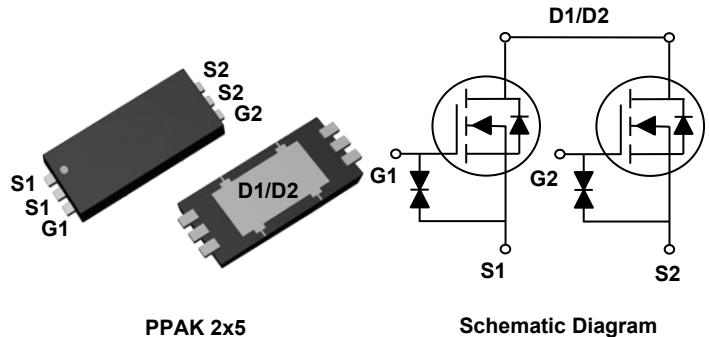


### Main Product Characteristics

$BV_{DSS}$	20V
$R_{DS(ON)}$	9.6m $\Omega$
$I_D$	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 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	$V_{GS}$	$\pm 12$	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 <sup>1</sup>	$I_{DM}$	80	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	27	W
Power Dissipation – Derate above $25^\circ\text{C}$		0.22	W/ $^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 to +150	$^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	4.55	$^\circ\text{C}/\text{W}$

