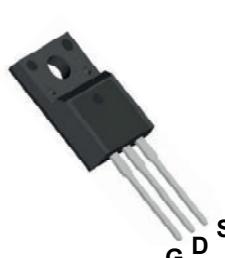
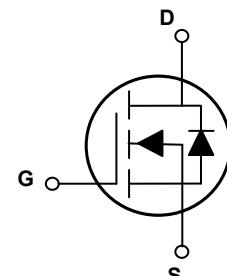


## Main Product Characteristics

$V_{(BR)DSS}$	650V
$R_{DS(ON)}$	0.29Ω (Max.)
$I_D$	15A



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 GSJU65R290 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	$V_{GS}$	$\pm 30$	V
Continuous Drain Current, @ Steady-State ( $T_C=25^\circ\text{C}$ )	$I_D$	15	A
Continuous Drain Current, @ Steady-State ( $T_C=100^\circ\text{C}$ )		9.0	A
Pulsed Drain Current	$I_{DM}$	60	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	26	W
		0.21	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	307	mJ
Body Diode Reverse Voltage Slope <sup>2</sup>	$dv/dt$	15	V/ns
MOS $dv/dt$ Ruggedness <sup>3</sup>	$dv/dt$	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction-to-Case	$R_{\theta JC}$	4.81	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	$T_J/T_{STG}$	-55 to + 150	$^\circ\text{C}$

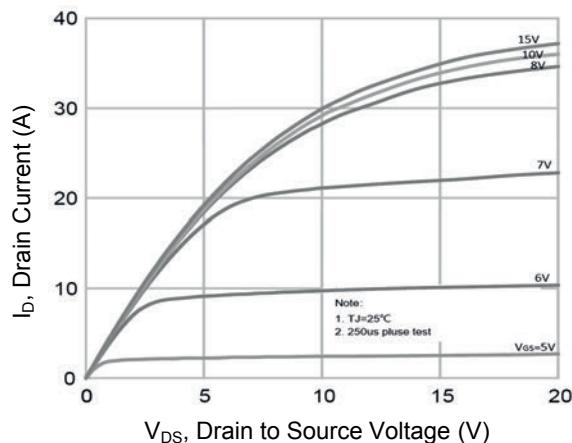
### Electrical Characteristics ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
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	$I_{\text{DSS}}$	$V_{\text{DS}}=650\text{V}, V_{\text{GS}}=0\text{V}$	-	-	200	nA
Gate-to-Source Forward Leakage	$I_{\text{GSS}}$	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=30\text{V}$	-	-	100	nA
		$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=-30\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=7\text{A}, T_J=25^\circ\text{C}$	-	0.25	0.29	$\Omega$
		$V_{\text{GS}}=10\text{V}, I_D=7\text{A}, T_J=125^\circ\text{C}$	-	0.52	-	$\Omega$
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
<b>Dynamic and Switching Characteristics</b>						
Input Capacitance	$C_{\text{iss}}$	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=100\text{V}, f=1\text{MHz}$	-	918	-	pF
Output Capacitance	$C_{\text{oss}}$		-	42	-	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	1.1	-	
Total Gate Charge <sup>4,5</sup>	$Q_g$	$I_D=14\text{A}, V_{\text{DD}}=520\text{V}, V_{\text{GS}}=10\text{V}$	-	26	-	nC
Gate-to-Source Charge <sup>4,5</sup>	$Q_{gs}$		-	7.1	-	
Gate-to-Drain ("Miller") Charge <sup>4,5</sup>	$Q_{gd}$		-	12	-	
Turn-On Delay Time <sup>4,5</sup>	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=325\text{V}, V_{\text{GS}}=10\text{V}, R_G=25\Omega, I_D=14\text{A}$	-	19	-	nS
Rise Time <sup>4,5</sup>	$t_r$		-	43	-	
Turn-Off Delay Time <sup>4,5</sup>	$t_{\text{d}(\text{off})}$		-	68	-	
Fall Time <sup>4,5</sup>	$t_f$		-	36	-	
Gate Resistance	$R_g$	$f=1\text{MHz}$	-	4.4	-	$\Omega$
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current (Body Diode)	$I_s$	$T_C=25^\circ\text{C}$ , MOSFET symbol showing the integral reverse p-n junction diode.	-	-	15	A
Source Pulse Current	$I_{\text{SM}}$		-	-	60	A
Diode Forward Voltage	$V_{\text{SD}}$	$I_s=14\text{A}, V_{\text{GS}}=0\text{V}$	-	-	1.3	V
Reverse Recovery Time <sup>3</sup>	$T_{\text{rr}}$	$I_F=14\text{A}, V_{\text{DD}}=50\text{V}, dI_F/dt=100\text{A/us}$	-	266	-	nS
Reverse Recovery Charge <sup>3</sup>	$Q_{\text{rr}}$		-	3.4	-	$\mu\text{C}$
Reverse Recovery Current	$I_{\text{rrm}}$		-	26	-	A

