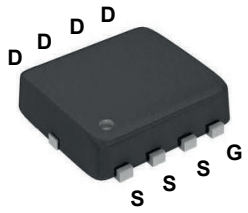
GOOD-ARK
SEMICONDUCTOR

GSFN4020

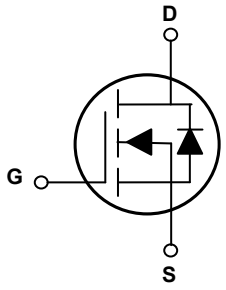
40V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	20mΩ (max.)
I_D	30A



PPAK3x3



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 GSFN4020 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_A=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_A=25°C)	I_D	30	A
Drain Current-Continuous (T_A=70°C)		21	A
Drain Current-Pulsed[1]	I_{DM}	120	A
Single Pulse Avalanche Energy[2]	E_{AS}	4.9	mJ
Single Pulse Avalanche Current[2]	I_{AS}	10	A
Power Dissipation (T_A=25°C)	P_D	45	W
Power Dissipation-Derate Above 25°C		0.36	W/°C
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.77	°C/W
Storage Temperature Range	T_{STG}	-50 To +150	°C
Operating Junction Temperature Range	T_J	-50 To +150	°C

Electrical Characteristics (T_J=25°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=250μA	40	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=32V, V_{GS}=0V, T_J=125°C	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8A	-	16	20	mΩ
		V_{GS}=4.5V, I_D=4A	-	20	26	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.1	1.6	2.8	V
Forward Transconductance	gfs	V_{DS}=10V, I_D=1A	-	4.5	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=32V, I_D=3A, V_{GS}=10V	-	10.8	-	nC
Gate-Source Charge[2,3]	Q_{gs}		-	1.6	-	
Gate-Drain Charge[2,3]	Q_{gd}		-	3.3	-	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=15V, R_G=3.3Ω, V_{GS}=10V, I_D=1A	-	3.8	-	nS
Rise Time[2,3]	t_r		-	10.5	-	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	22.2	-	
Fall Time[2,3]	t_f		-	6.6	-	
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	800	-	pF
Output Capacitance	C_{oss}		-	71	-	
Reverse Transfer Capacitance	C_{rss}		-	110	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	2.6	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	30	A
Pulsed Source Current	I_{SM}		-	-	120	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V
Reverse Recovery Time	T_{rr}	V_R=30V, I_S=8A, di/dt=100A/μs, T_J=25°C	-	33	-	nS
Reverse Recovery Charge	Q_{rr}		-	12	-	nC

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=9.9A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

