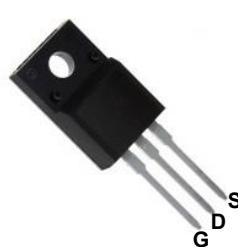
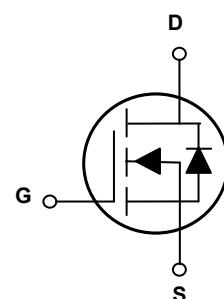


Main Product Characteristics

BV _{DSS}	650V
R _{DS(ON)}	0.8Ω (Max.)
I _D	10A



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 GSFU10N65 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°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage	V _{GS}	±30	V
Continuous Drain Current @ Steady-State ¹ (T _C =25°C)	I _D	10	A
Continuous Drain Current @ Steady-State (T _C =70°C)		5.5	
Drain Current-Pulsed ²	I _{DM}	40	A
Single Pulse Avalanche Energy ³	E _{AS}	650	mJ
Power Dissipation (T _C =25°C)	P _D	40	W
Linear Derating Factor (T _C =25°C)		0.32	W/°C
Junction-to-Ambient (PCB Mounted, Steady-State) ⁴	R _{θJA}	120	°C/W
Junction-to-Case	R _{θJC}	2.2	°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	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	650	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-Source Leakage Current	I_{GS}	$V_{\text{GS}}=\pm 30\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=10\text{A}$	-	0.74	0.8	Ω
Gate Resistance	R_g	$F=1\text{MHz}$	-	1.9	-	Ω
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_D=250\mu\text{A}$	2.1	3	3.9	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	$V_{\text{DS}}=480\text{V}, I_D=10\text{A}, V_{\text{GS}}=10\text{V}$	-	21	-	nC
Gate-Source Charge	Q_{gs}		-	7.8	-	
Gate-Drain ("Miller") Charge	Q_{gd}		-	6.4	-	
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DS}}=300\text{V}, R_{\text{GEN}}=25\Omega$ $V_{\text{GS}}=10\text{V}, I_D=10\text{A}$	-	41	-	nS
Rise Time	t_r		-	73.4	-	
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	53	-	
Fall Time	t_f		-	38	-	
Input Capacitance	C_{iss}	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	1940	-	pF
Output Capacitance	C_{oss}		-	131	-	
Reverse Transfer Capacitance	C_{rss}		-	3.5	-	
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_s	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	10	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	40	A
Diode Forward Voltage	V_{SD}	$V_{\text{GS}}=0\text{V}, I_s=10\text{A}$	-	-	1.4	V
Reverse Recovery Time	t_{rr}	$I_F=10\text{A}, dI/dt=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	-	571	-	nS
Reverse Recovery Charge	Q_{rr}		-	4.6	-	μC

Note:

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating: Pulsed width limited by maximum junction temperature.
- $V_{\text{DD}}=150\text{V}, L=30\text{mH}, I_{\text{AS}}=5.8\text{A}, T_J=25^\circ\text{C}$.
- Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

