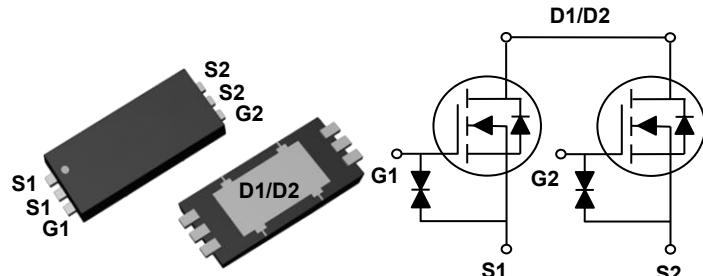


Main Product Characteristics

BV_{DSS}	20V
$R_{DS(ON)}$	9.6mΩ
I_D	20A



PPAK 2x5

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 GSFN0220 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 supply 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}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current—Continuous ($T_C=25^\circ\text{C}$)	I_D	20	A
Drain Current—Continuous ($T_C=100^\circ\text{C}$)		12.6	A
Drain Current—Pulsed ¹	I_{DM}	80	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	27	W
Power Dissipation—Derate above 25°C		0.22	W/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	4.55	°C/W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	20	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{\text{DS}}=20\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{\text{DS}}=16\text{V}, V_{\text{GS}}=0\text{V}, T_J=85^\circ\text{C}$	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 12\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 20	μA
On Characteristics						
Static Drain-Source On-Resistance ³	$R_{\text{DS(ON)}}$	$V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=2.4\text{A}$	-	8	9.6	$\text{m}\Omega$
		$V_{\text{GS}}=4.0\text{V}, I_{\text{D}}=2.4\text{A}$	-	8.2	9.8	
		$V_{\text{GS}}=3.7\text{V}, I_{\text{D}}=2.4\text{A}$	-	8.5	10.6	
		$V_{\text{GS}}=3.1\text{V}, I_{\text{D}}=2.4\text{A}$	-	9.1	11.8	
		$V_{\text{GS}}=2.5\text{V}, I_{\text{D}}=2.4\text{A}$	-	10.3	13.4	
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=250\mu\text{A}$	0.5	0.65	1.5	V
Forward Transconductance	g_{fs}	$V_{\text{DS}}=5\text{V}, I_{\text{D}}=5\text{A}$	-	15	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q_g	$V_{\text{DS}}=20\text{V}, I_{\text{D}}=5\text{A}, V_{\text{GS}}=4.5\text{V}$	-	13.8	-	nC
Gate-Source Charge ^{2,3}	Q_{gs}		-	2.1	-	
Gate-Drain Charge ^{2,3}	Q_{gd}		-	4.5	-	
Turn-On Delay Time ^{2,3}	$t_{\text{d(on)}}$	$V_{\text{DD}}=15\text{V}, R_{\text{G}}=6\Omega, V_{\text{GS}}=10\text{V}, I_{\text{D}}=5\text{A}$	-	28	-	nS
Rise Time ^{2,3}	t_r		-	64	-	
Turn-Off Delay Time ^{2,3}	$t_{\text{d(off)}}$		-	60	-	
Fall Time ^{2,3}	t_f		-	55	-	
Input Capacitance	C_{iss}	$V_{\text{DS}}=20\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	1514	-	pF
Output Capacitance	C_{oss}		-	178	-	
Reverse Transfer Capacitance	C_{rss}		-	145	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_s	Force Current	-	-	20	A
Pulsed Source Current	I_{SM}		-	-	40	A
Diode Forward Voltage ²	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{S}}=1\text{A}, T_J=25^\circ\text{C}$	-	-	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width $\leq 300\text{us}$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

