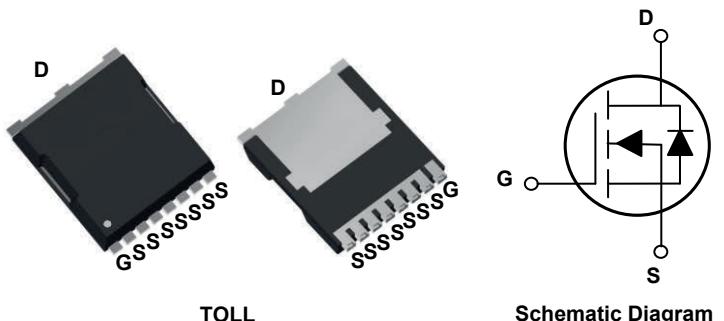


Main Product Characteristics

$V_{(BR)DSS}$	600V
$R_{DS(ON)}$	0.19Ω (max.)
I_D	20A



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 GSJTL60R190 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}	600	V
Gate-to-Source Voltage	V_{GS}	± 20	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	156	W
		1.25	W/°C
Single Pulse Avalanche Energy ¹	E_{AS}	470	mJ
Body Diode Reverse Voltage Slope ²	dv/dt	15	V/ns
MOS dv/dt Ruggedness	dv/dt	50	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	°C/W
Junction-to-Case	$R_{\theta JC}$	0.80	°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	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	600	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=600\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=20\text{V}$	-	-	100	nA
		$V_{\text{DS}}=0\text{V}, V_{\text{GS}}=-20\text{V}$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=10\text{A}, T_J=25^\circ\text{C}$	-	0.14	0.19	Ω
		$V_{\text{GS}}=10\text{V}, I_D=10\text{A}, T_J=125^\circ\text{C}$	-	0.31	-	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}	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=100\text{V}, f=1\text{MHz}$	-	1174	-	pF
Output Capacitance	C_{oss}		-	52	-	
Reverse Transfer Capacitance	C_{rss}		-	1.2	-	
Total Gate Charge ^{4,5}	Q_g	$I_D=20\text{A}, V_{\text{DD}}=480\text{V}, V_{\text{GS}}=10\text{V}$	-	31	-	nC
Gate-to-Source Charge ^{4,5}	Q_{gs}		-	9.6	-	
Gate-to-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	14	-	
Gate-to-Platesu Voltage ^{4,5}	V_{plateau}		-	7.1	-	V
Turn-On Delay Time ^{4,5}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=300\text{V}, V_{\text{GS}}=10\text{V}, R_G=24\Omega, I_D=20\text{A}$	-	22	-	nS
Rise Time ^{4,5}	t_r		-	50	-	
Turn-Off Delay Time ^{4,5}	$t_{\text{d}(\text{off})}$		-	78	-	
Fall Time ^{4,5}	t_f		-	38	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	4.6	-	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}	$I_S=20\text{A}, V_{\text{GS}}=0\text{V}$	-	-	1.2	V
Reverse Recovery Time ⁴	T_{rr}	$I_F=20\text{A}, V_{\text{DD}}=50\text{V}, dI_F/dt=100\text{A}/\mu\text{s}$	-	289	-	nS
Reverse Recovery Charge ⁴	Q_{rr}		-	4.2	-	μC
Reverse Recovery Peak Current ⁴	I_{rrm}		-	28	-	A

Note:

1. $L=79\text{mH}, I_{AS}=3.2\text{A}, V_{\text{DD}}=100\text{V}$, starting temperature $T_J=25^\circ\text{C}$.
2. $V_{\text{DS}}=0-400\text{V}, I_{SD}<=20\text{A}, T_J=25^\circ\text{C}$.
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

