{GS}}=10\text{V}$	-	19.2	-	nC
Gate-to-Source Charge <sup>4,5</sup>	$Q_{\text{gs}}$		-	3.18	-	
Gate-to-Drain ("Miller") Charge <sup>4,5</sup>	$Q_{\text{gd}}$		-	11.5	-	
Turn-On Delay Time <sup>4,5</sup>	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=400\text{V}, V_{\text{GS}}=10\text{V}, R_G=24\Omega, I_D=4\text{A}$	-	9.68	-	nS
Rise Time <sup>4,5</sup>	$t_r$		-	26.6	-	
Turn-Off Delay Time <sup>4,5</sup>	$t_{\text{d}(\text{off})}$		-	58.82	-	
Fall Time <sup>4,5</sup>	$t_f$		-	25.5	-	
Gate Resistance	$R_g$	$f=1\text{MHz}$	-	6.8	-	$\Omega$
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current (Body Diode)	$I_s$	$T_C=25^\circ\text{C}$ , MOSFET symbol showing the integral reverse p-n junction diode.	-	-	4	A
Source Pulse Current	$I_{\text{SM}}$	$I_S=4\text{A}, V_{\text{GS}}=0\text{V}$	-	-	16	A
Diode Forward Voltage	$V_{\text{SD}}$		-	1.1	1.4	V
Reverse Recovery Time <sup>2</sup>	$T_{\text{rr}}$		-	370	-	nS
Reverse Recovery Charge <sup>2</sup>	$Q_{\text{rr}}$	$I_F=4\text{A}, V_{\text{DD}}=50\text{V}, dI_F/dt=100\text{A}/\mu\text{s}$	-	2.6	-	$\mu\text{C}$

Note:

1.  $L=79\text{mH}, I_{AS}=2.2\text{A}, V_{\text{DD}}=100\text{V}, R_g=25\Omega$ , starting temperature  $T_J=25^\circ\text{C}$ .
2.  $V_{\text{DS}}=0-400\text{V}, I_{\text{SD}} \leq I_s, T_J=25^\circ\text{C}$ .
3.  $V_{\text{DS}}=0-480\text{V}$ .
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

