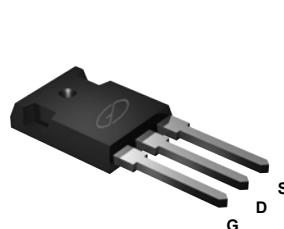
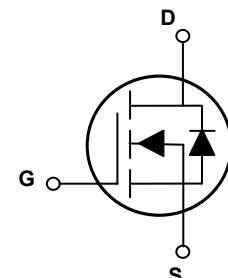


Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.22Ω (max.)
I_D	20A



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 GSJA65R220 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}	650	V
Gate-to-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current, @ Steady-State ($T_C=25^\circ\text{C}$)	I_D	20	A
Continuous Drain Current, @ Steady-State ($T_C=100^\circ\text{C}$)		12	A
Pulsed Drain Current	I_{DM}	80	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	230	W
		1.84	W/°C
Single Pulse Avalanche Energy ¹	E_{AS}	657	mJ
Body Diode Reverse Voltage Slope ²	dv/dt	15	V/ns
MOS dv/dt Ruggedness ³	dv/dt	100	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	0.54	°C/W
Operating Junction and Storage Temperature Range	T_J/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-to-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	650	-	-	V
Drain-to-Source Leakage Current	$I_{\text{DS}(\text{SS})}$	$V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
Gate-to-Source Forward Leakage	I_{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	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=10\text{A}$	-	0.19	0.22	Ω
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
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=100\text{V}, f=1\text{MHz}$	-	1718	-	pF
Output Capacitance	C_{oss}		-	66	-	
Reverse Transfer Capacitance	C_{rss}		-	1.7	-	
Total Gate Charge ^{4,5}	Q_g	$I_D=20\text{A}, V_{\text{DD}}=520\text{V}, V_{\text{GS}}=10\text{V}$	-	48	-	nC
Gate-to-Source Charge ^{4,5}	Q_{gs}		-	20	-	
Gate-to-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	19	-	
Turn-On Delay Time ^{4,5}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=325\text{V}, V_{\text{GS}}=10\text{V}, R_G=25\Omega, I_D=20\text{A}$	-	32	-	nS
Rise Time ^{4,5}	t_r		-	96	-	
Turn-Off Delay Time ^{4,5}	$t_{\text{d}(\text{off})}$		-	105	-	
Fall Time ^{4,5}	t_f		-	75	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	1.3	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	$T_C=25^\circ\text{C}$, MOSFET symbol showing the integral reverse p-n junction diode.	-	-	20	A
Source Pulse Current	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	$I_S=20\text{A}, V_{\text{GS}}=0\text{V}$	-	1.1	1.4	V
Reverse Recovery Time ²	T_{rr}	$I_F=20\text{A}, V_{\text{DD}}=50\text{V}, dI_F/dt=100\text{A/us}$	-	330	-	nS
Reverse Recovery Charge ²	Q_{rr}		-	5.7	-	μC

Note:

1. $L=79\text{mH}, I_{AS}=3.8\text{A}, V_{DD}=100\text{V}, R_g=25\Omega$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{\text{DS}}=0-400\text{V}, I_{SD} \leq I_S, T_J=25^\circ\text{C}$.
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

