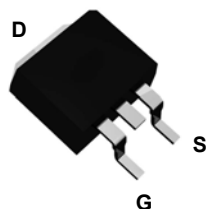
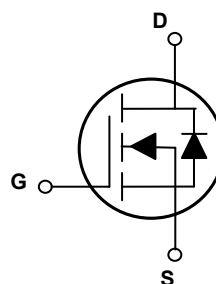


Main Product Characteristics

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



TO-263 (D²PAK)



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 GSFT60R190 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}	600	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current-Continuous, at Steady-State ($T_C=25^\circ\text{C}$)	I_D	20	A
Drain Current-Continuous, at Steady-State ($T_C=100^\circ\text{C}$)		12	
Drain Current-Pulsed	I_{DM}	80	A
Single Pulse Avalanche Energy ¹	E_{AS}	967	mJ
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	66	W
		0.52	W/ $^\circ\text{C}$
Body Diode Reverse Voltage Slope ²	dv/dt	15	V/ns
MOS dv/dt Ruggedness ³	dv/dt	50	V/ns
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.9	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	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
On / Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	600	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$	-	-	200	nA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
		$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$ $T_J=25^\circ\text{C}$	-	0.16	0.19	Ω
		$V_{GS}=10V, I_D=10A$ $T_J=125^\circ\text{C}$	-	0.3	-	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	-	4	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{4,5}	Q_g	$V_{DD}=480V, I_D=20A,$ $V_{GS}=10V$	-	39	-	nC
Gate-Source Charge ^{4,5}	Q_{gs}		-	9.6	-	
Gate-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	20	-	
Turn-On Delay Time ^{4,5}	$t_{d(on)}$	$V_{DD}=300V, R_G=25\Omega,$ $V_{GS}=10V, I_D=20A$	-	20	-	nS
Rise Time ^{4,5}	t_r		-	60	-	
Turn-Off Delay Time ^{4,5}	$t_{d(off)}$		-	105	-	
Fall Time ^{4,5}	t_f		-	42	-	
Input Capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V,$ $F=1\text{MHz}$	-	1174	-	pF
Output Capacitance	C_{oss}		-	67	-	
Reverse Transfer Capacitance	C_{rss}		-	4	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	2.6	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
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
Pulsed Source Current	I_{SM}		-	-	80	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=20A$	-	-	1.2	V
Reverse Recovery Time ³	t_{rr}	$V_{DD}=50V, I_F=20A,$ $dI_F/dt=100A/\mu s$	-	426	-	nS
Reverse Recovery Charge ³	Q_{rr}		-	6.2	-	μC

Note:

- $L=79\text{mH}, I_{AS}=4.6\text{A}, V_{DD}=100V$, starting temperature $T_J=25^\circ\text{C}$.
- $V_{DS}=0-400V, I_{SD}\leq 20A, T_J=25^\circ\text{C}$.
- $V_{DS}=0-480V$.
- Pulse Test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