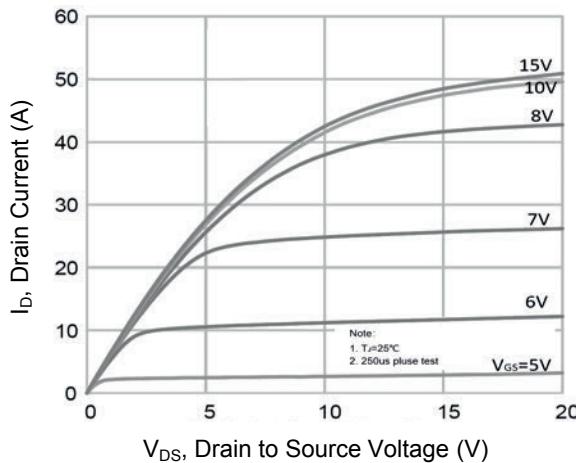


Figure 1. Typical Output Characteristics

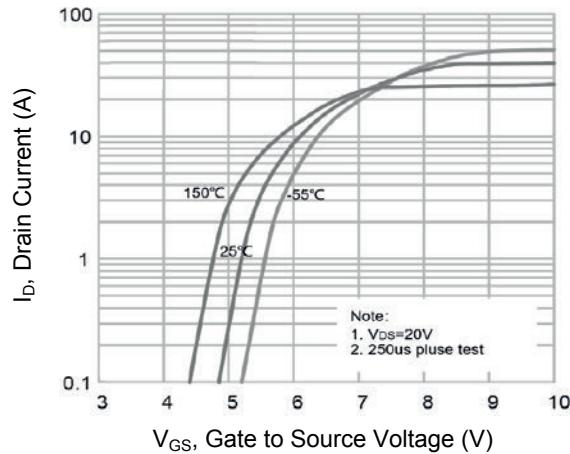


Figure 2. Transfer Characteristics

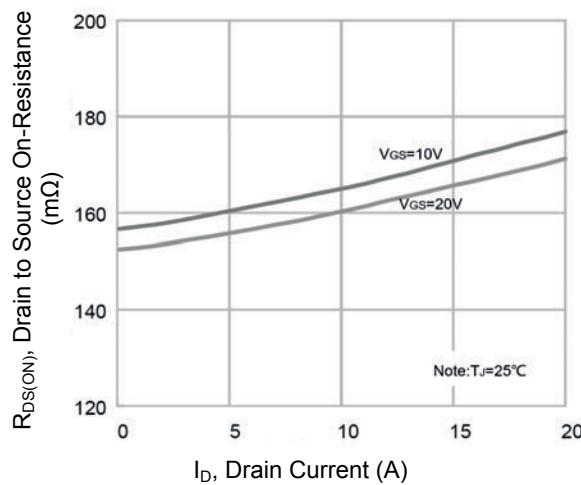


Figure 3. $R_{DS(\text{ON})}$ Vs. Drain Current

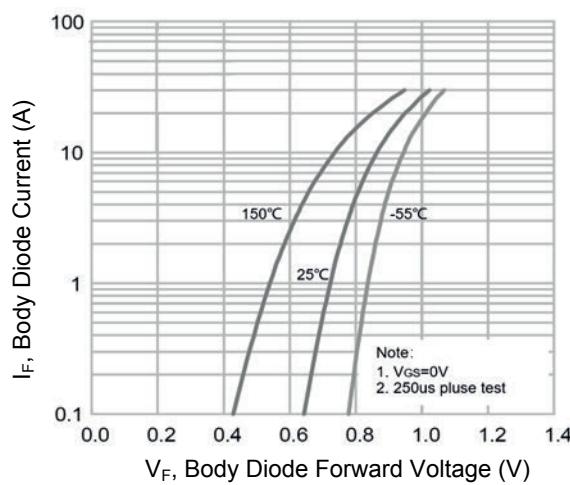


Figure 4. Body Diode Characteristics

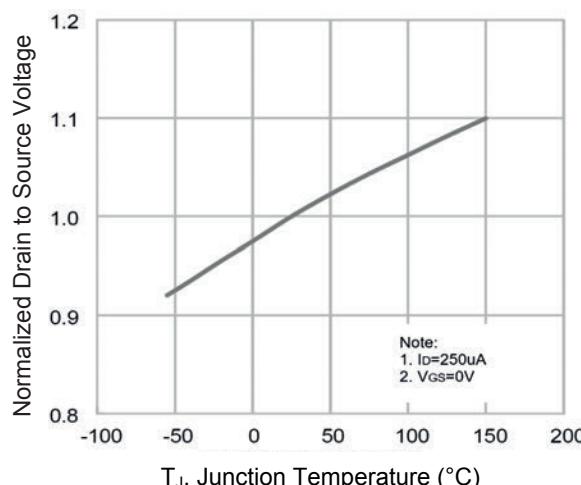


Figure 5. Normalized BV_{DSS} Vs. T_J

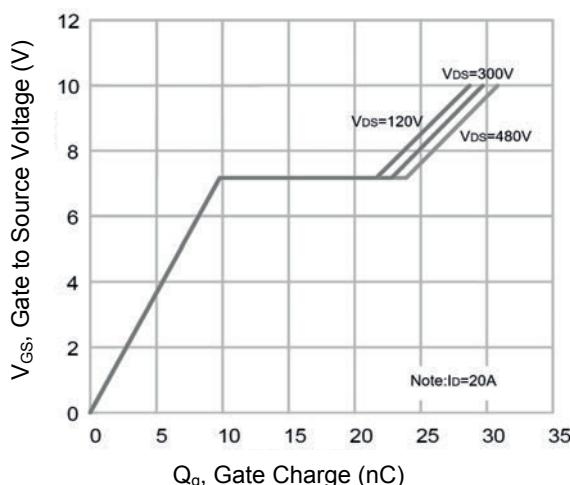


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