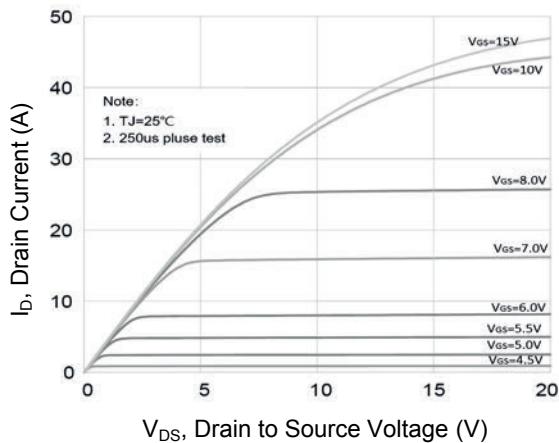


Figure 1. Typical Output Characteristics

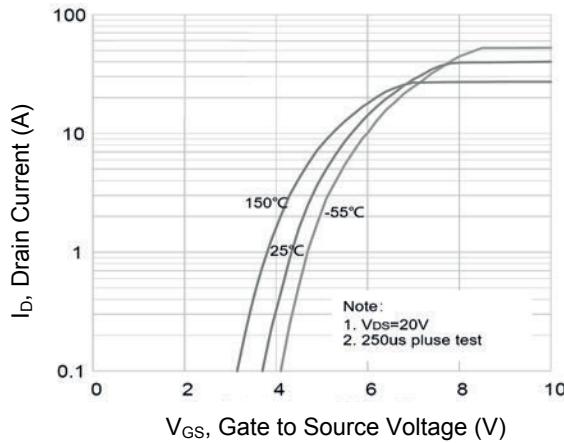


Figure 2. Transfer Characteristics

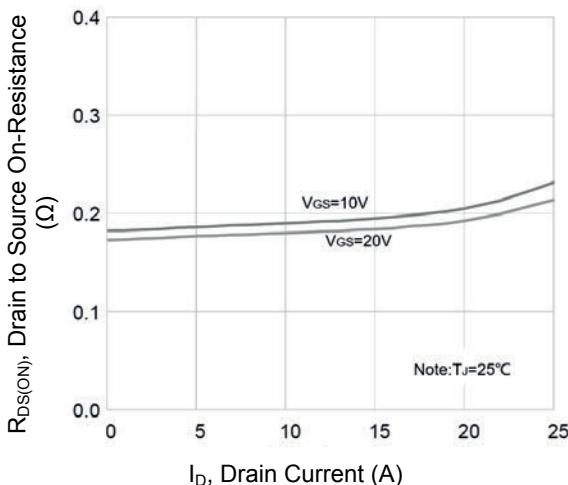


Figure 3. $R_{DS(ON)}$ Vs. Drain Current

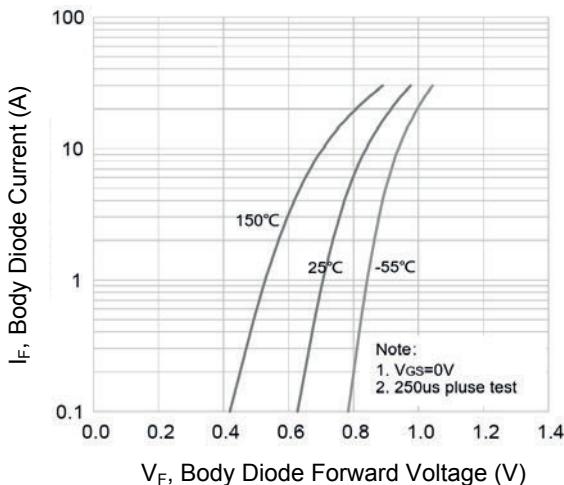


Figure 4. Body Diode Characteristics

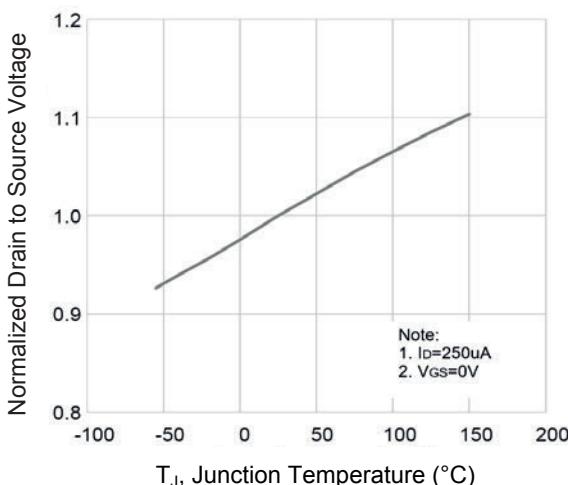


Figure 5. Normalized BV_{DSS} Vs. T_J

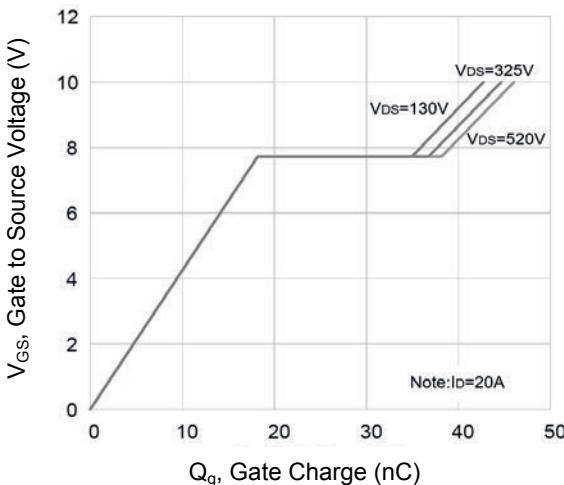