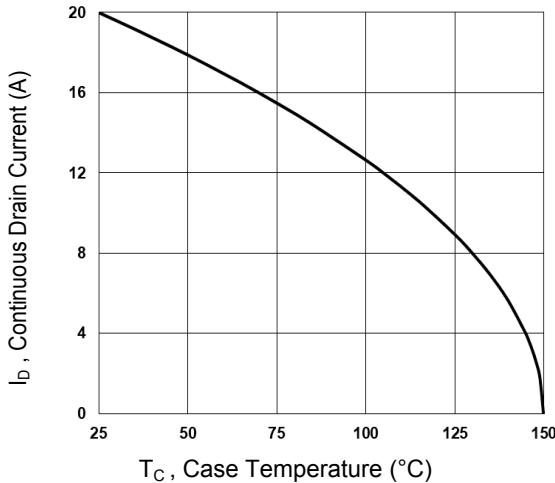


Figure 1. Continuous Drain Current vs. T_c

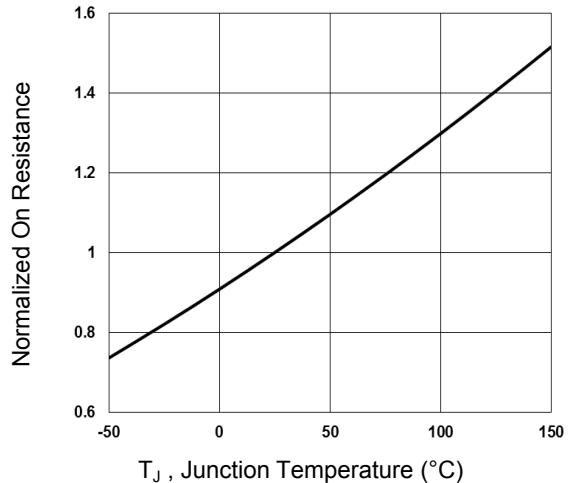


Figure 2. Normalized R_{DS(on)} vs. T_j

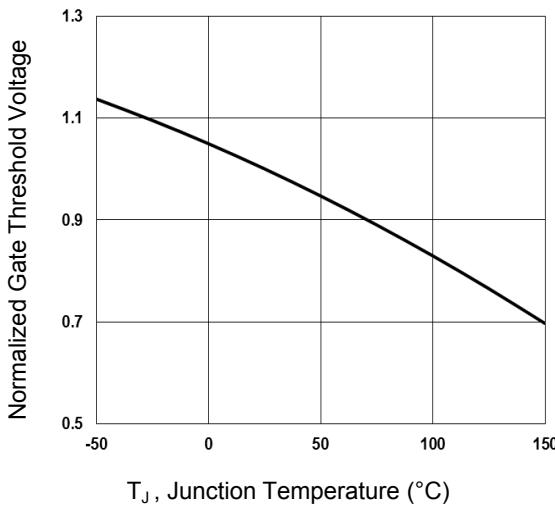


Figure 3. Normalized V_{th} vs. T_j

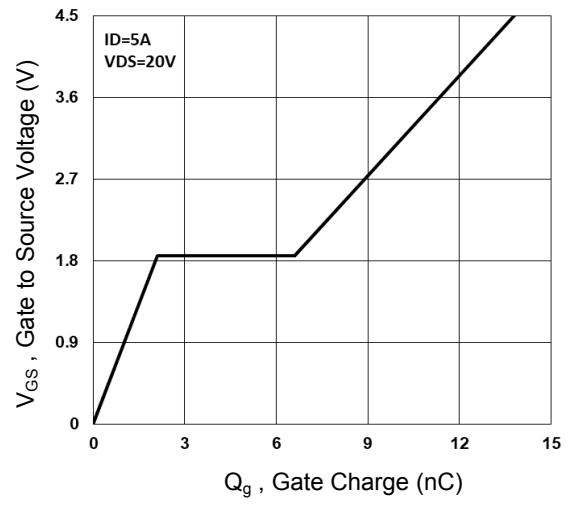


Figure 4. Gate Charge Waveform

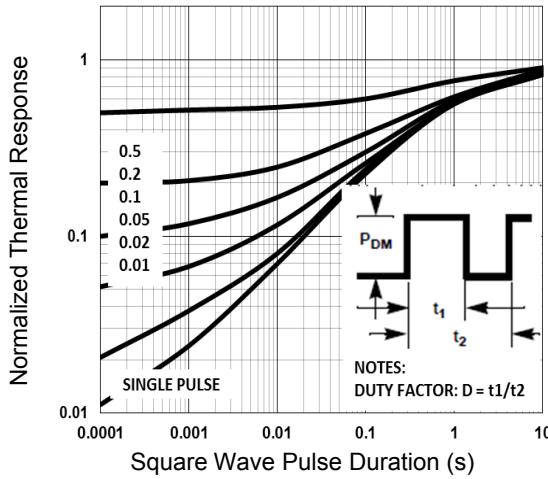


Figure 5. Normalized Transient Response

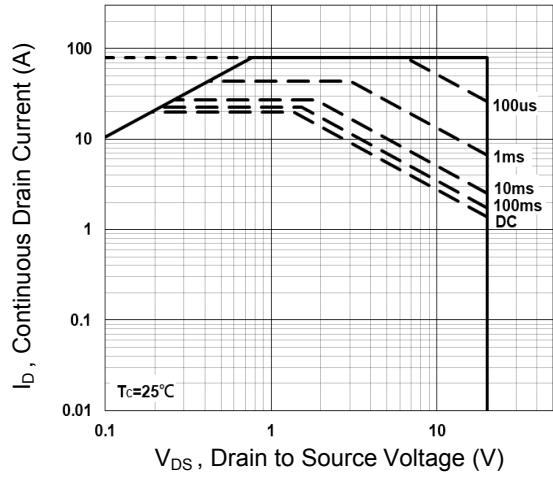


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

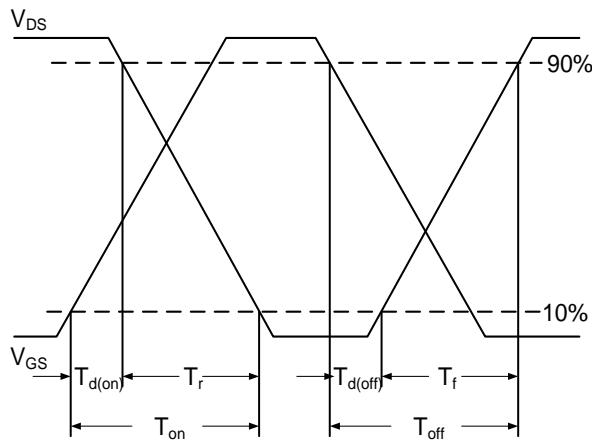


Figure 7. Switching Time Waveform

