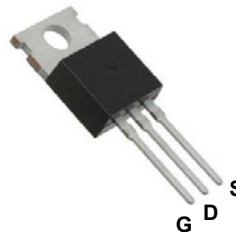
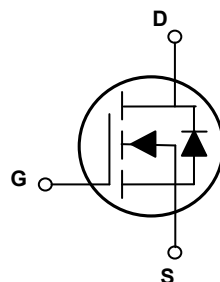


Main Product Characteristics

$V_{(BR)DSS}$	800V
$R_{DS(ON)}$	0.42Ω (max.)
I_D	12A



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 GSFH80R420 utilizes the latest techniques to achieve ultra low on-resistance and low gate charge. 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 ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	800	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous, at Steady-State, ($T_C=25^{\circ}\text{C}$)	I_D	12	A
Drain Current-Continuous, at Steady-State, ($T_C=100^{\circ}\text{C}$)		7.6	
Drain Current-Pulsed	I_{DM}	48	A
Single Pulse Avalanche Energy ¹	E_{AS}	510	mJ
Single Pulse Avalanche Current	I_{AS}	3.4	A
Power Dissipation ($T_C=25^{\circ}\text{C}$)	P_D	120	W
		0.96	W/°C
Body Diode Reverse Voltage Slope ²	dv/dt	50	V/ns
MOS dv/dt Ruggedness ³	dv/dt	100	V/ns
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	60.0	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.04	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C
Soldering Temperature	T_{SOLD}	260	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	800	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=800V, V_{GS}=0V$ $T_J=25^\circ\text{C}$	-	-	1.0	μA
		$V_{DS}=800V, V_{GS}=0V$ $T_J=125^\circ\text{C}$	-	1.0	-	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6.0A$	-	0.34	0.42	Ω
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.4	-	4.8	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{4,5}	Q_g	$V_{DD}=640V, I_D=12A,$ $V_{GS}=10V$	-	30	-	nC
Gate-Source Charge ^{4,5}	Q_{gs}		-	9.5	-	
Gate-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	12	-	
Gate Plateau ^{4,5}	$V_{plateau}$		-	6.9	-	V
Turn-On Delay Time ^{4,5}	$t_{d(on)}$	$V_{DD}=400V, R_G=25\Omega,$ $V_{GS}=10V, I_D=12A$	-	24	-	nS
Rise Time ^{4,5}	t_r		-	57	-	
Turn-Off Delay Time ^{4,5}	$t_{d(off)}$		-	80	-	
Fall Time ^{4,5}	t_f		-	36	-	
Input Capacitance	C_{iss}	$V_{DS}=100V, V_{GS}=0V,$ $F=1MHz$	-	1130	-	pF
Output Capacitance	C_{oss}		-	36	-	
Reverse Transfer Capacitance	C_{rss}		-	1.9	-	
Gate Resistance	R_g	$F=1MHz$	-	6.4	-	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.	-	-	12	A
Pulsed Source Current	$I_{S,pulse}$		-	-	48	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=12A$	-	-	1.4	V
Reverse Recovery Time ⁴	t_{rr}	$V_{GS}=0V, I_S=12A,$ $di/dt=100A/\mu s$	-	391	-	nS
Reverse Recovery Charge ⁴	Q_{rr}		-	4.5	-	μC
Reverse Recovery Peak Current ⁴	I_{rrm}		-	23	-	A

Note:

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

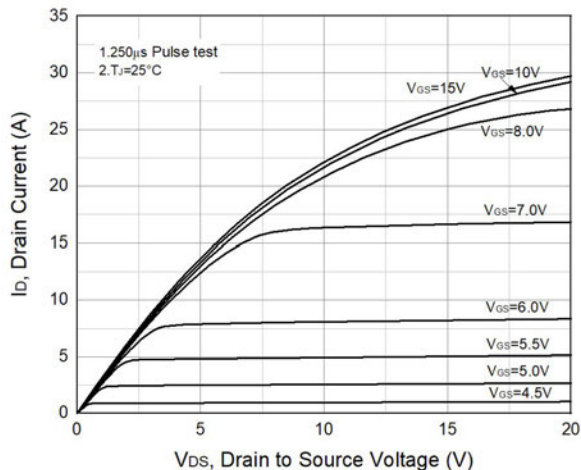


Figure 1. Typical Output Characteristics

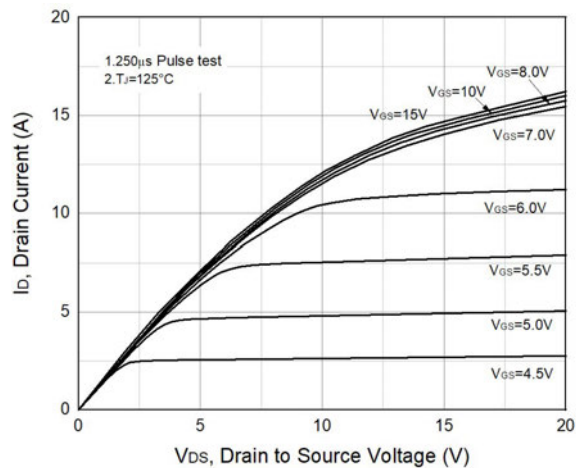


Figure 2. Typical Output Characteristics

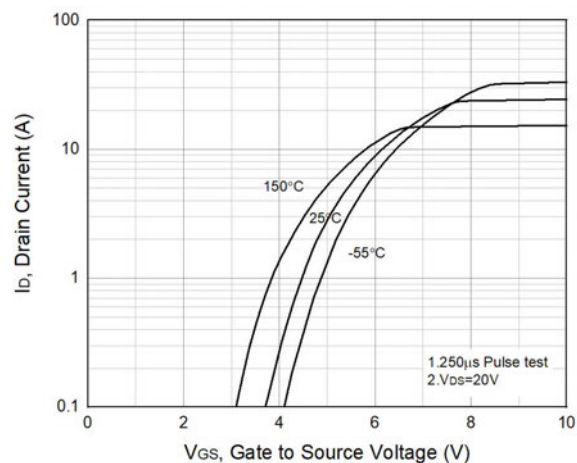


Figure 3. Transfer Characteristics

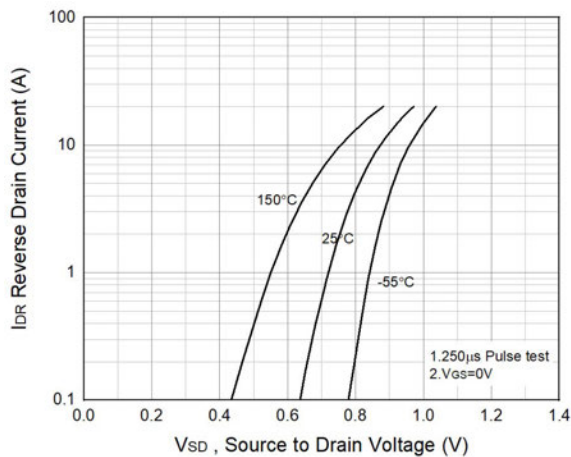


Figure 4. Body Diode Characteristic

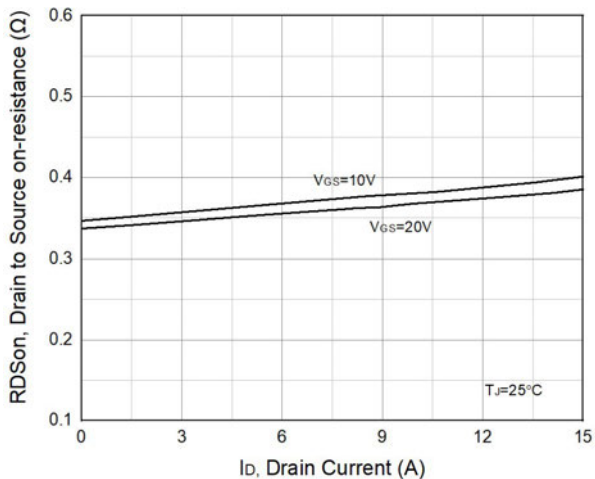


Figure 5. $R_{DS(on)}$ vs. Drain Current

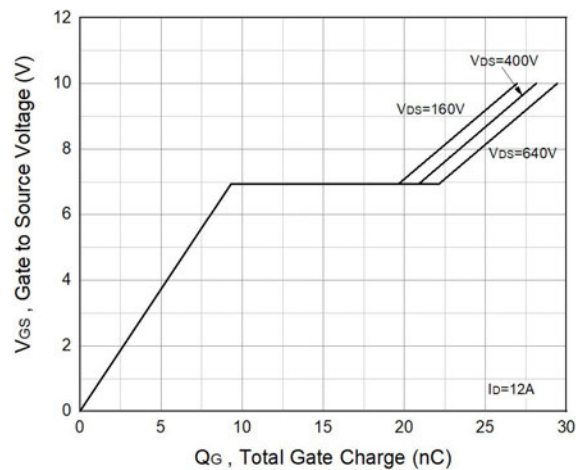


Figure 6. Gate Charge Characteristic

