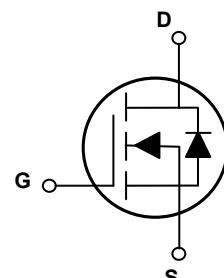
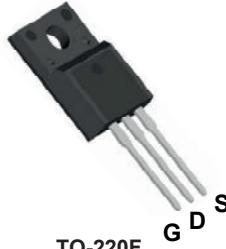


Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	1.4Ω (Max.)
I_D	7A



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 GSFU7N65 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_{DSS}	650	V
Gate-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current ($T_C=25^\circ\text{C}$)	I_D	7	A
Continuous Drain Current ($T_C=100^\circ\text{C}$)		4.4	A
Pulsed Drain Current ¹	I_{DM}	28	A
Single Pulsed Avalanche Energy ³	E_{AS}	435	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	46	W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.7	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J/T_{STG}	-55 to +150	$^\circ\text{C}$



GSFU7N65

650V N-Channel MOSFET

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

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	-
		$V_{\text{DS}}=520\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	50	μA
Gate to Body Leakage Current	I_{GSS}	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=\pm 30\text{V}$	-	-	± 100	nA
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	2	-	4	V
Static Drain-Source On-Resistance ²	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}}=10\text{V}, I_D=3.5\text{A}$	-	1.1	1.4	Ω
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1.0\text{MHz}$	-	789	-	pF
Output Capacitance	C_{oss}		-	98	-	pF
Reverse Transfer Capacitance	C_{rss}		-	9	-	pF
Total Gate Charge	Q_g	$V_{\text{DD}}=520\text{V}, I_D=7\text{A}, V_{\text{GS}}=10\text{V}$	-	21.4	-	nC
Gate-Source Charge	Q_{gs}		-	4.54	-	nC
Gate-Drain ("Miller") Charge	Q_{gd}		-	10.2	-	nC
Turn-on Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=325\text{V}, I_D=7\text{A}, R_G=25\Omega$	-	15	-	ns
Turn-on Rise Time	t_r		-	32	-	ns
Turn-off Delay Time	$t_{\text{d}(\text{off})}$		-	51	-	ns
Turn-off Fall Time	t_f		-	32.3	-	ns
Source-Drain Ratings and Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	7	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}		-	-	28	A
Drain to Source Diode Forward Voltage	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{SD}}=7\text{A}$	-	-	1.4	V
Reverse Recovery Time	t_{rr}	$V_{\text{GS}}=0\text{V}, I_S=7\text{A}, \frac{di}{dt}=100\text{A}/\mu\text{s}$	-	498	-	ns
Reverse Recovery Charge	Q_{rr}		-	3.1	-	μC

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. $L=30\text{mH}, I_{AS}=5\text{A}, V_{DD}=100\text{V}, T_J=25^\circ\text{C}$.