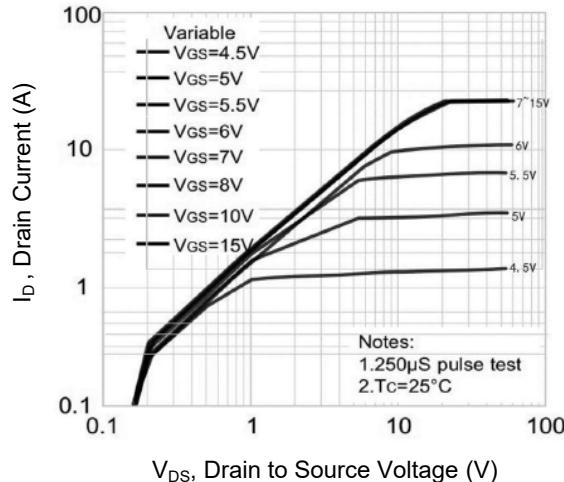


Figure 1. Typical Output Characteristics

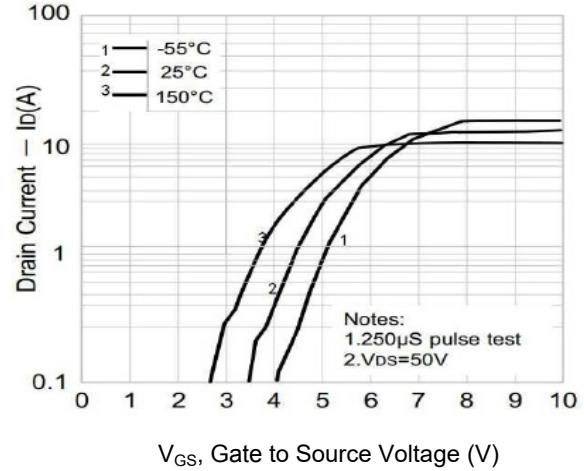


Figure 2. Transfer Characteristics

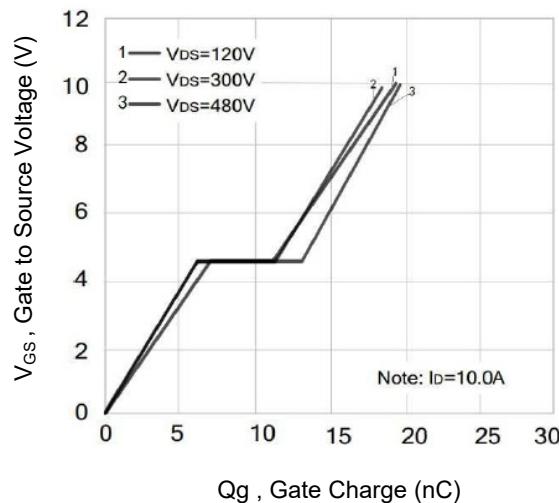


Figure 3. Gate Charge Waveform

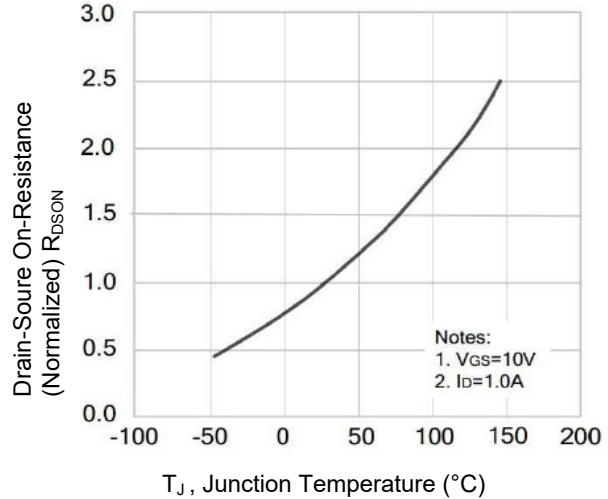


Figure 4. Normalized On Resistance vs. T_J

