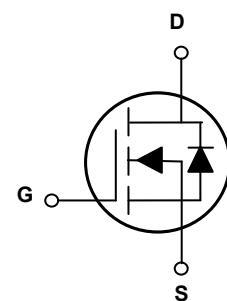
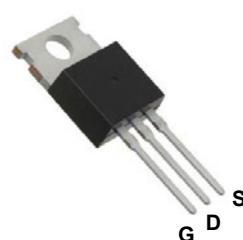


Main Product Characteristics

$V_{(BR)DSS}$	800V
$R_{DS(ON)}$	0.28Ω (Max.)
I_D	17A



TO-220

Schematic Diagram

Features and Benefits

- Optimized the cell structure.
- Low on-resistance and low gate charge.
- Featuring low switching and drive losses.
- Fast switching and reverse body recovery.
- High ruggedness and robustness.



Description

The GSFH80R280 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 ($T_J=25^\circ\text{C}$ 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	17	A
Drain Current-Continuous, at Steady-State, ($T_C=100^\circ\text{C}$)		10	
Drain Current-Pulsed	I_{DM}	68	A
Single Pulse Avalanche Energy ¹	E_{AS}	857	mJ
Single Pulse Avalanche Current	I_{AS}	4.4	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	179	W
		1.43	W/ $^\circ\text{C}$
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)	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.7	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$
Soldering Temperature	T_{SOLD}	260	$^\circ\text{C}$

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	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	800	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=800\text{V}, V_{\text{GS}}=0\text{V}$ $T_J=25^\circ\text{C}$	-	-	1.0	μA
		$V_{\text{DS}}=800\text{V}, V_{\text{GS}}=0\text{V}$ $T_J=125^\circ\text{C}$	-	1.5	-	
Gate-Source Forward Current	I_{GSS}	$V_{\text{GS}}=\pm 30\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=8.5\text{A}$	-	0.24	0.28	Ω
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_D=250\mu\text{A}$	2.4	-	4.6	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{4,5}	Q_g	$V_{\text{DD}}=640\text{V}, I_D=17\text{A}, V_{\text{GS}}=10\text{V}$	-	44	-	nC
Gate-Source Charge ^{4,5}	Q_{gs}		-	14	-	
Gate-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	17	-	
Gate Plateau ^{4,5}	V_{plateau}		-	7.0	-	
Turn-On Delay Time ^{4,5}	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=400\text{V}, R_G=25\Omega, V_{\text{GS}}=10\text{V}, I_D=17\text{A}$	-	31	-	nS
Rise Time ^{4,5}	t_r		-	78	-	
Turn-Off Delay Time ^{4,5}	$t_{\text{d}(\text{off})}$		-	100	-	
Fall Time ^{4,5}	t_f		-	42	-	
Input Capacitance	C_{iss}		-	1170	-	pF
Output Capacitance	C_{oss}	$V_{\text{DS}}=100\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	47	-	
Reverse Transfer Capacitance	C_{rss}		-	2.2	-	
Gate Resistance	R_g		-	2.8	-	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	-	-	17	A
Pulsed Source Current	$I_{\text{s,pulse}}$	$V_{\text{GS}}=0\text{V}, I_s=17\text{A}, dI/dt=100\text{A}/\mu\text{s}$	-	-	68	A
Diode Forward Voltage	V_{SD}		-	-	1.4	V
Reverse Recovery Time ⁴	t_{rr}		-	414	-	nS
Reverse Recovery Charge ⁴	Q_{rr}		-	6.2	-	μC
Reverse Recovery Peak Current ⁴	I_{rrm}		-	28	-	A

Note:

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

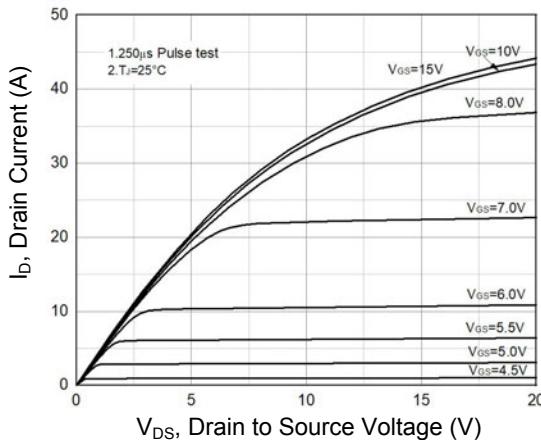


Figure 1. Output Characteristics

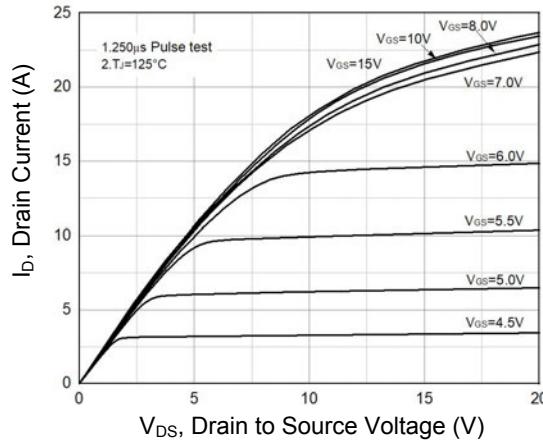


Figure 2. Output Characteristics

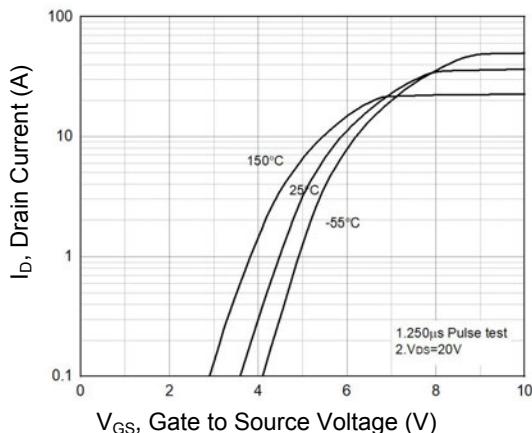


Figure 3. Transfer Characteristics

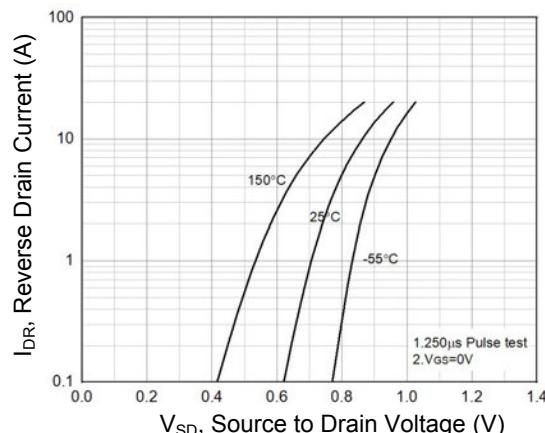


Figure 4. Body Diode Characteristics

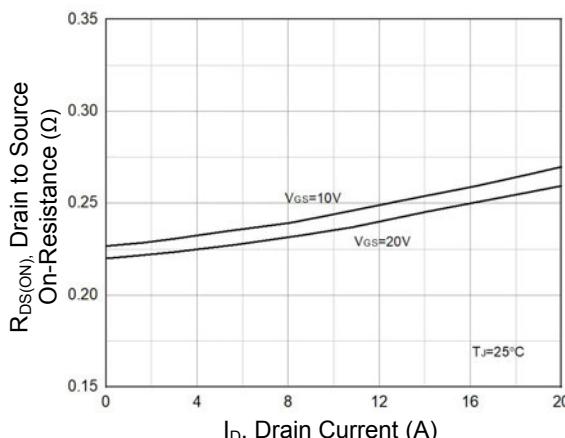


Figure 5. $R_{DS(ON)}$ vs. Drain Current

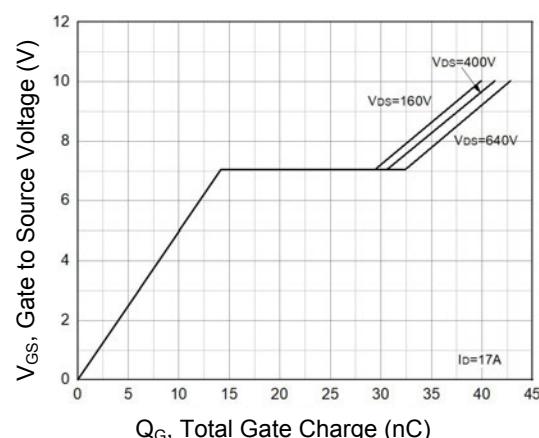