Typical Electrical and Thermal Characteristic Curves

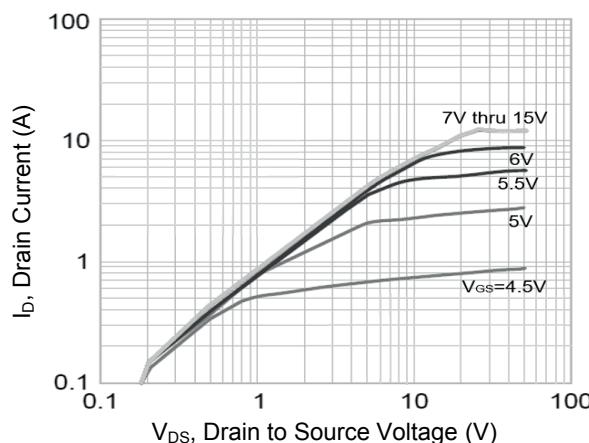


Figure 1. Output Characteristics

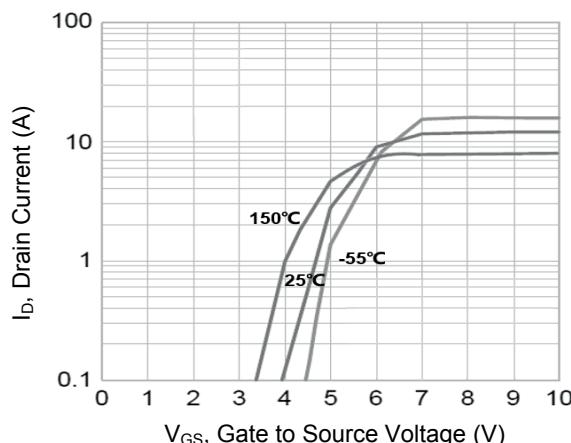


Figure 2. Transfer Characteristics

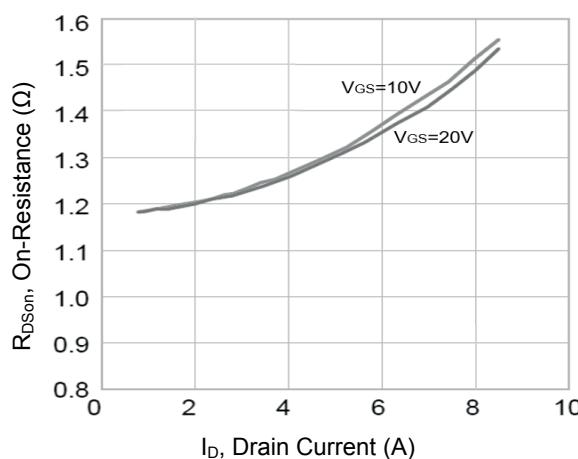


Figure 3. $R_{DS(ON)}$ Vs. Drain Current

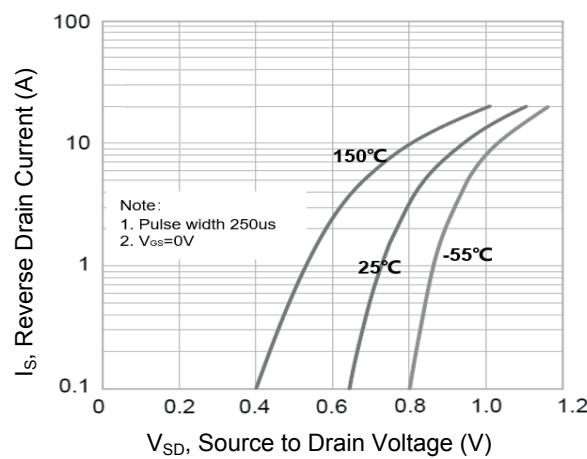


Figure 4. Body Diode Characteristics

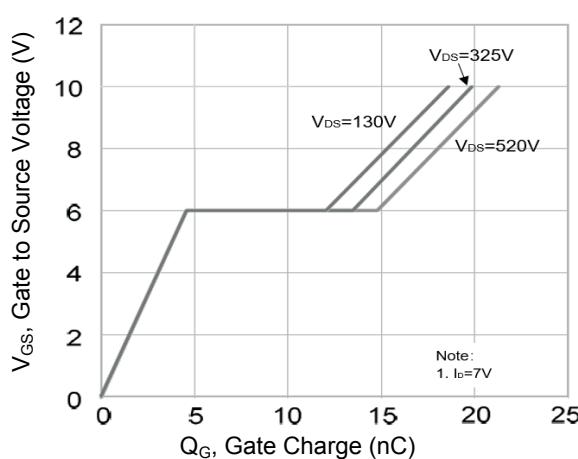


Figure 5. Gate Charge

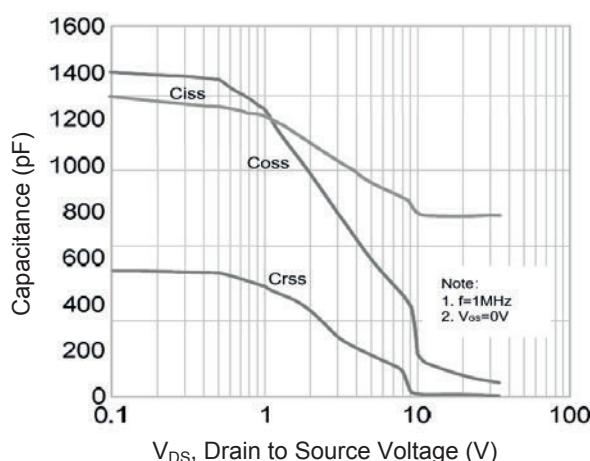


Figure 6. Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

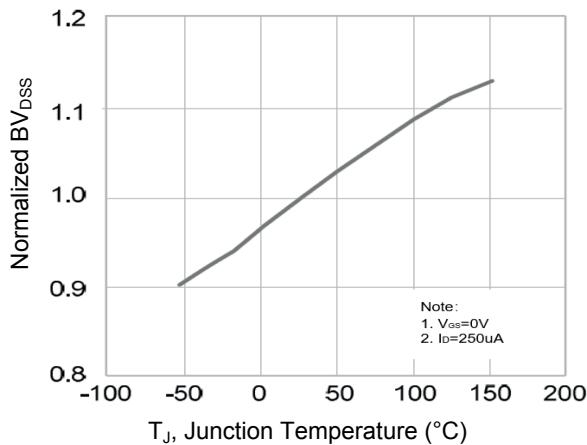


Figure 7. Normalized BV_{DSS} Vs. T_J

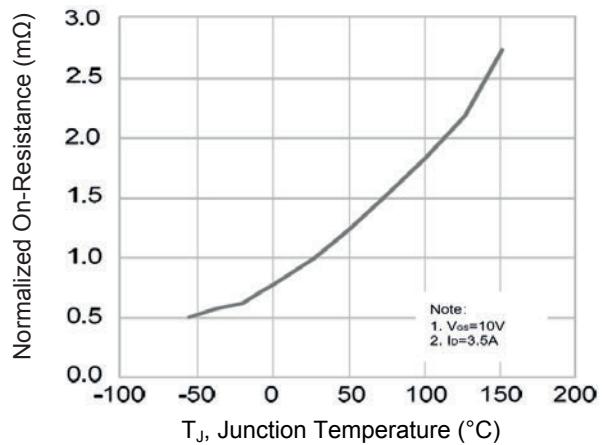


Figure 8. Normalized $R_{DS(ON)}$ Vs. T_J

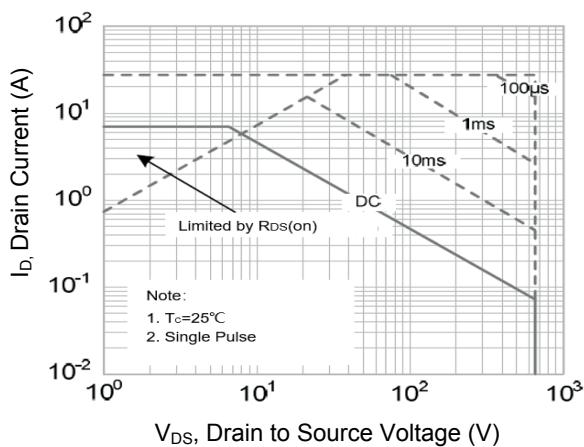


Figure 9. Safe Operation Area

