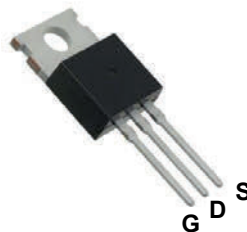
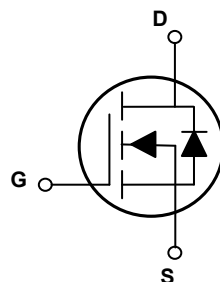


Main Product Characteristics

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



TO-220



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 GSJH65R290 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	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	120	W
		0.96	W/°C
Single Pulse Avalanche Energy ¹	E_{AS}	307	mJ
Body Diode Reverse Voltage Slope ²	dv/dt	15	V/ns
MOS dv/dt Ruggedness ³	dv/dt	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	1.04	°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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	-	-	200	nA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
		$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=7A, T_J=25^\circ\text{C}$	-	0.25	0.29	Ω
		$V_{GS}=10V, I_D=7A, T_J=125^\circ\text{C}$	-	0.52	-	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=100V, f=1\text{MHz}$	-	918	-	pF
Output Capacitance	C_{oss}		-	42	-	
Reverse Transfer Capacitance	C_{rss}		-	1.1	-	
Total Gate Charge ^{4,5}	Q_g	$I_D=14A, V_{DD}=520V, V_{GS}=10V$	-	26	-	nC
Gate-to-Source Charge ^{4,5}	Q_{gs}		-	7.1	-	
Gate-to-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	12	-	
Turn-On Delay Time ^{4,5}	$t_{d(on)}$	$V_{DD}=325V, V_{GS}=10V, R_G=25\Omega, I_D=14A$	-	19	-	nS
Rise Time ^{4,5}	t_r		-	43	-	
Turn-Off Delay Time ^{4,5}	$t_{d(off)}$		-	68	-	
Fall Time ^{4,5}	t_f		-	36	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	4.4	-	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.	-	-	15	A
Source Pulse Current	I_{SM}		-	-	60	A
Diode Forward Voltage	V_{SD}	$I_S=14A, V_{GS}=0V$	-	-	1.3	V
Reverse Recovery Time ³	T_{rr}	$I_F=14A, V_{DD}=50V, di_F/dt=100A/\mu s$	-	266	-	nS
Reverse Recovery Charge ³	Q_{rr}		-	3.4	-	μC
Reverse Recovery Current	I_{rm}		-	26	-	A

Note:

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

Typical Electrical and Thermal Characteristic Curves

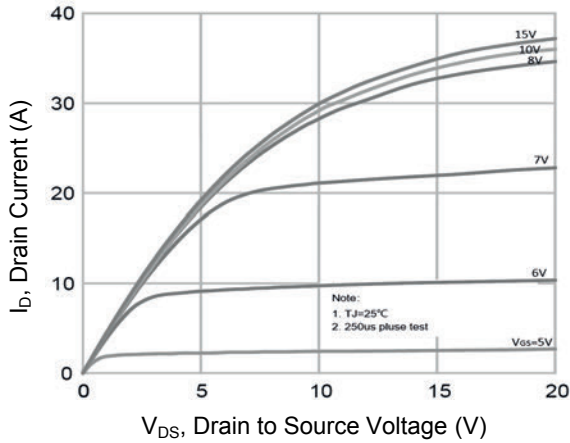


Figure 1. Typical Output Characteristics

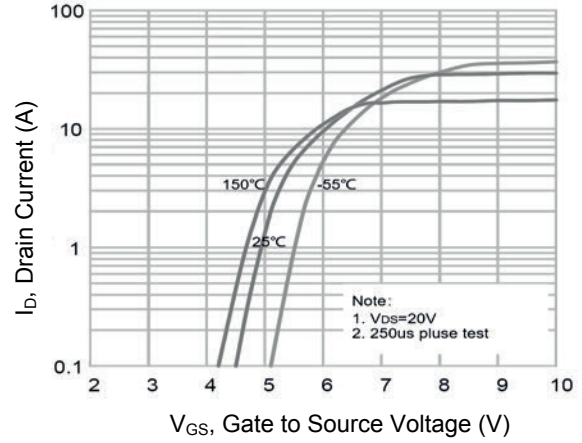


Figure 2. Transfer Characteristics

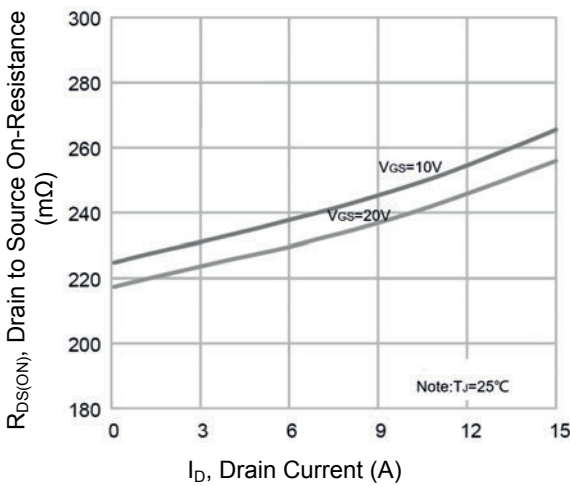


Figure 3. $R_{DS(ON)}$ Vs. Drain Current

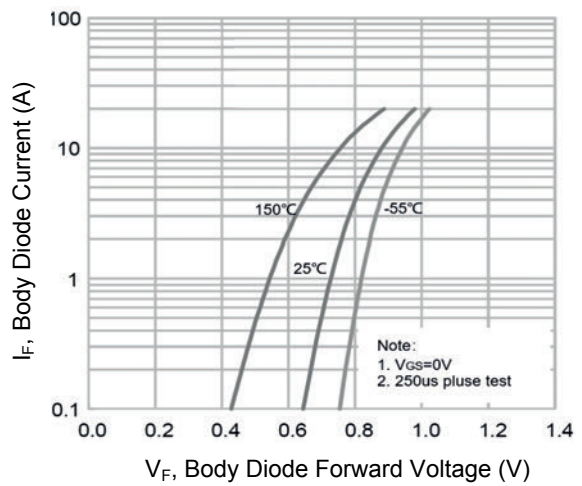


Figure 4. Body Diode Characteristics

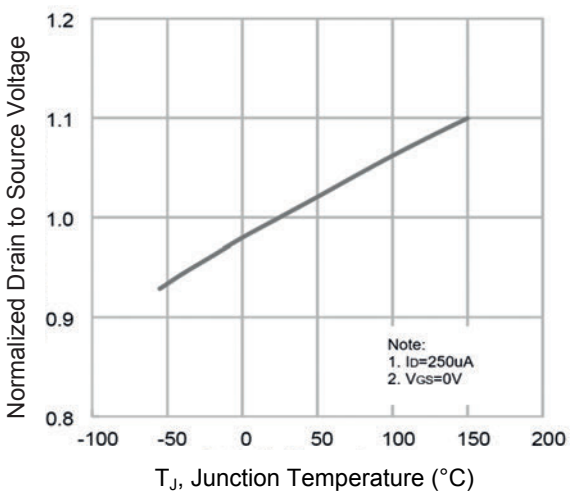