Typical Electrical and Thermal Characteristic Curves

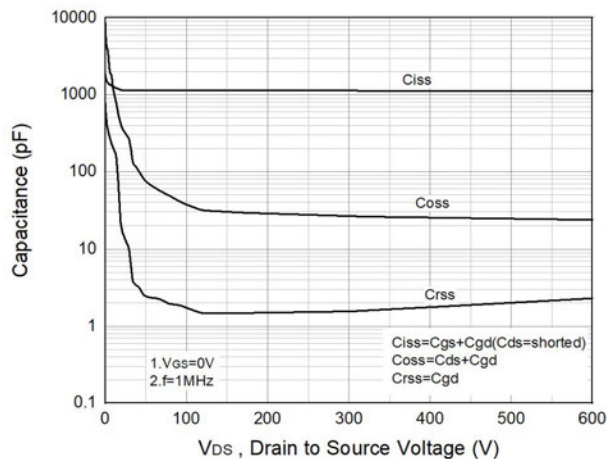


Figure 7. Capacitance Characteristic

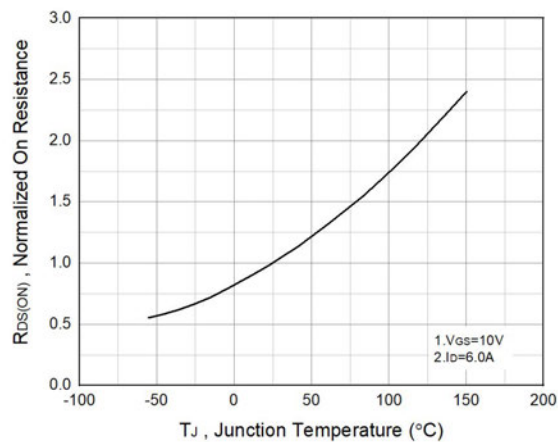


Figure 8. Normalized Rdson vs. Tj

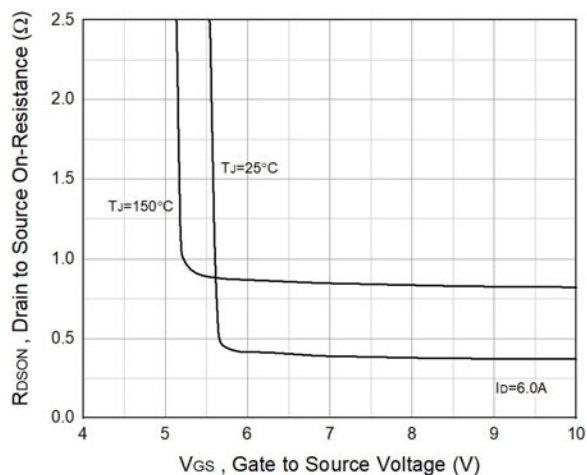


Figure 9. Normalized Rdson vs. Vgs

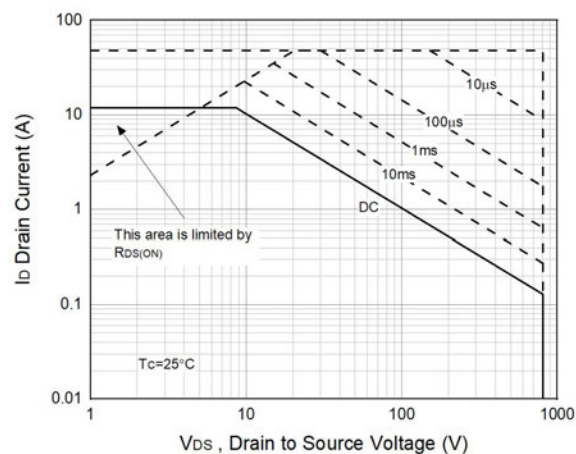


Figure 10. Safe Operation Area

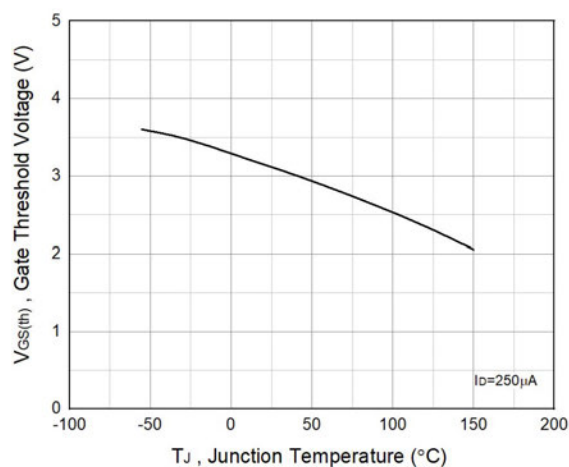


Figure 11. Gate Threshold Voltage vs. Tj

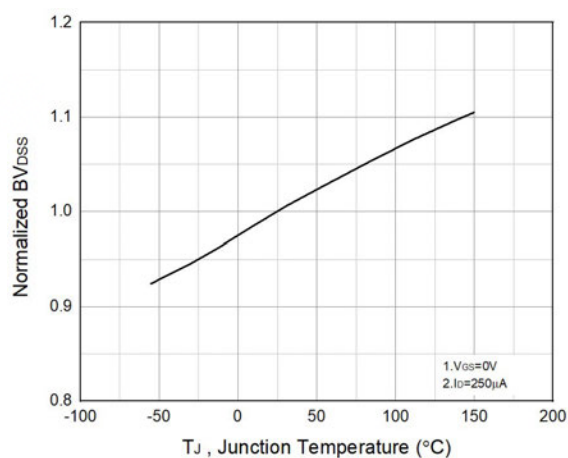
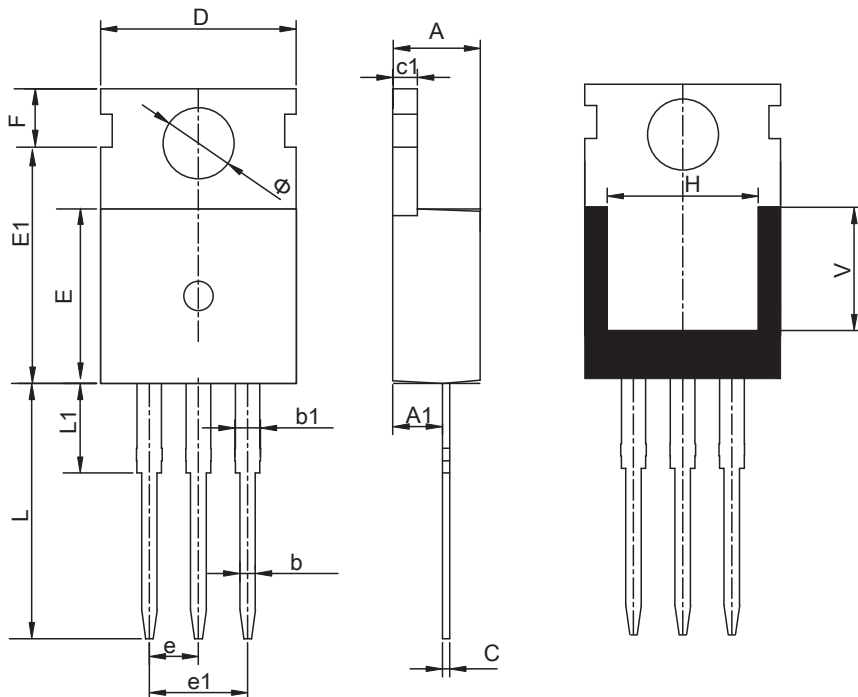


Figure 12. Normalized BV_{DSS} vs. Tj

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.25	2.70	0.089	0.106
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
C	0.33	0.65	0.013	0.026
c1	1.20	1.40	0.047	0.055
D	9.91	10.25	0.390	0.404
E	8.95	9.75	0.352	0.384
E1	12.65	13.00	0.498	0.512
e	2.54 TYP		0.100 TYP	
e1	4.98	5.18	0.196	0.204
F	2.65	2.95	0.104	0.116
H	7.90	8.10	0.311	0.319
L	12.90	13.40	0.508	0.528
L1	2.68	3.25	0.106	0.128
V	6.90 REF		0.272 REF	
Φ	3.40	3.80	0.134	0.150

Order Information

Device	Package	Marking	Carrier	Quantity
GSFH80R420	TO-220	H80R420	Tube	50pcs / Tube