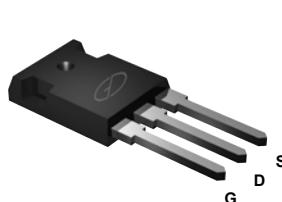
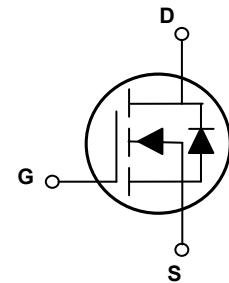


Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	100mΩ (max.)
I_D	35A



TO-247



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 GSFA65RF100 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 ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous, at Steady-State, ($T_C=25^\circ\text{C}$)	I_D	35	A
Drain Current-Continuous, at Steady-State, ($T_C=100^\circ\text{C}$)		22	
Drain Current-Pulsed	I_{DM}	140	A
Single Pulse Avalanche Energy ¹	E_{AS}	1131	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	298	W
Power Dissipation – Derate above 25°C		2.4	W/°C
Body Diode Reverse Voltage Slope ²	dv/dt	50	V/ns
MOS dv/dt Ruggedness ³	dv/dt	100	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.42	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 To +150	°C
Soldering Temperature	T_{SOLD}	260	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	650	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	6	μA
		$V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	80	-	μA
Gate-Source Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 30\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=17.5\text{A}$	-	85	100	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	2.5	-	4.5	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{4,5}	Q_g	$V_{\text{DD}}=520\text{V}, I_{\text{D}}=35\text{A}, V_{\text{GS}}=10\text{V}$	-	139	-	nC
Gate-Source Charge ^{4,5}	Q_{gs}		-	21	-	
Gate-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	92	-	
Gate to Plateau ^{4,5}	V_{plateau}		-	7.1	-	
Turn-On Delay Time ^{4,5}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=325\text{V}, R_{\text{G}}=1.6\Omega, V_{\text{GS}}=10\text{V}, I_{\text{D}}=35\text{A}$	-	28	-	nS
Rise Time ^{4,5}	t_r		-	69	-	
Turn-Off Delay Time ^{4,5}	$t_{\text{d}(\text{off})}$		-	92	-	
Fall Time ^{4,5}	t_f		-	28	-	
Input Capacitance	C_{iss}	$V_{\text{DS}}=100\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	2923	-	pF
Output Capacitance	C_{oss}		-	109	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	1.1	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_s	$T_c=25^\circ\text{C}$, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	35	A
Pulsed Source Current	I_{SM}	-	-	140	A	
Diode Forward Voltage	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=35\text{A}$	-	-	1.4	V
Reverse Recovery Time ⁴	t_{rr}	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=35\text{A}, \text{di}/\text{dt}=100\text{A}/\mu\text{s}$	-	125	-	nS
Reverse Recovery Charge ⁴	Q_{rr}		-	0.6	-	μC
Reverse Recovery Peak Current ⁴	I_{rrm}		-	10	-	A

Note:

1. $L=79\text{mH}, I_{AS}=5.0\text{A}, V_{DD}=100\text{V}, R_g=25\Omega$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{\text{DS}}=0\text{ - }400\text{V}, I_{\text{SD}} \leq I_s, T_J=25^\circ\text{C}$.
3. $V_{\text{DS}}=0\text{ - }400\text{V}$.
4. Pulse test: pulse width $\leq 300\text{us}$, duty cycle $\leq 2\%$.
5. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