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

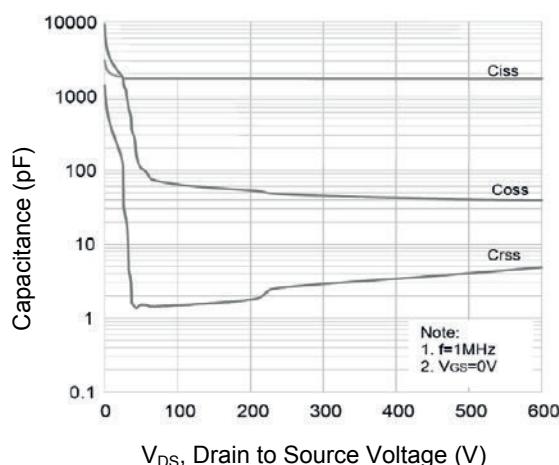


Figure 7. Capacitance Characteristics

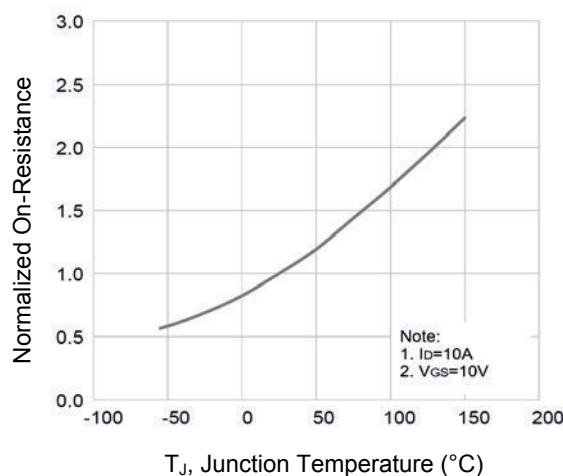


Figure 8. Normalized $R_{DS(ON)}$ Vs. T_J

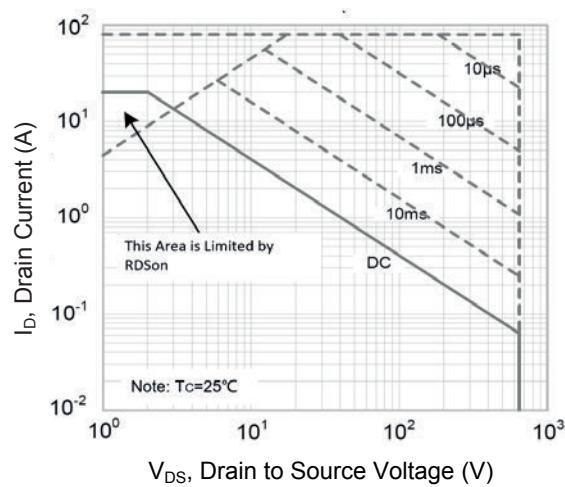
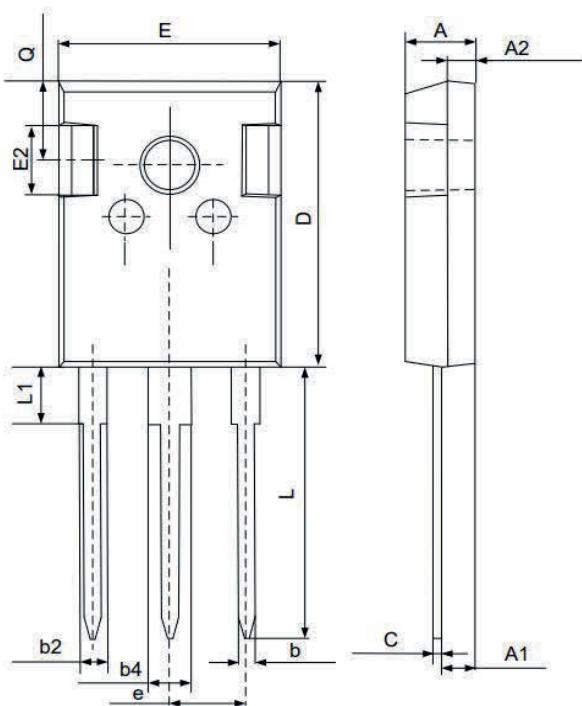


Figure 9. Safe Operation Area

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	-	0.170
Q	5.60	6.00	0.220	0.236