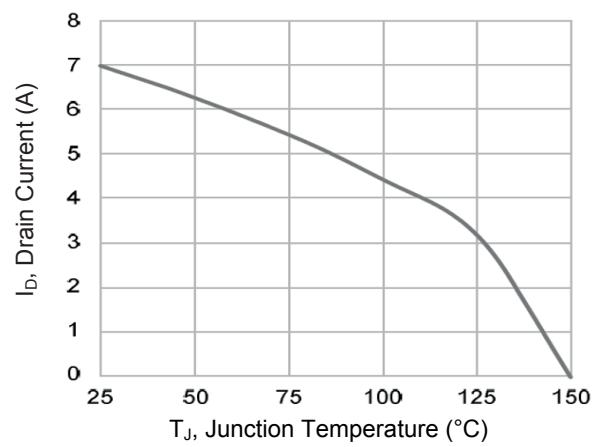
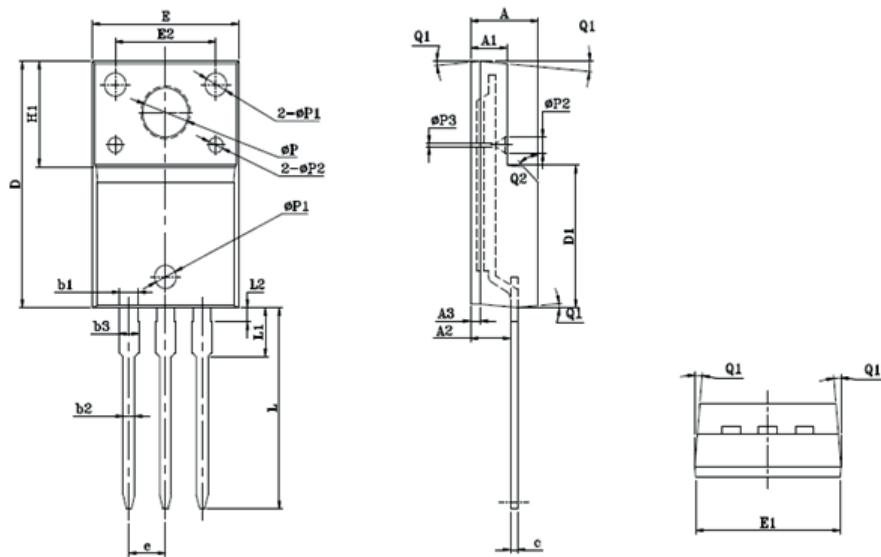


Figure 10. Current De-Rating

Package Outline Dimensions (TO-220F)



Symbol	Dimension In Millimeters		Dimension In Inches	
	Min	Max	Min	Max
E	9.96	10.36	0.392	0.408
E1	9.84	10.24	0.387	0.403
E2	6.80	7.20	0.268	0.283
A	4.60	4.80	0.181	0.189
A1	2.44	2.64	0.096	0.104
A2	2.66	2.86	0.105	0.113
A3	0.60	0.80	0.024	0.031
c	-	-	-	-
D	15.78	15.98	0.621	0.629
D1	8.97	9.37	0.353	0.369
H1	6.50	6.80	0.256	0.268
e	2.54 BSC		0.10 BSC	
ΦP	3.08	3.28	0.121	0.129
ΦP1	1.40	1.60	0.055	0.063
ΦP2	0.90	1.10	0.035	0.043
ΦP3	0.10	0.30	0.004	0.012
L	12.78	13.18	0.503	0.519
L1	2.97	3.37	0.117	0.133
L2	0.83	1.03	0.033	0.041
Q1	3°	7°	3°	7°
Q2	43°	47°	43°	47°
b1	1.18	1.38	0.046	0.054
b2	0.76	0.84	0.030	0.033
b3	-	1.42	-	0.056