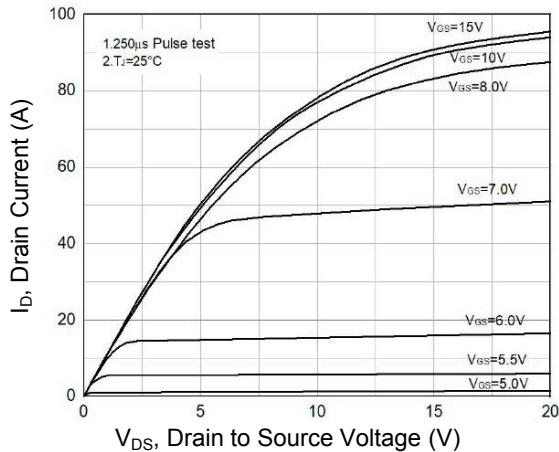


Figure 1. Typical Output Characteristics

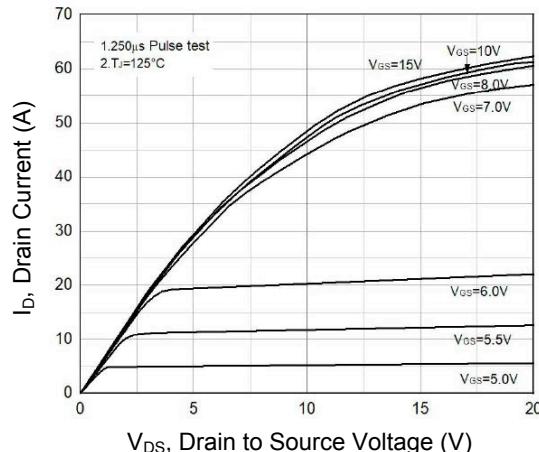


Figure 2. Typical Output Characteristics

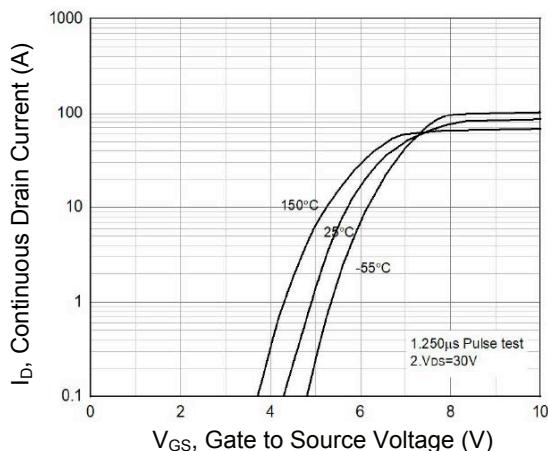


Figure 3. Transfer Characteristics

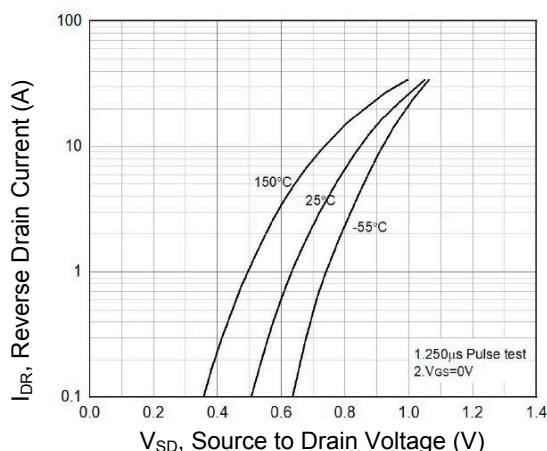


Figure 4. Body Diode Characteristics

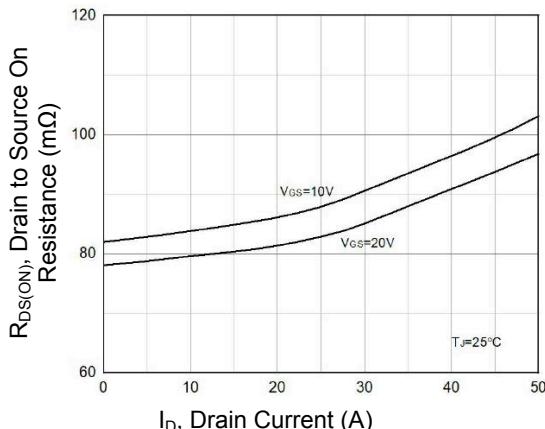


Figure 5. $R_{DS(ON)}$ vs. Drain Current

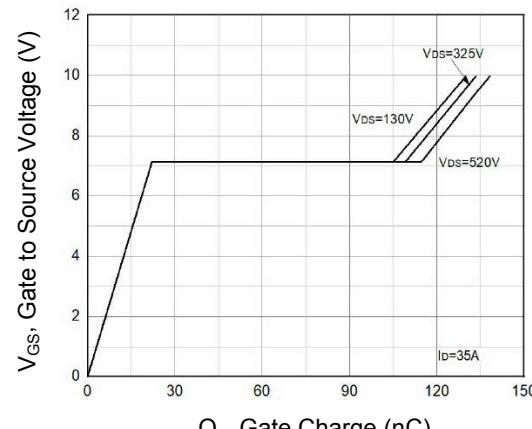


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

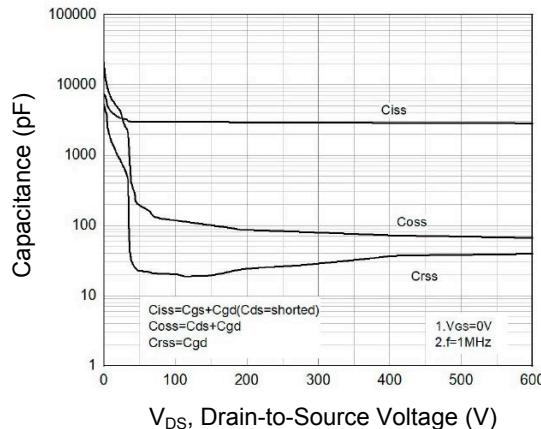


Figure 7. Capacitance Characteristics

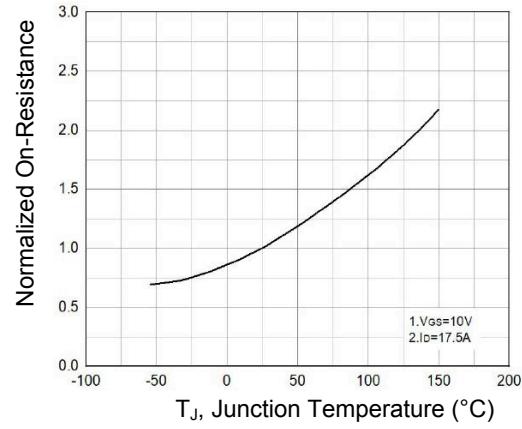