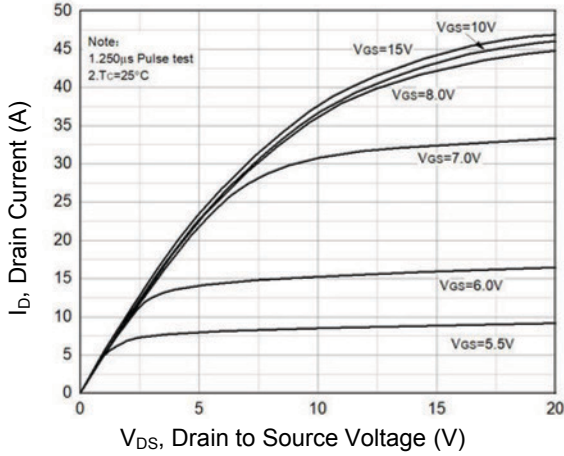


Figure 1. Typical Output Characteristics

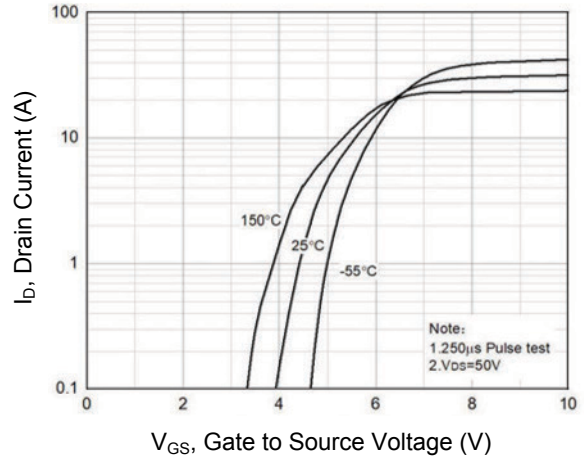


Figure 2. Typical Transfer Characteristics

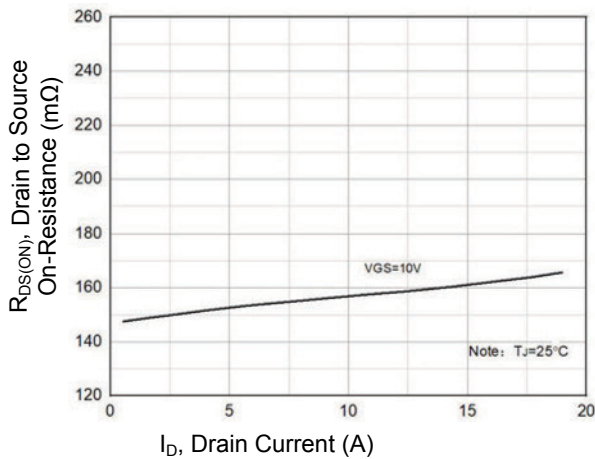


Figure 3. On Resistance vs. Drain Current

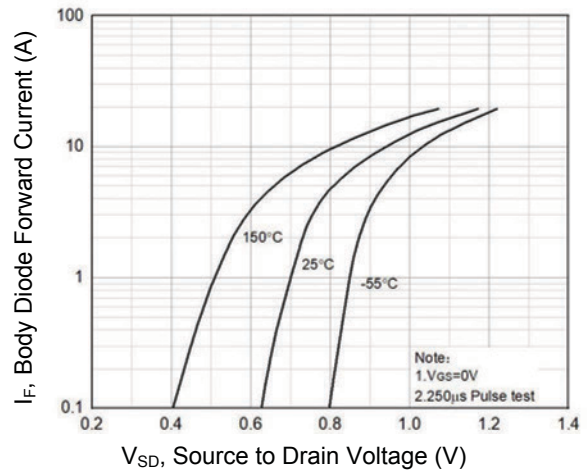


Figure 4. Body Diode Characteristics

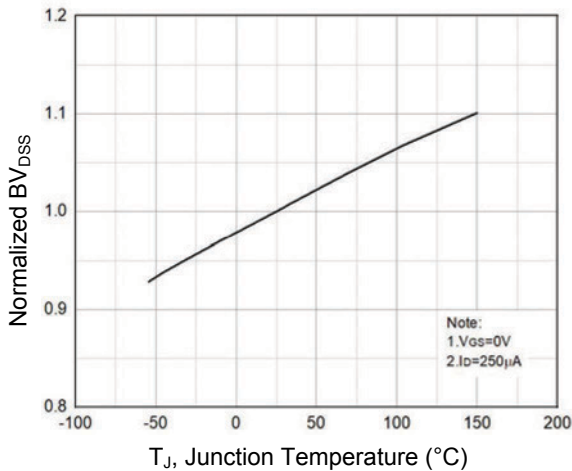


Figure 5. Normalized BV_{DSS} vs. Junction Temperature

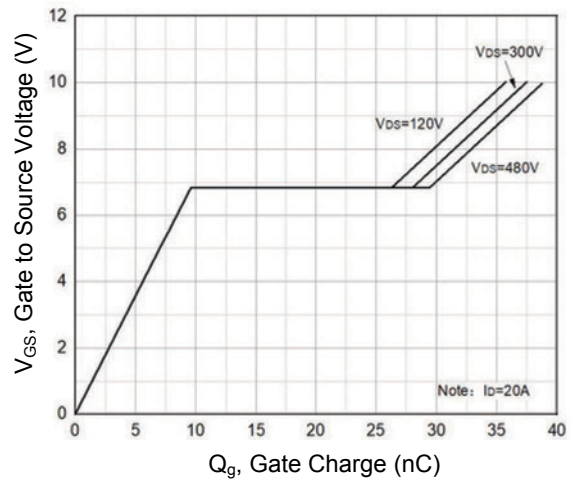


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

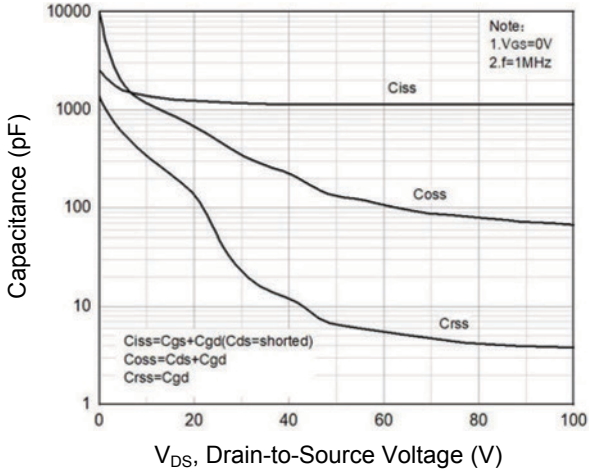


Figure 7. Capacitance Characteristics

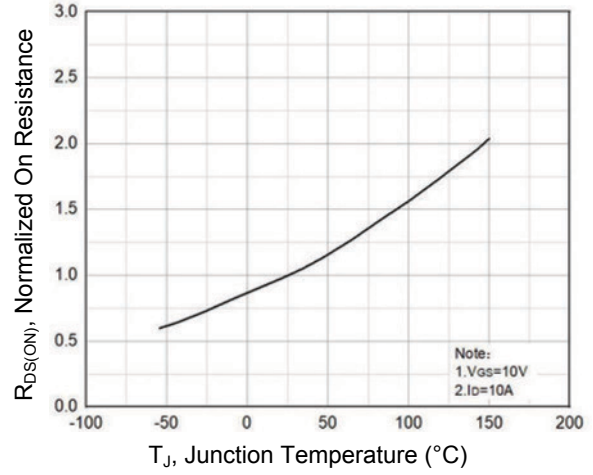