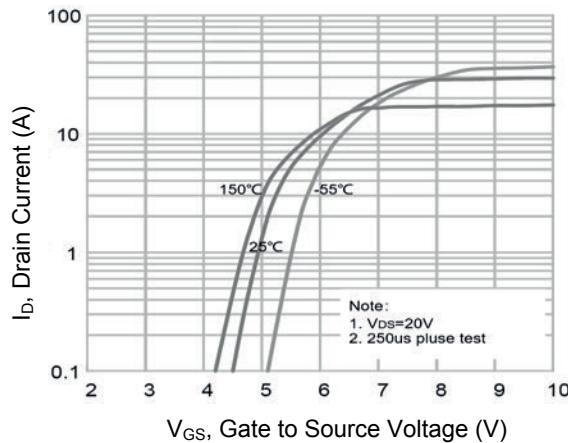
Note:

1.  $L=79\text{mH}, I_{AS}=2.6\text{A}, V_{\text{DD}}=100\text{V}$ , starting temperature  $T_J=25^\circ\text{C}$ .
2.  $V_{\text{DS}}=0\text{-}400\text{V}, I_{SD}<=20\text{A}, T_J=25^\circ\text{C}$ .
3.  $V_{\text{DS}}=0\text{-}480\text{V}$ .
4. Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
5. Essentially independent of operating temperature.

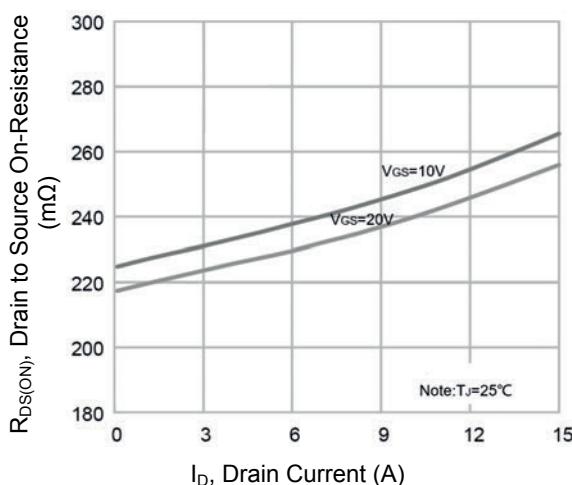
### Typical Electrical and Thermal Characteristic Curves