Figure 5. Normalized BV_{DSS} Vs. T_J

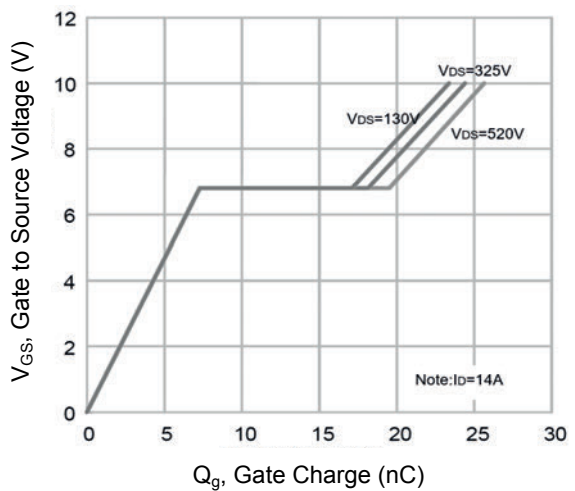


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

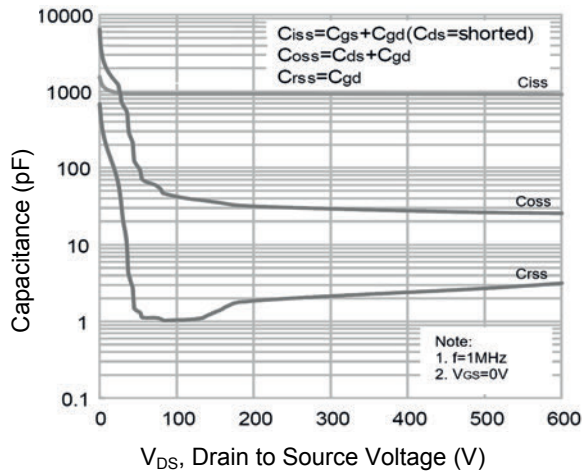


Figure 7. Capacitance Characteristics

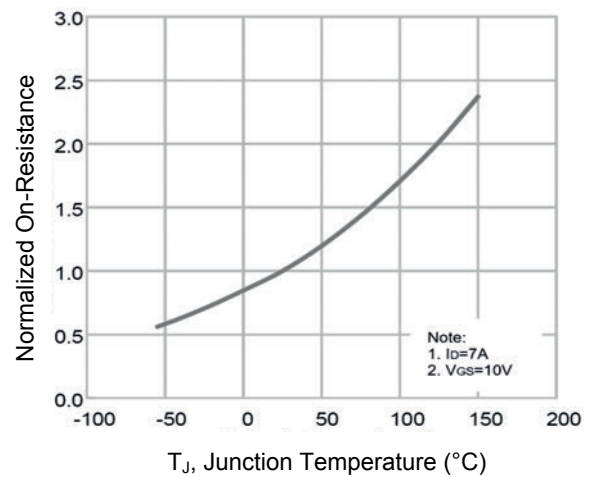


Figure 8. Normalized $R_{DS(ON)}$ Vs. T_J

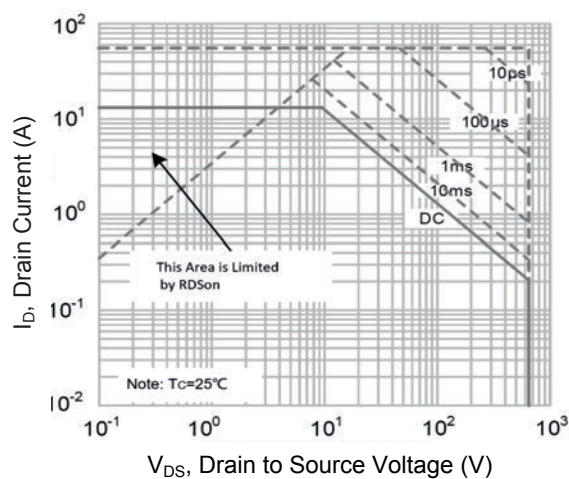
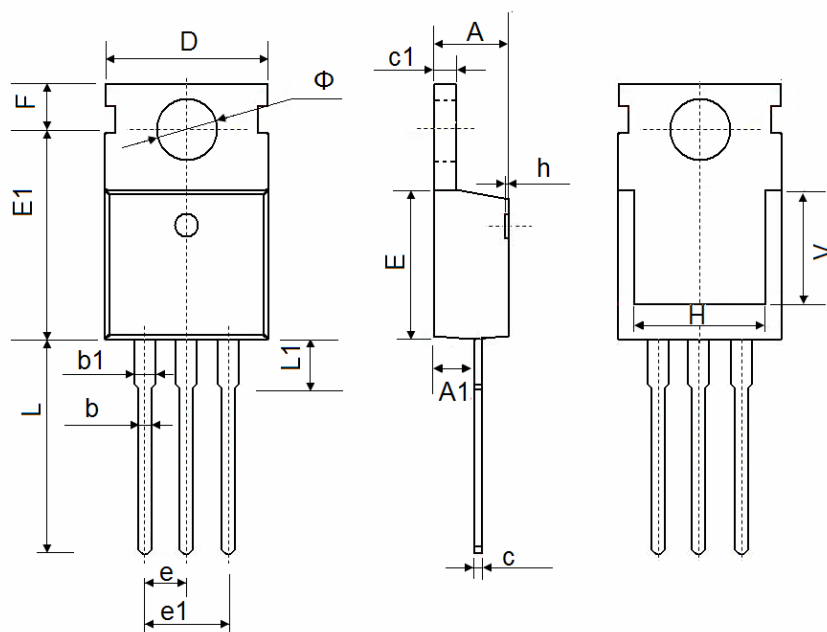


Figure 9. Safe Operation Area

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150