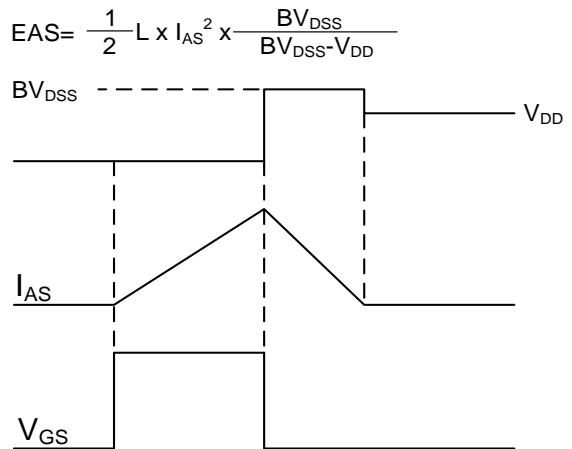
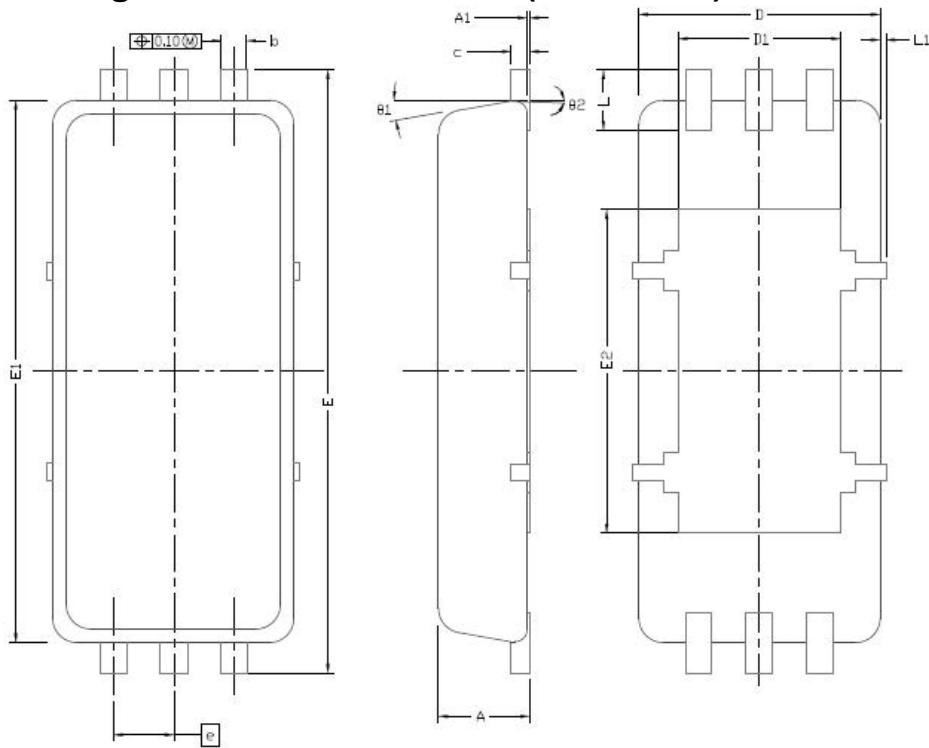


Figure 8. EAS Waveform

Package Outline Dimensions (PPAK 2x5)



DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.0315
A1	0.00	---	0.05	0.000	---	0.002
b	0.20	0.225	0.30	0.008	0.009	0.012
c	0.10	0.152	0.20	0.004	0.006	0.008
D	2.00 BSC			0.079 BSC		
D1	1.30	1.35	1.55	0.051	0.053	0.061
E	5.00 BSC			0.197 BSC		
E1	4.50 BSC			0.177 BSC		
E2	2.60	2.67	2.95	0.102	0.105	0.116
e	0.50 BSC			0.020 BSC		
L	0.40	0.50	0.600	0.016	0.0197	0.0236
L1	0	---	0.100	0	---	0.004
theta1	0°	10°	12°	0°	10°	12°
theta2	3° BSC			3° BSC		