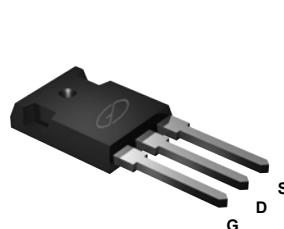
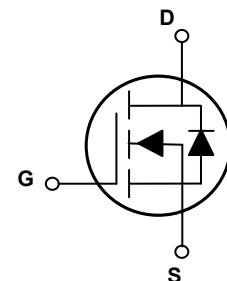


Main Product Characteristics

$V_{(BR)DSS}$	150V
$R_{DS(ON)}$	5.0mΩ (Typ.)
I_D	175A



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 GSFA7R515 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_{DS}	150	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, @ Steady-State ($T_C=25^\circ\text{C}$) ¹	I_D	175	A
Continuous Drain Current, @ Steady-State ($T_C=100^\circ\text{C}$)		124	A
Pulsed Drain Current ²	I_{DM}	690	A
Power Dissipation ($T_A=25^\circ\text{C}$)	P_D	500	W
Linear Derating Factor ($T_A=25^\circ\text{C}$)		3.33	W/°C
Single Pulse Avalanche Energy ³	E_{AS}	803	mJ
Junction-to-Case	$R_{\theta JC}$	0.3	°C/W
Junction-to-Ambient (PCB Mounted, Steady-State) ⁴	$R_{\theta JA}$	62.0	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to + 175	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	150	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=150\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{\text{GS}}=20\text{V}$	-	-	100	nA
		$V_{\text{GS}}=-20\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=100\text{A}$	-	5.0	7.5	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_D=250\mu\text{A}$	2.1	3	3.9	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=25\text{V}, f=1\text{MHz}$	-	5400	-	pF
Output Capacitance	C_{oss}		-	3300	-	
Reverse Transfer Capacitance	C_{rss}		-	80	-	
Total Gate Charge	Q_g	$I_D=100\text{A}, V_{\text{DS}}=120\text{V}, V_{\text{GS}}=10\text{V}$	-	81	-	nC
Gate-to-Source Charge	Q_{gs}		-	29	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	15	-	
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{GS}}=10\text{V}, V_{\text{DS}}=75\text{V}, I_D=80\text{A}, R_{\text{GEN}}=2.5\Omega$	-	16.5	-	nS
Rise Time	t_r		-	106.3	-	
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	60.6	-	
Fall Time	t_f		-	104.6	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	4.3	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	175	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	690	A
Diode Forward Voltage	V_{SD}	$I_S=80\text{A}, V_{\text{GS}}=0\text{V}$	-	1	1.2	V
Reverse Recovery Time	T_{rr}	$T_J=25^\circ\text{C}, I_F=80\text{A}, \text{di}/\text{dt}=100\text{A}/\mu\text{s}$	-	110	-	nS
Reverse Recovery Charge	Q_{rr}		-	0.36	-	μC

Note:

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. $L=0.3\text{mH}, R_G=25\Omega, V_{\text{DD}}=50\text{V}, T_J=25^\circ\text{C}$.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