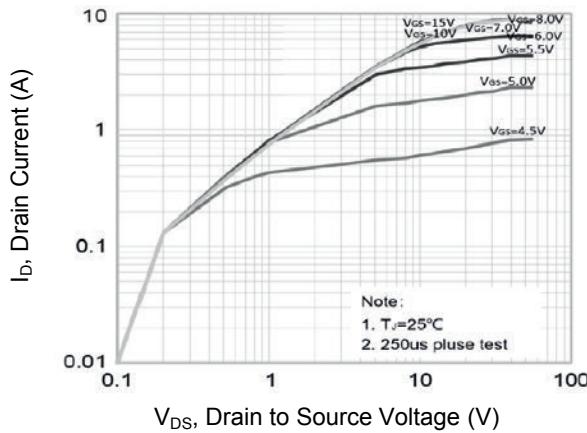


Figure 1. Typical Output Characteristics

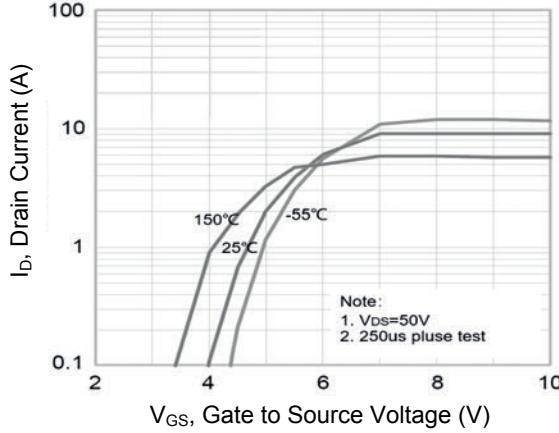


Figure 2. Transfer Characteristics

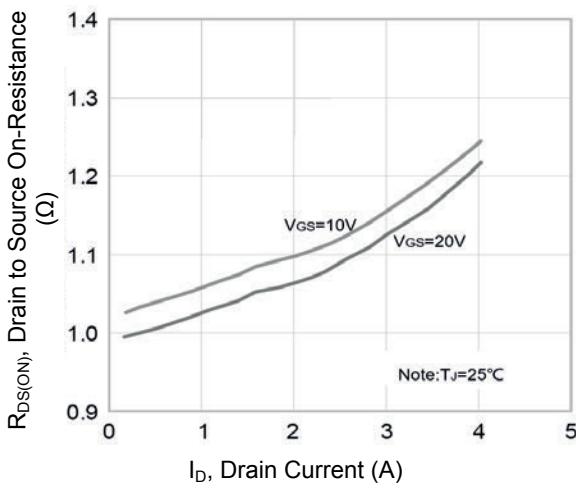


Figure 3.  $R_{DS(ON)}$  Vs. Drain Current

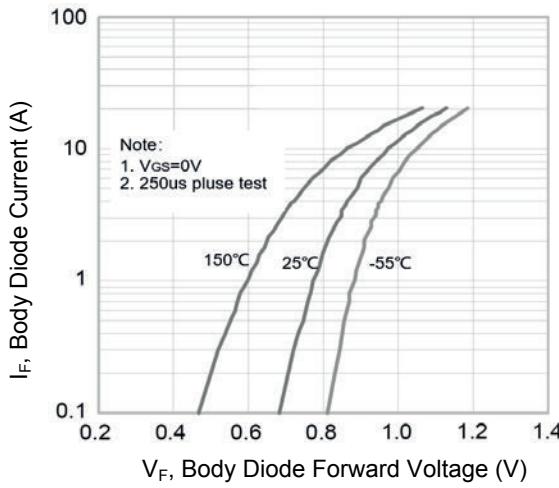


Figure 4. Body Diode Characteristics

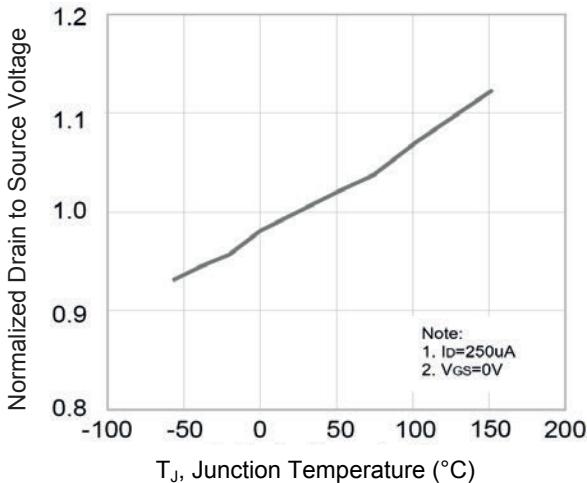


Figure 5. Normalized  $BV_{DSs}$  Vs.  $T_J$

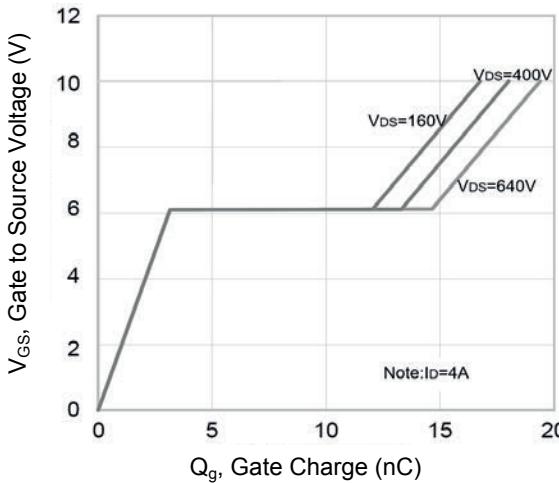


Figure 6. Gate Charge

### Typical Electrical and Thermal Characteristic Curves

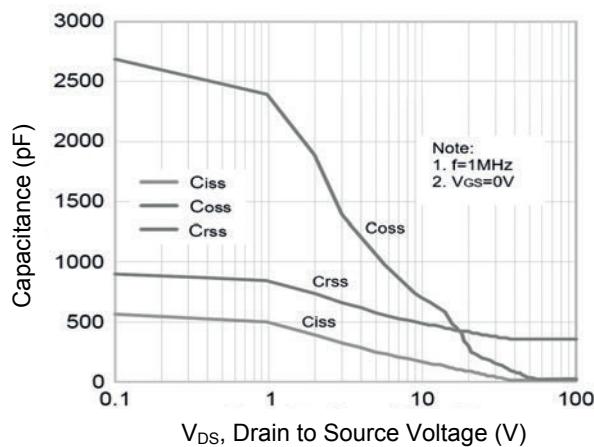