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

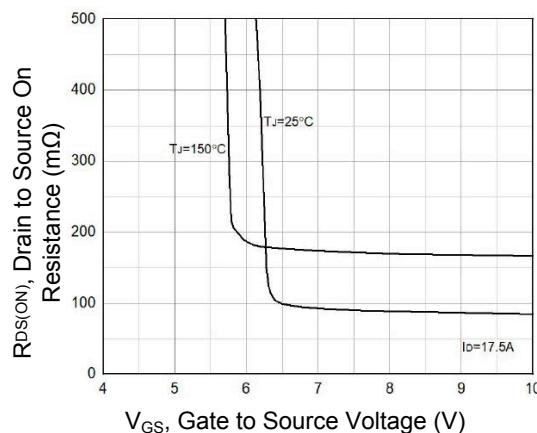


Figure 9. Normalized $R_{DS(ON)}$ vs. V_{GS}

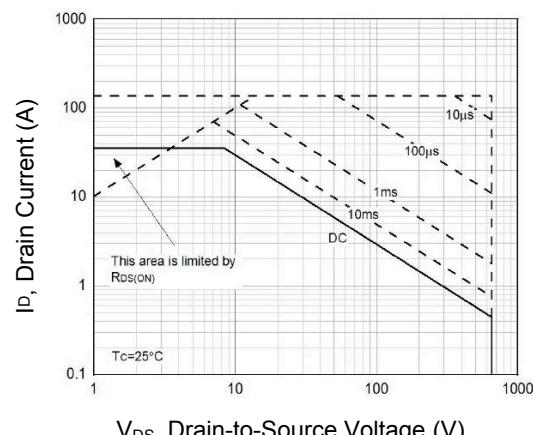


Figure 10. Safe Operation Area

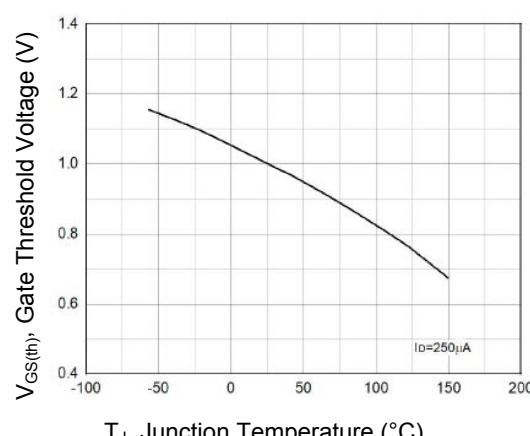


Figure 11. Gate Threshold Voltage vs. T_J

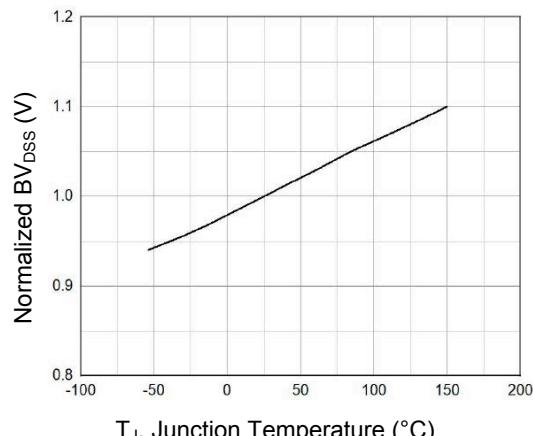


Figure 12. Normalized $BV_{DS(on)}$ vs. T_J

Typical Electrical and Thermal Characteristic Curves

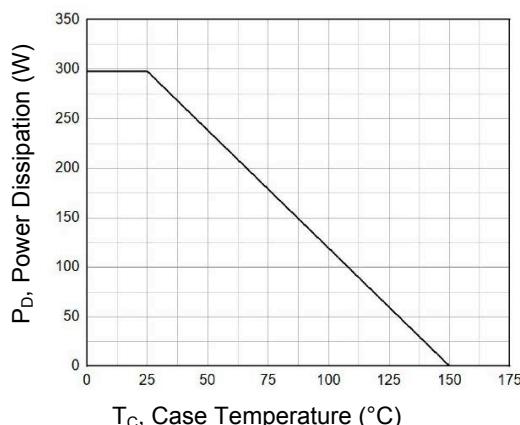


Figure 13. Power Dissipation vs. T_c

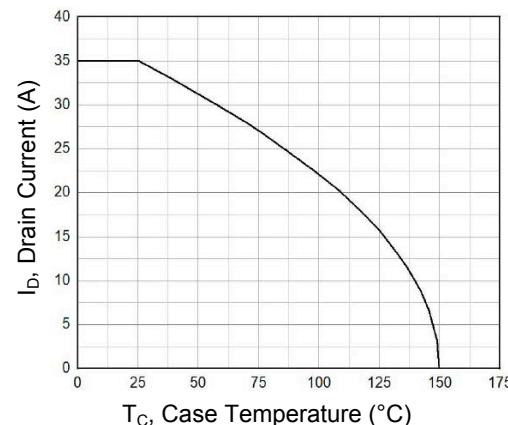


Figure 14. Drain Current vs. T_c