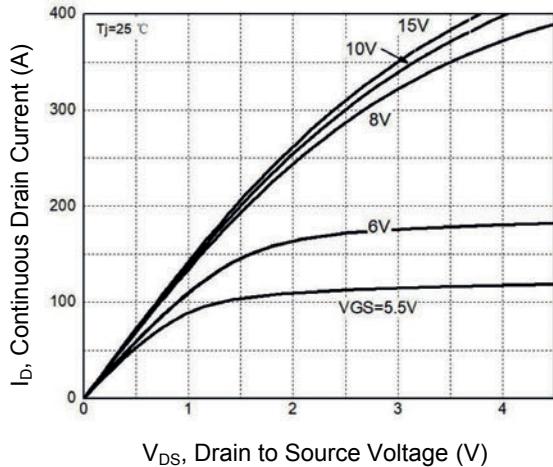


Figure 1. Typical Output Characteristics

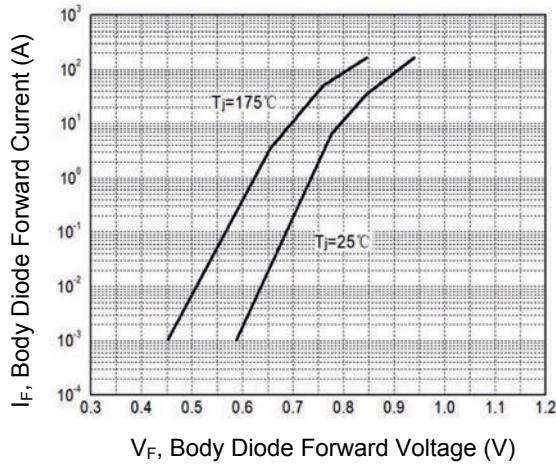


Figure 2. Body Diode Characteristics

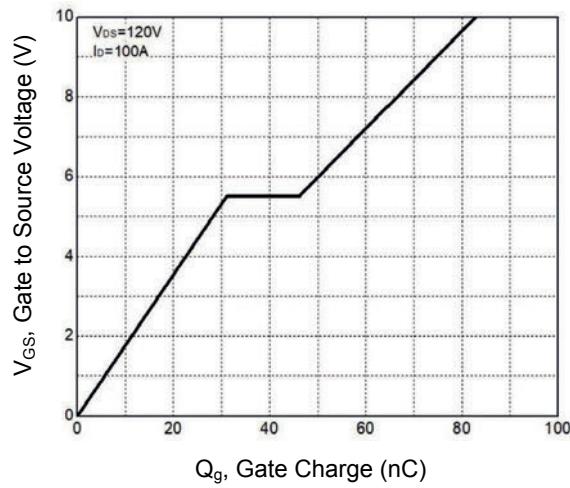


Figure 3. Gate Charge

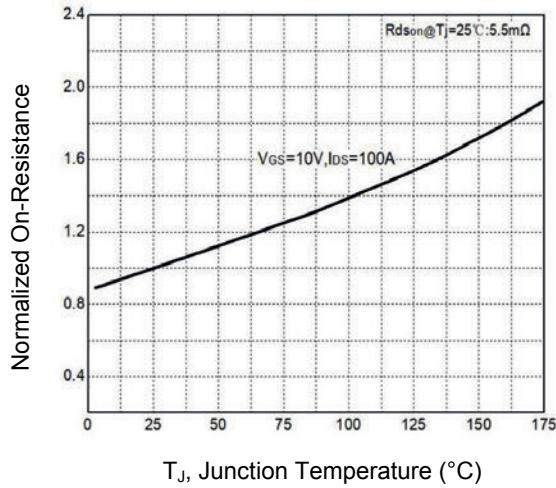


Figure 4. Normalized $R_{DS(ON)}$ Vs. T_J

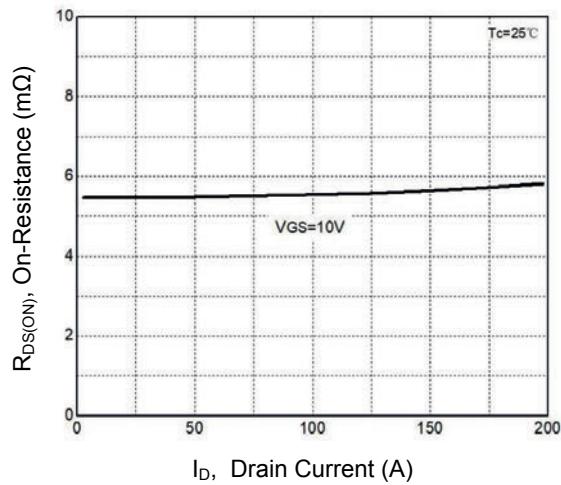


Figure 5. Drain to Source On-Resistance

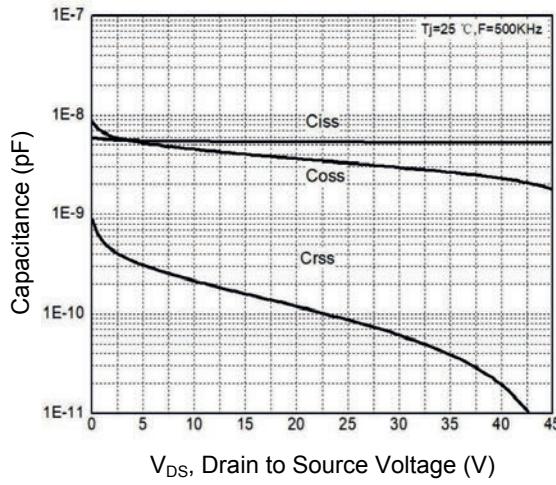


Figure 6. Typical Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

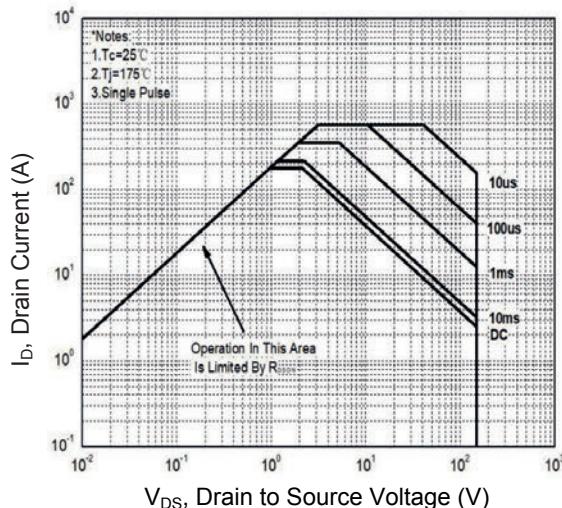


Figure 7. Safe Operation Area