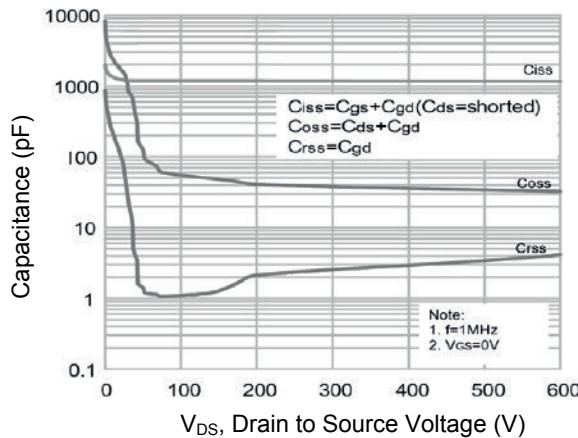


Figure 7. Capacitance Characteristics

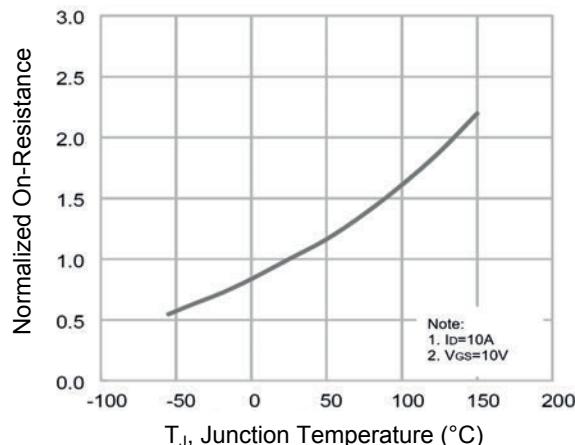


Figure 8. Normalized $R_{DS(ON)}$ Vs. T_J

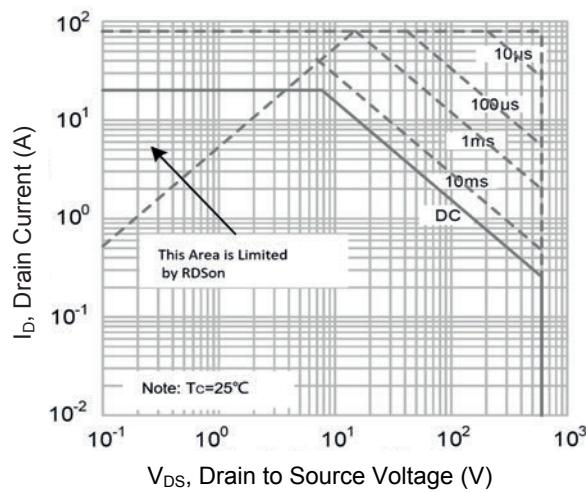
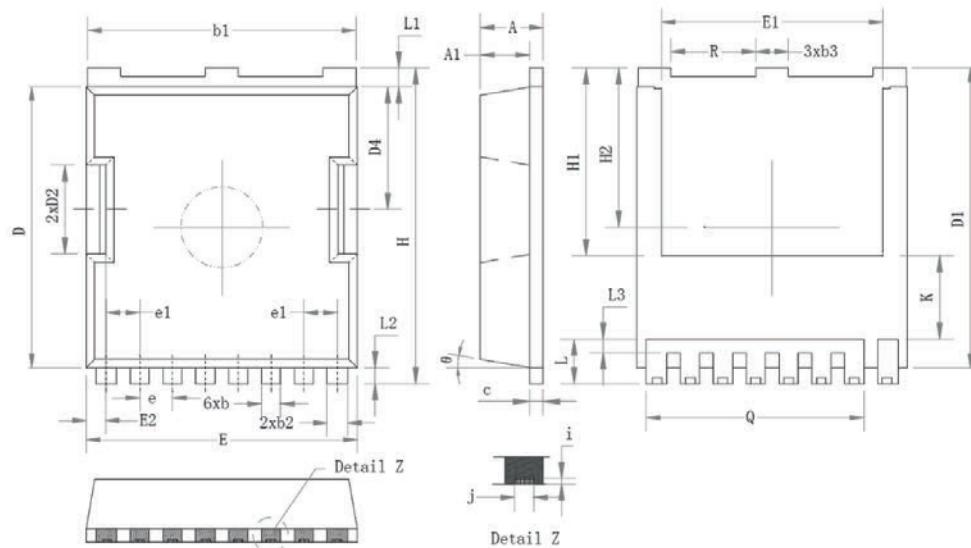


Figure 9. Safe Operation Area

Package Outline Dimensions (TOLL)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.25	2.35	0.089	0.093
A1	1.75	1.85	0.069	0.073
b	0.65	0.75	0.026	0.030
b1	9.75	9.85	0.384	0.388
b2	0.70	0.80	0.028	0.031
b3	1.15	1.25	0.045	0.049
c	0.45	0.55	0.018	0.022
D	10.35	10.45	0.407	0.411
D1	11.00	11.20	0.433	0.441
D2	3.25	3.35	0.128	0.132
D4	4.50	4.60	0.177	0.181
e	1.200 BSC		0.047 BSC	
e1	1.225 BSC		0.048 BSC	
E	9.85	9.95	0.388	0.392
E1	8.00	8.20	0.315	0.323
E2	0.65	0.75	0.026	0.030
H	11.60	11.80	0.457	0.465
H1	6.95 BSC		0.274 BSC	
H2	5.90 BSC		0.232 BSC	
i	0.10 REF		0.004 REF	
j	0.35 REF		0.014 REF	
K	3.10 REF		0.122 REF	
L	1.55	1.75	0.061	0.069
L1	0.65	0.75	0.026	0.030
L2	0.50	0.70	0.020	0.028
L3	0.40	0.60	0.016	0.024
Q	7.95 REF		0.313 REF	
R	3.05	3.15	0.120	0.124
θ	10° REF		10° REF	