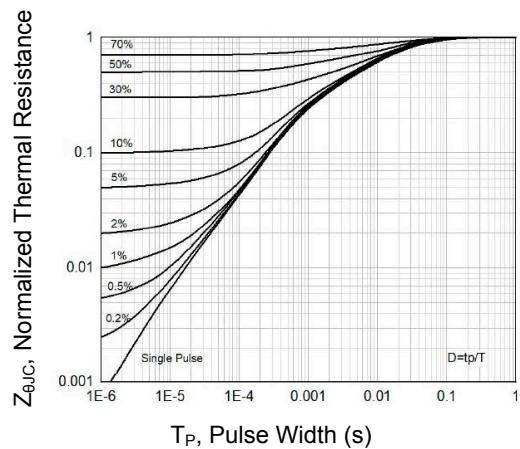
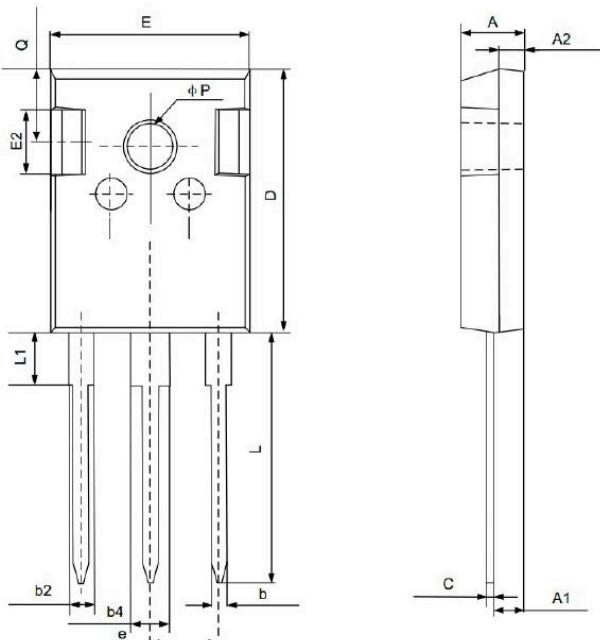


Figure 15. Transient Thermal Impedance vs. T_p

Package Outline Dimensions (TO-247)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.800	5.200	0.189	0.205
A1	2.210	2.590	0.087	0.102
A2	1.850	2.150	0.073	0.085
b	1.110	1.360	0.044	0.054
b2	1.910	2.250	0.075	0.089
b4	2.910	3.250	0.115	0.128
c	0.510	0.750	0.020	0.030
D	20.800	21.300	0.819	0.839
E	15.500	16.100	0.610	0.634
E2	4.400	5.200	0.173	0.205
e	5.440 BSC		0.214 BSC	
L	19.720	20.220	0.776	0.796
L1	-	4.300	-	0.169
Q	5.600	6.000	0.220	0.236
P	3.400	3.800	0.134	0.150