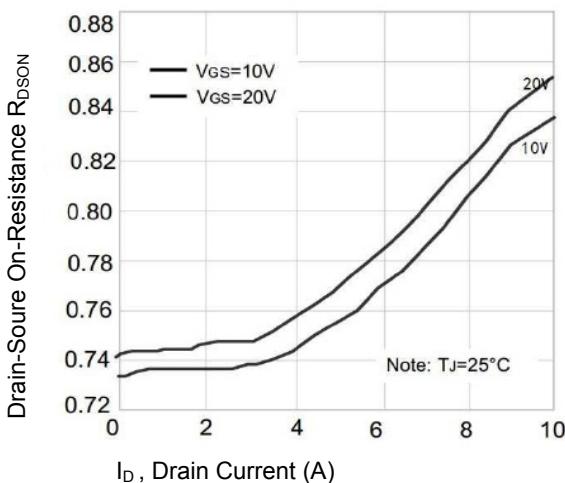


Figure 5. Drain-Source On-Resistance

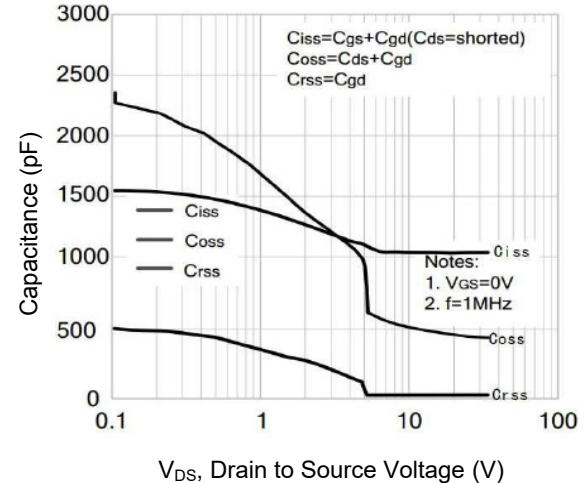


Figure 6. Capacitance Vs. Drain-to-Source Voltage

Typical Electrical and Thermal Characteristic Curves

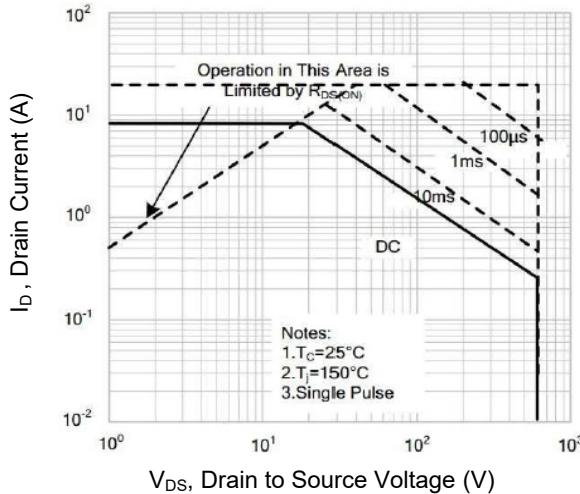


Figure 7. Safe Operation Area

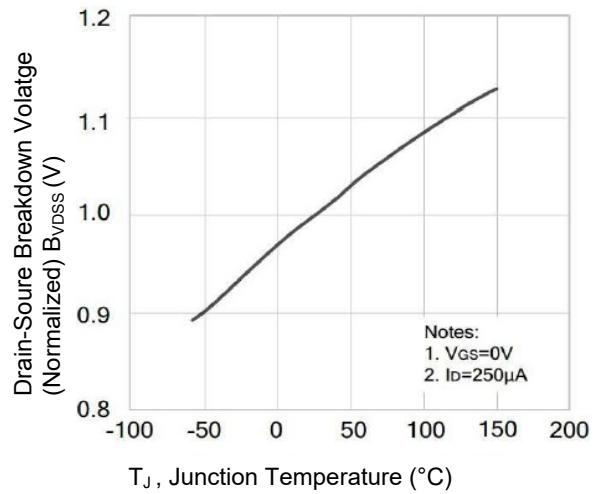