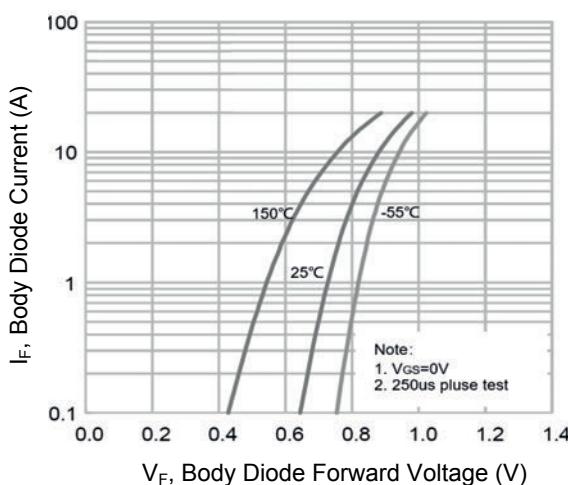
**Figure 1. Typical Output Characteristics**



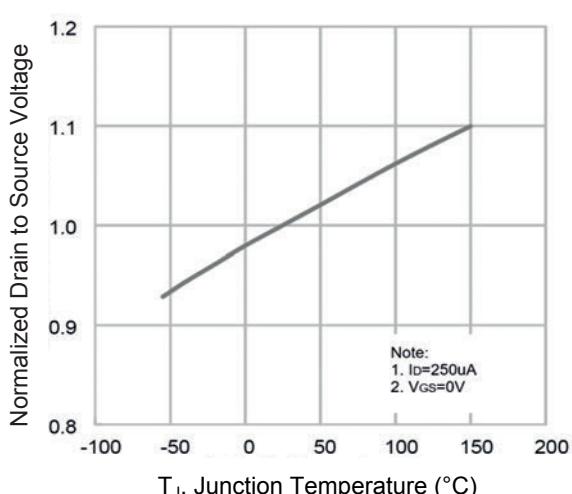
**Figure 2. Transfer Characteristics**



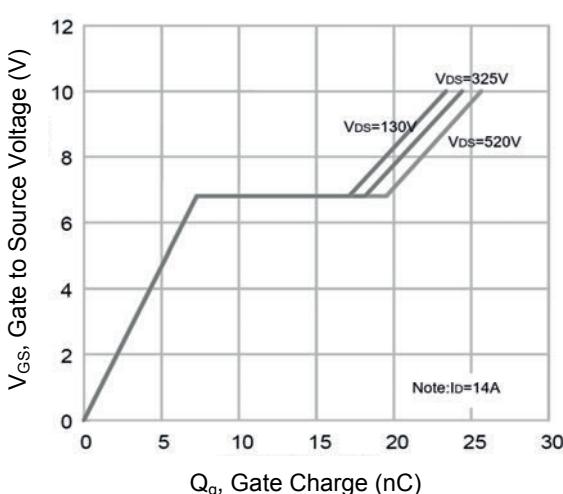
**Figure 3.  $R_{DS(ON)}$  Vs. Drain Current**