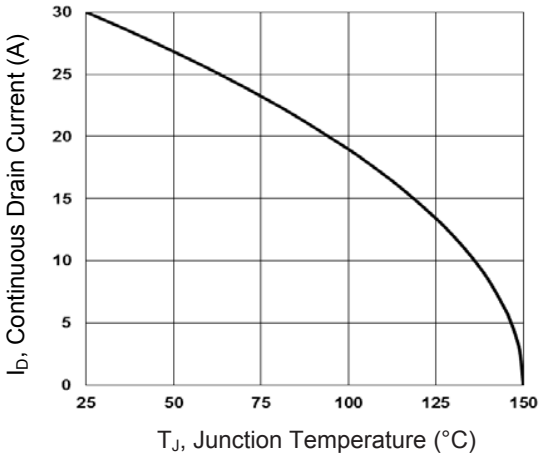


Figure 1. Continuous Drain Current vs. T_J

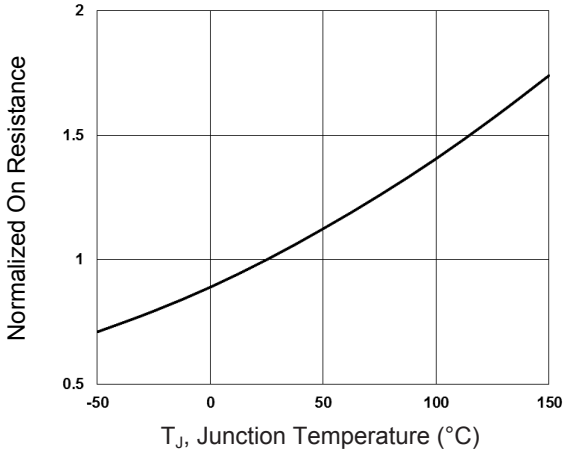


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

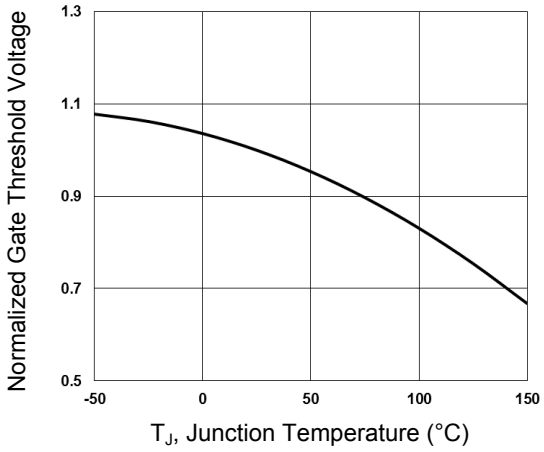


Figure 3. Normalized V_{th} vs. T_J

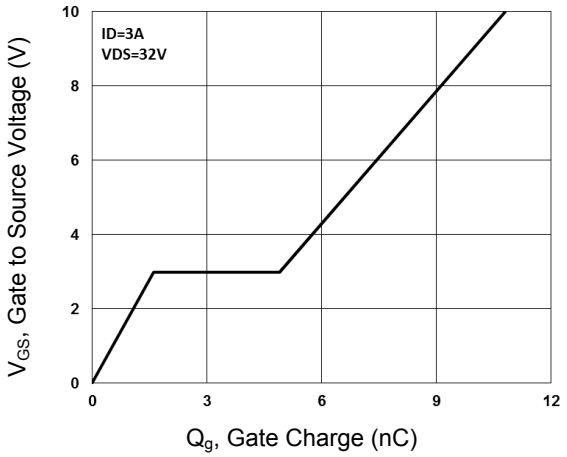


Figure 4. Gate Charge Waveform

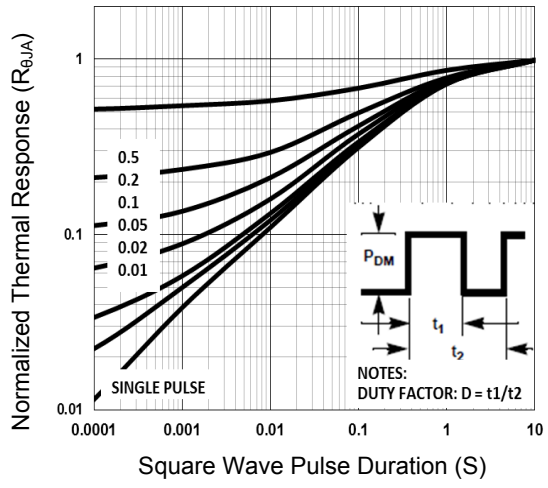


Figure 5. Normalized Transient Impedance

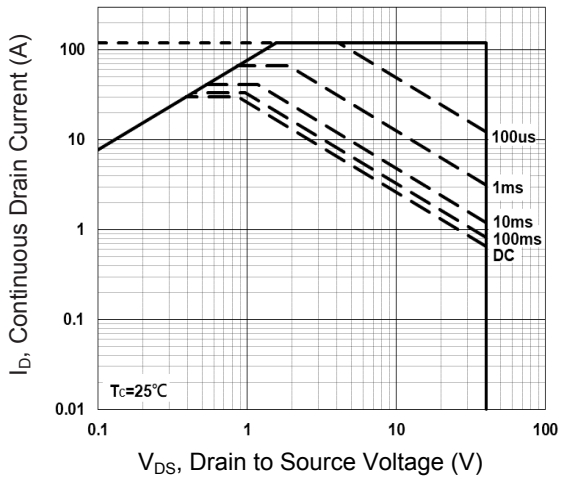
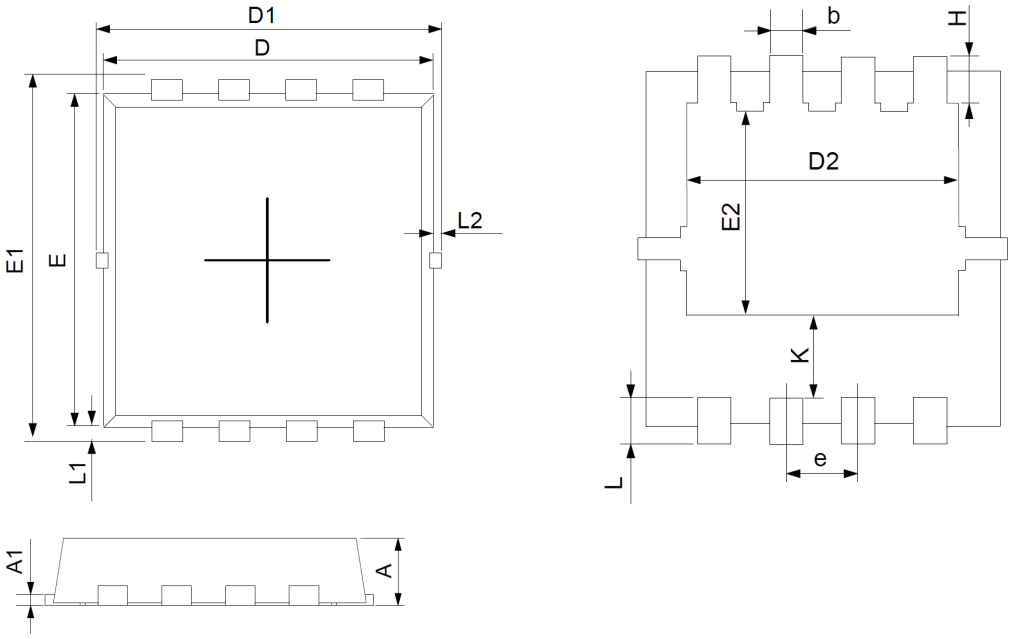


Figure 6. Maximum Safe Operation Area

Package Outline Dimensions (PPAK3x3)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.70	0.90	0.028	0.035
A1	0.14	0.20	0.006	0.008
D	3.05	3.25	0.120	0.128
E	2.90	3.10	0.114	0.122
D1	3.10	3.50	0.122	0.138
D2	2.35	2.50	0.093	0.098
E1	3.10	3.50	0.122	0.138
E2	1.64	1.84	0.065	0.072
b	0.25	0.35	0.010	0.014
k	0.59	0.79	0.023	0.031
e	0.55	0.75	0.022	0.030
E4	3.34	3.92	0.131	0.154
L	0.25	0.55	0.010	0.022
L1	0.10	0.20	0.004	0.008
H	0.32	0.52	0.013	0.020

Order Information

Device	Package	Marking	Carrier	Quantity
GSFN4020	PPAK3x3	N4020	Tape & Reel	5,000 pcs / Reel