Figure 8. Normalized BV_{DSS} vs. T_J

Typical Electrical and Thermal Characteristic Curves

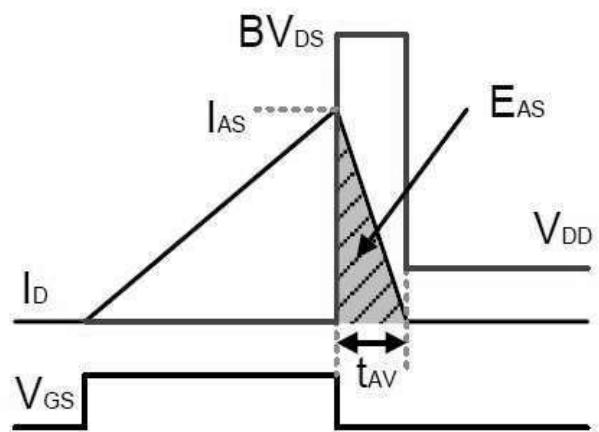
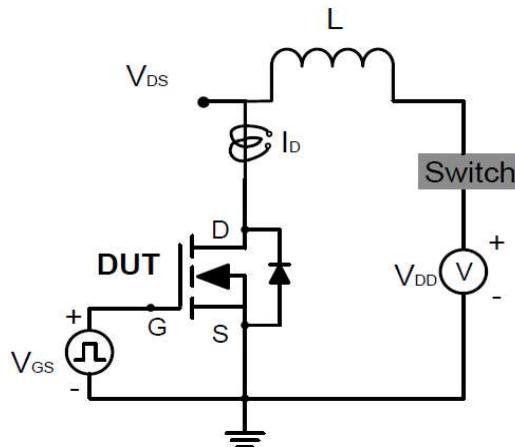


Figure 9. EAS Test Circuit & Waveforms

Switch Time Test Circuit:

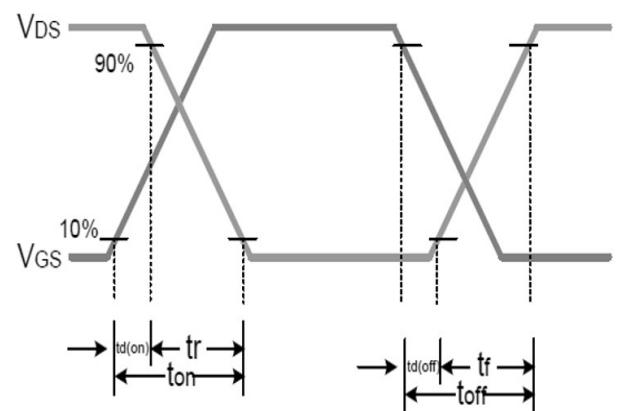
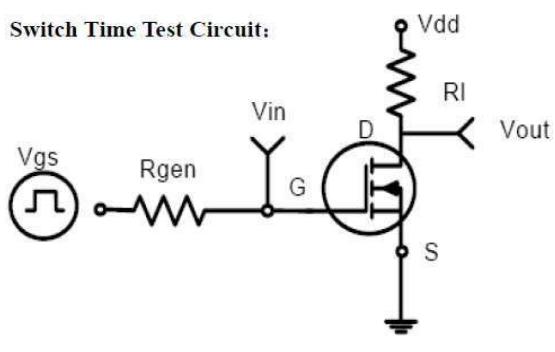