Figure 7. Capacitance Characteristics

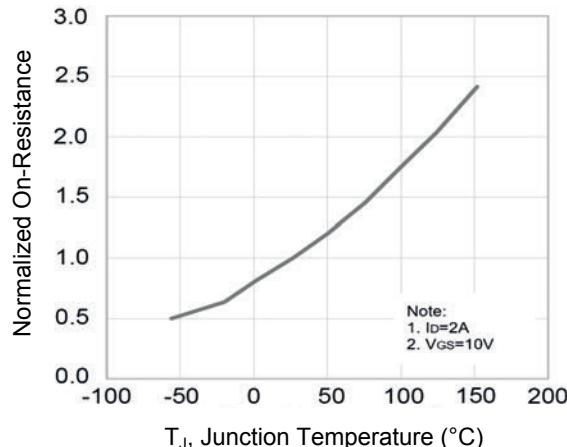


Figure 8. Normalized  $R_{DS(\text{ON})}$  Vs.  $T_J$

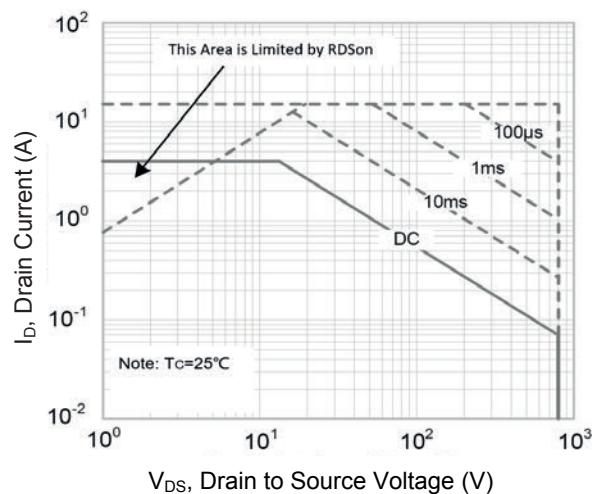
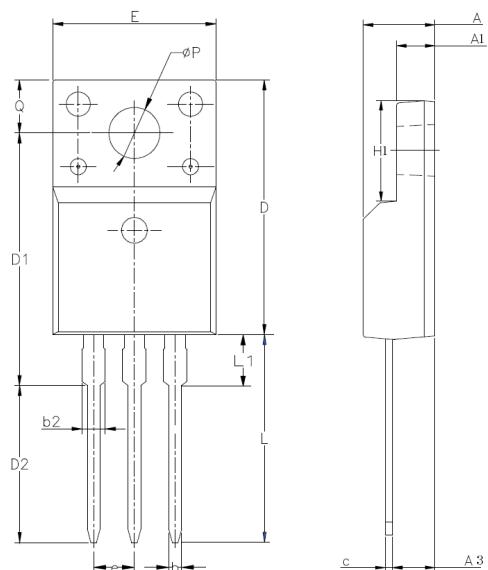


Figure 9. Safe Operation Area

**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	0.85	0.022	0.033
b2	-	1.29	-	0.051
c	0.35	0.65	0.014	0.026
D	15.25	16.25	0.600	0.640
D1	13.97	14.97	0.550	0.589
D2	10.58	11.58	0.417	0.456
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	-	2.00	-	0.079
ΦP	3.00	3.40	0.118	0.134
Q	3.05	3.55	0.120	0.140