Figure 8. Normalized $R_{DS(ON)}$ vs. Junction Temperature

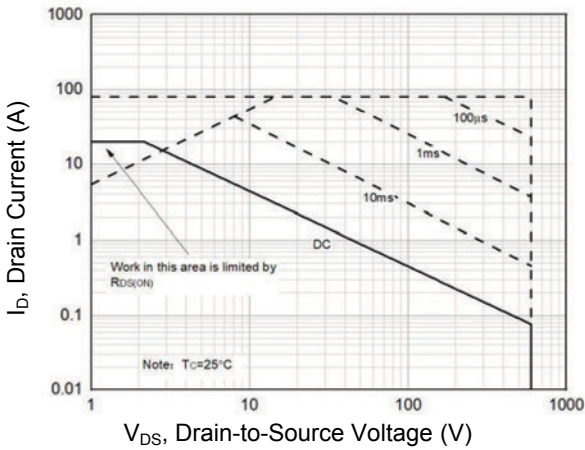
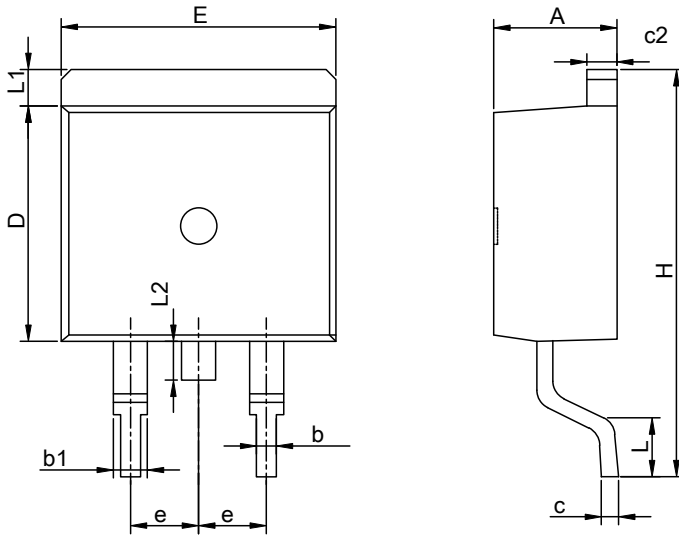


Figure 9. Safe Operation Area

Package Outline Dimensions TO-263 (D²PAK)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.30	4.90	0.169	0.193
b	0.70	0.95	0.028	0.037
b1	1.07	1.50	0.042	0.059
c	0.28	0.60	0.011	0.024
c2	1.17	1.37	0.046	0.054
D	8.40	9.35	0.331	0.368
E	9.80	10.45	0.386	0.411
e	2.54 BSC		0.100 BSC	
H	14.70	16.30	0.579	0.642
L	2.00	3.80	0.079	0.150
L1	0.97	1.42	0.038	0.056
L2	-	1.75	-	0.069

Order Information

Device	Package	Marking	Carrier	Quantity
GSFT60R190	TO-263 (D ² PAK)	T60R190	Tape & Reel	800 Pcs / Reel