Figure 10. Resistive Switching Test Circuit & Waveforms

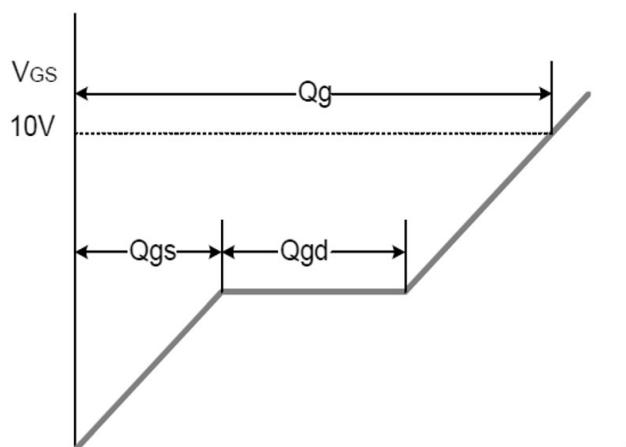
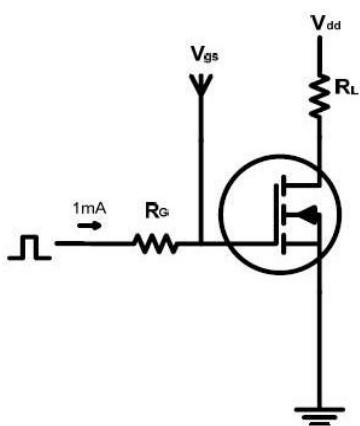
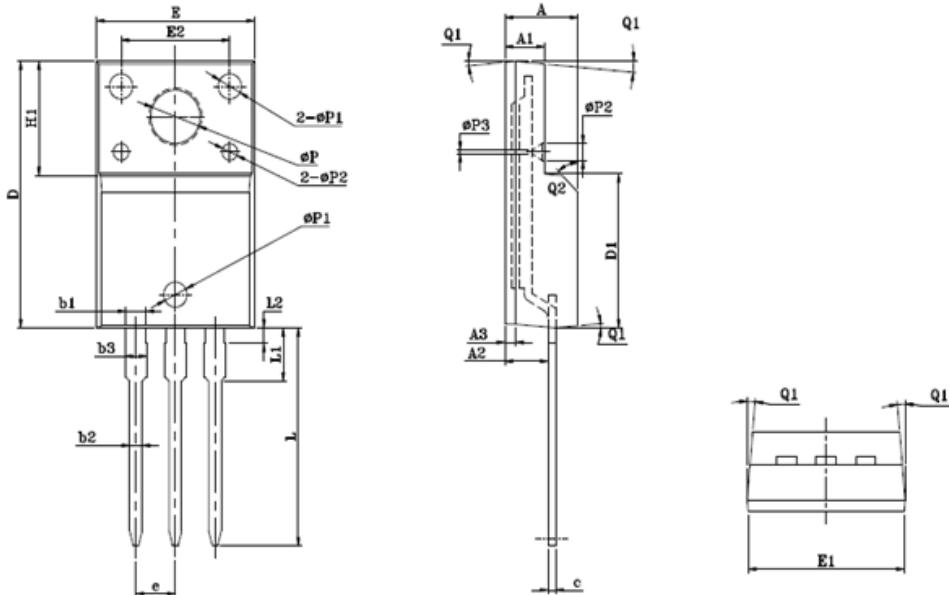


Figure 11. Gate Charge Test Circuit & Waveform

Package Outline Dimensions (TO-220F)



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
E	9.960	10.160	10.360	0.392	0.400	0.408
E1	9.840	10.040	10.240	0.387	0.395	0.403
E2	6.800	7.000	7.200	0.268	0.276	0.283
A	4.600	4.700	4.800	0.181	0.185	0.189
A1	2.440	2.540	2.640	0.096	0.100	0.104
A2	2.660	2.760	2.860	0.105	0.109	0.113
A3	0.600	0.700	0.800	0.024	0.028	0.031
c	-	0.500	-	-	0.020	-
D	15.780	15.870	15.980	0.621	0.625	0.629
D1	8.970	9.170	9.370	0.353	0.361	0.369
H1	6.500	6.700	6.800	0.256	0.264	0.268
e	2.54BSC			0.10BSC		
ΦP	3.080	3.180	3.280	0.121	0.125	0.129
ΦP1	1.400	1.500	1.600	0.055	0.059	0.063
ΦP2	0.900	1.000	1.100	0.035	0.039	0.043
ΦP3	0.100	0.200	0.300	0.004	0.008	0.012
L	12.780	12.980	13.180	0.503	0.511	0.519
L1	2.970	3.170	3.370	0.117	0.125	0.133
L2	0.830	0.930	1.030	0.033	0.037	0.041
Q1	3°	5°	7°	3°	5°	7°
Q2	43°	45°	47°	43°	45°	47°
b1	1.180	1.280	1.380	0.046	0.050	0.054
b2	0.760	0.800	0.840	0.030	0.031	0.033
b3	-	-	1.420	-	-	0.056