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

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

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

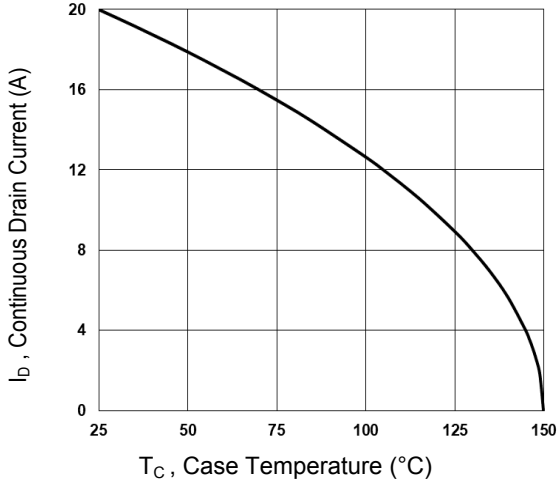


Figure 1. Continuous Drain Current vs.  $T_C$

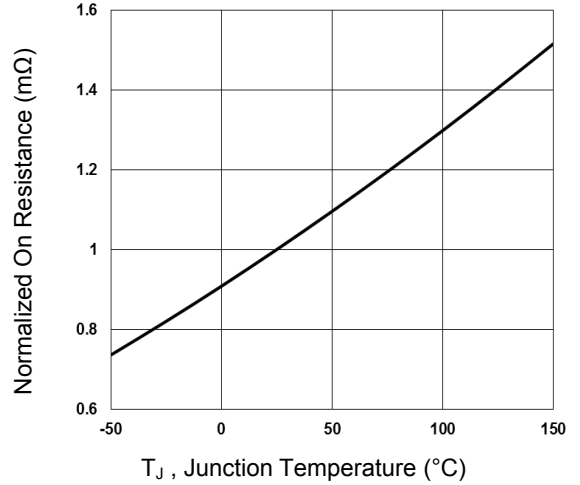


Figure 2. Normalized  $R_{DS(on)}$  vs.  $T_J$

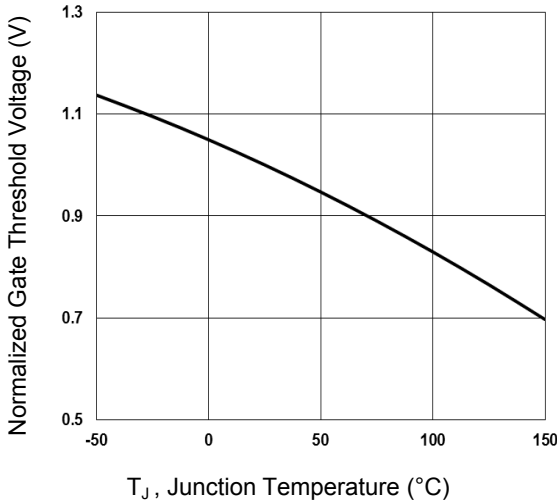


Figure 3. Normalized  $V_{th}$  vs.  $T_J$

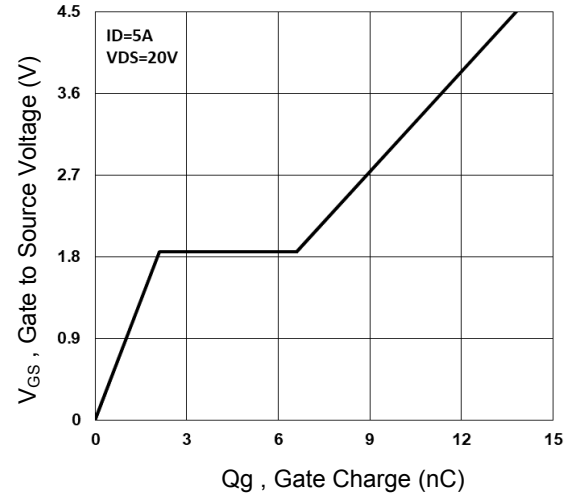


Figure 4. Gate Charge Waveform

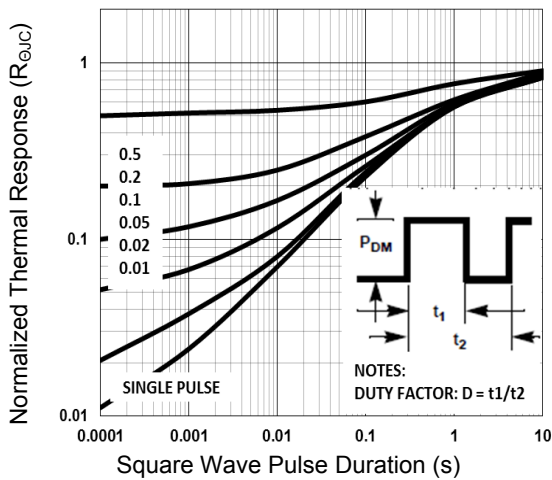


Figure 5. Normalized Transient Response

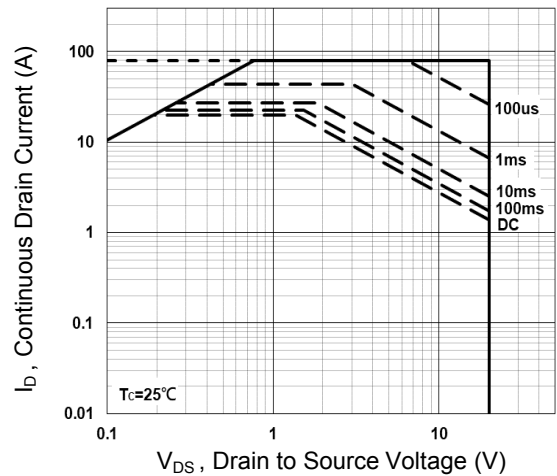
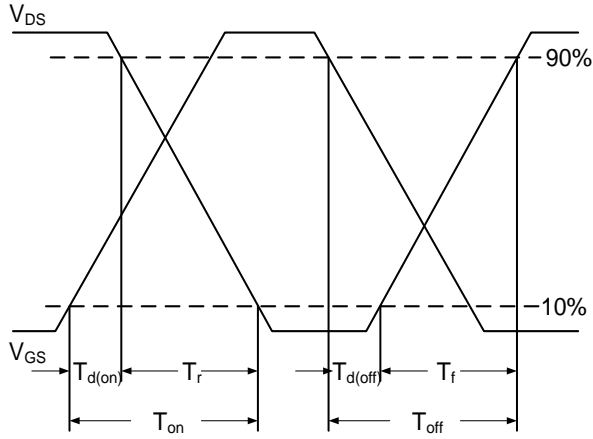
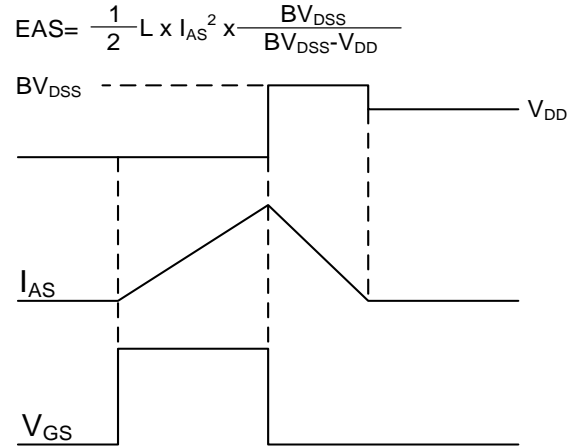


Figure 6. Maximum Safe Operation Area

**Typical Electrical and Thermal Characteristic Curves**

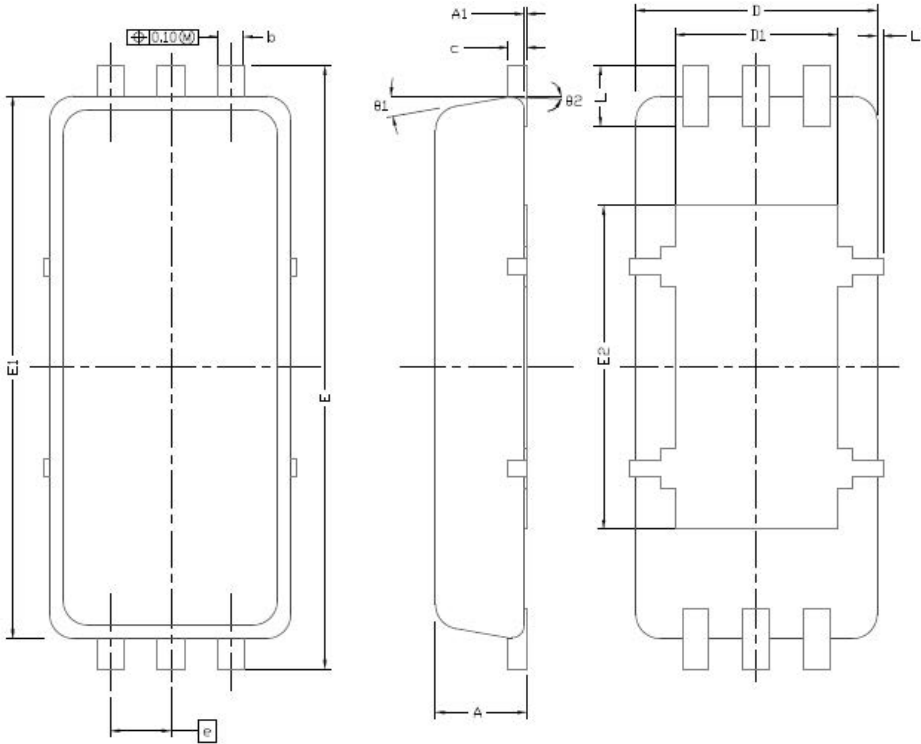


**Figure 7. Switching Time Waveform**



**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
θ1	0°	10°	12°	0°	10°	12°
θ2	3° BSC			3° BSC		