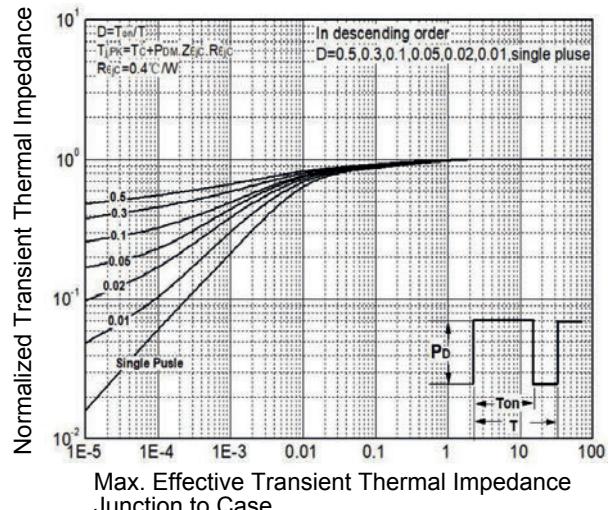
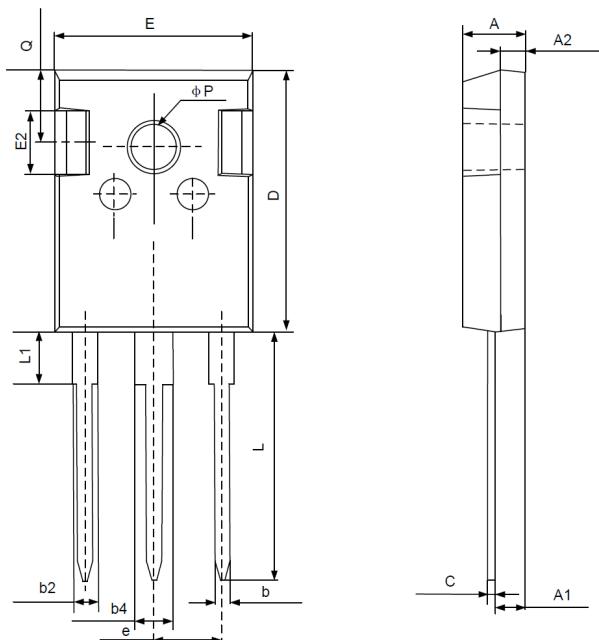


Figure 8. Thermal Transient Impedance

Package Outline Dimensions (TO-247)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.80	5.20	0.189	0.205
A1	2.21	2.59	0.087	0.102
A2	1.85	2.15	0.073	0.085
b	1.11	1.36	0.044	0.054
b2	1.91	2.25	0.075	0.089
b4	2.91	3.25	0.115	0.128
C	0.51	0.75	0.020	0.030
D	20.80	21.30	0.819	0.839
E	15.50	16.10	0.610	0.634
E2	4.40	5.20	0.173	0.205
e	5.44 BSC		0.214 BSC	
L	19.72	20.22	0.776	0.796
L1	-	4.30	-	0.169
Q	5.60	6.00	0.220	0.236
P	3.40	3.80	0.134	0.150