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

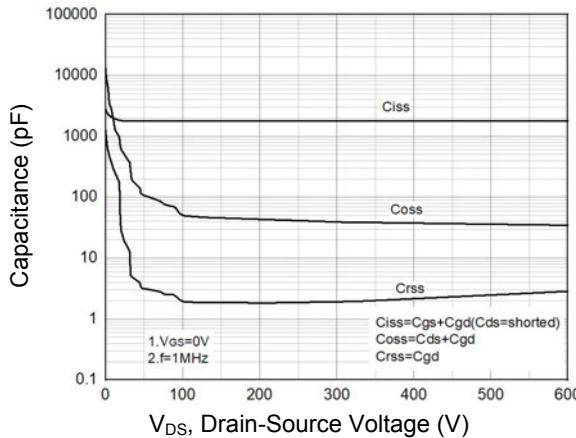


Figure 7. Capacitance Characteristics

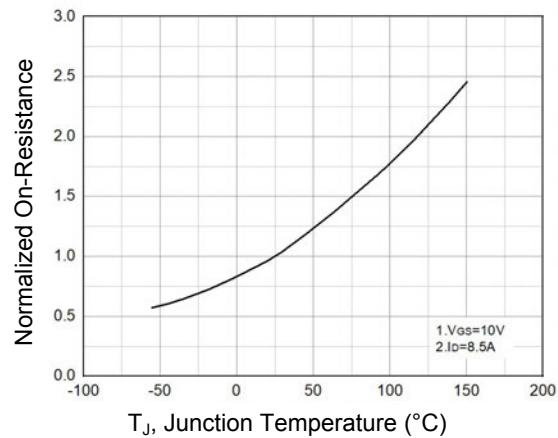


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

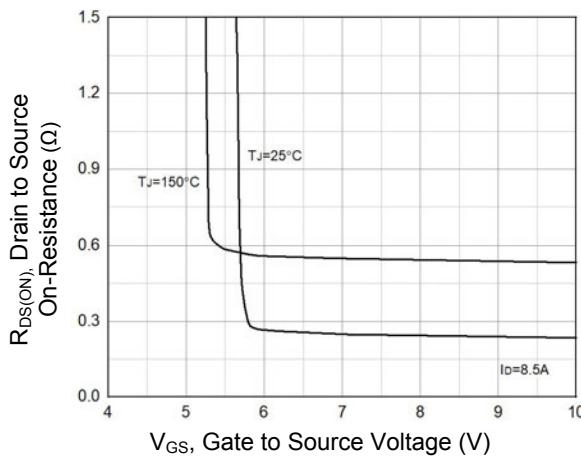


Figure 9. $R_{DS(ON)}$ vs. V_{GS}

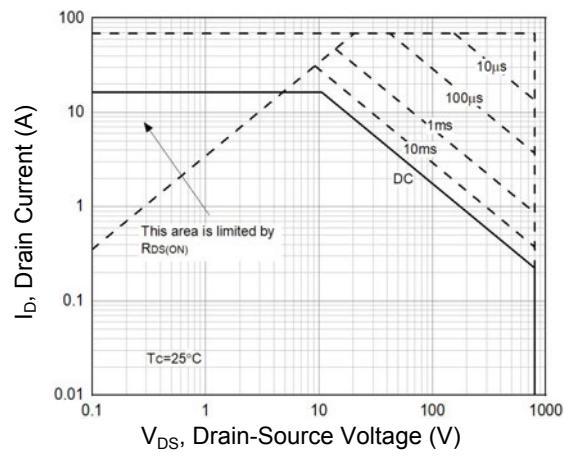


Figure 10. Safe Operation Area

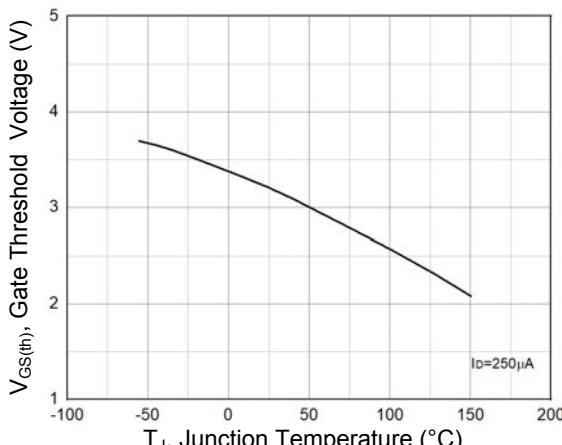


Figure 11. Gate Threshold Voltage vs. T_J

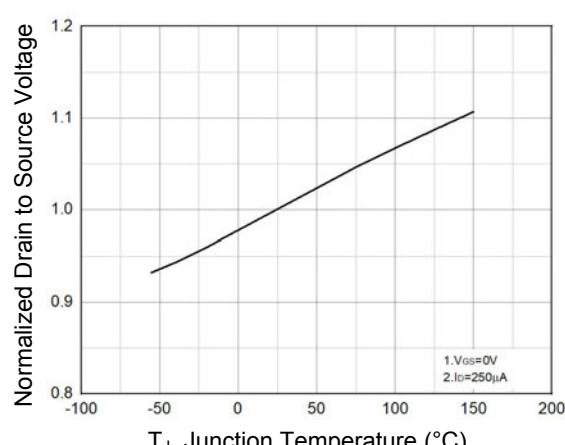