**Figure 4. Body Diode Characteristics**

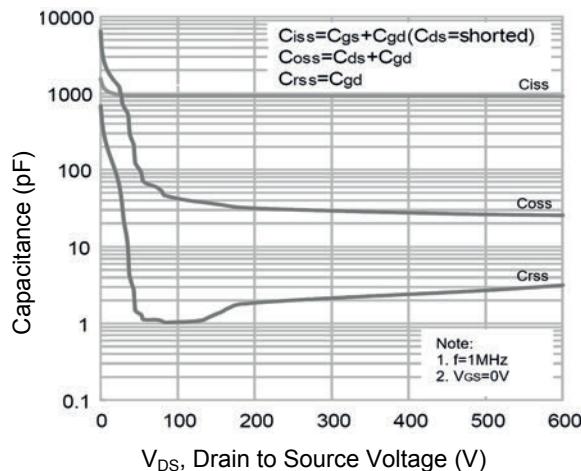


**Figure 5. Normalized  $\text{BV}_{DSS}$  Vs.  $T_J$**

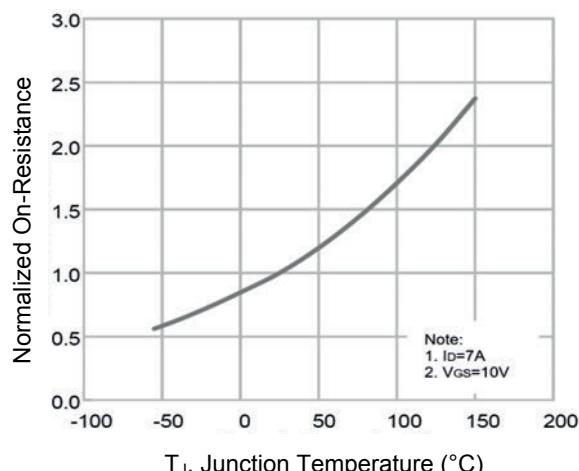


**Figure 6. Gate Charge**

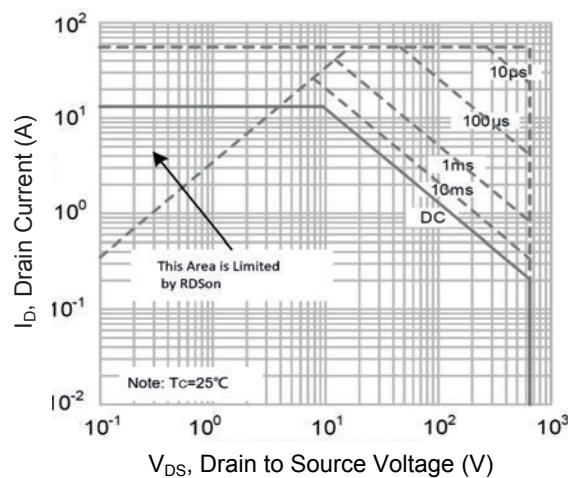
### Typical Electrical and Thermal Characteristic Curves



**Figure 7. Capacitance Characteristics**

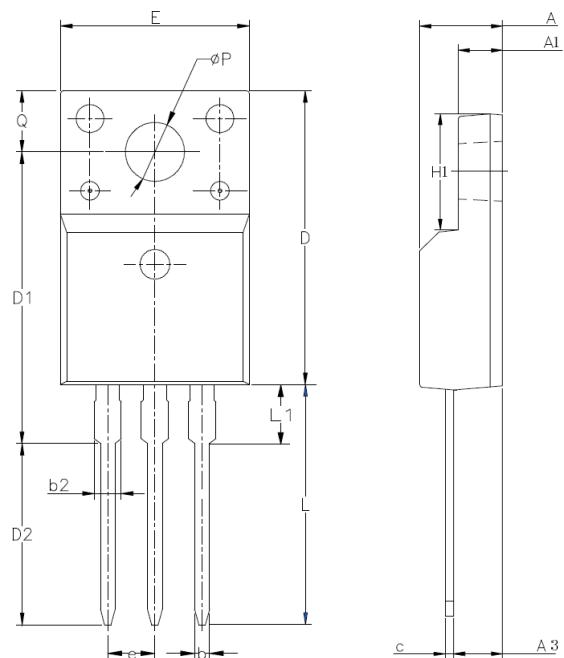


**Figure 8. Normalized  $R_{DS(ON)}$  Vs.  $T_J$**



**Figure 9. Safe Operation Area**

**Package Outline Dimensions (TO-220F)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.42	5.02	0.174	0.198
A1	2.30	2.80	0.091	0.110
A3	2.50	3.10	0.098	0.122
b	0.55	0.85	0.022	0.033
b2	-	1.29	-	0.051
c	0.35	0.65	0.014	0.026
D	15.25	16.25	0.600	0.640
D1	13.97	14.97	0.550	0.589
D2	10.58	11.58	0.417	0.456
E	9.73	10.36	0.383	0.408
e	2.54 BSC		0.10 BSC	
H1	6.40	7.00	0.252	0.276
L	12.48	13.48	0.491	0.531
L1	-	2.00	-	0.079
ΦP	3.00	3.40	0.118	0.134
Q	3.05	3.55	0.120	0.140