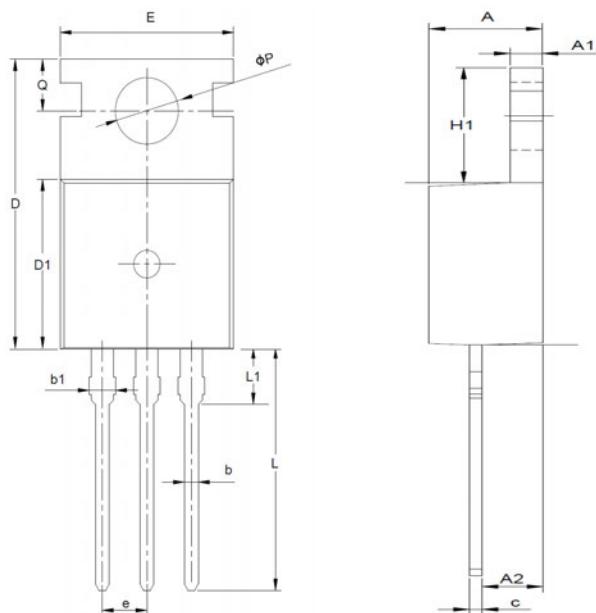


Figure 12. Normalized BV_{DSS} vs. T_J

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.300	4.700	0.169	0.185
A1	1.000	1.500	0.039	0.059
A2	1.800	2.800	0.071	0.110
b	0.600	1.000	0.024	0.039
b1	1.000	1.600	0.039	0.063
c	0.300	0.700	0.012	0.028
D	15.100	16.100	0.594	0.634
D1	8.100	10.000	0.319	0.394
E	9.600	10.400	0.378	0.409
e	2.540 BSC		0.100 BSC	
H1	6.100	7.000	0.240	0.276
L	12.600	13.600	0.496	0.535
L1	-	3.950	-	0.156
ΦP	3.400	3.900	0.134	0.154
Q	2.600	3.200	0.102	0.126