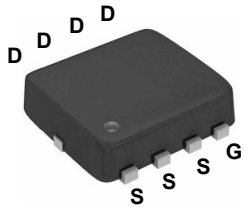
GOOD-ARK SEMICONDUCTOR

GSFN0390

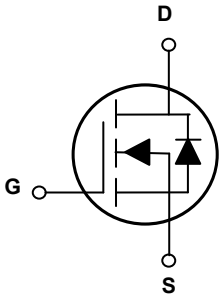
30V N-Channel MOSFET

Main Product Characteristics

BV_{DSS}	30V
$R_{DS(ON)}$	2.95mΩ
I_D	90A



PPAK 3x3



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 GSFN0390 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°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	90	A
Drain Current-Continuous (T_C=100°C)		57	
Drain Current-Pulsed[1]	I_{DM}	360	A
Power Dissipation (T_C=25°C)	P_D	51	W
Power Dissipation-Derate above 25°C		0.41	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.43	°C/W
Operating Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 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=250uA	30	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=24V,V_{GS}=0V, T_J=85°C	-	0.7	-	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=20A	-	2.5	2.95	mΩ
		V_{GS}=4.5V, I_D=15A	-	4	5.2	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D =250uA	1.2	1.8	2.5	V
Forward Transconductance	g_{fs}	V_{DS}=10V, I_D=3A	-	7	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=15V, I_D=45A, V_{GS}=10V	-	24	-	nC
Gate-Source Charge[2,3]	Q_{gs}		-	5.8	-	
Gate-Drain Charge[2,3]	Q_{gd}		-	4.5	-	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=15V, R_G=6Ω V_{GS}=10V, I_D=45A	-	4	-	nS
Rise Time[2,3]	t_r		-	6	-	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	12	-	
Fall Time[2,3]	t_f		-	8	-	
Input Capacitance	C_{lss}	V_{DS}=15V, V_{GS}=0V, F=1MHz	-	1870	-	pF
Output Capacitance	C_{oss}		-	1380	-	
Reverse Transfer Capacitance	C_{rss}		-	18	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	1	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	90	A
Pulsed Source Current	I_{SM}		-	-	180	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width≤300us, duty cycle≤2%.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

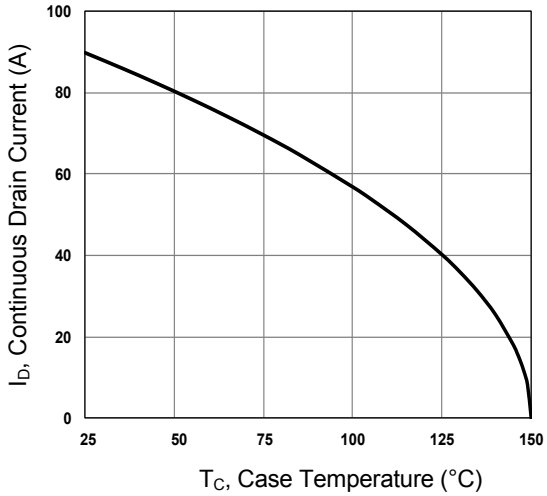


Figure 1. Continuous Drain Current vs. TC

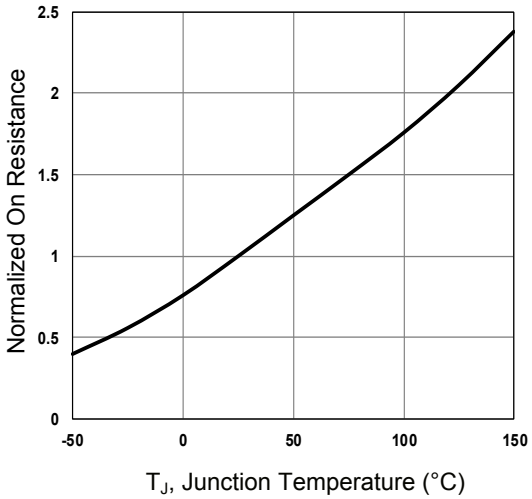


Figure 2. Normalized R_{DSON} vs. T_J

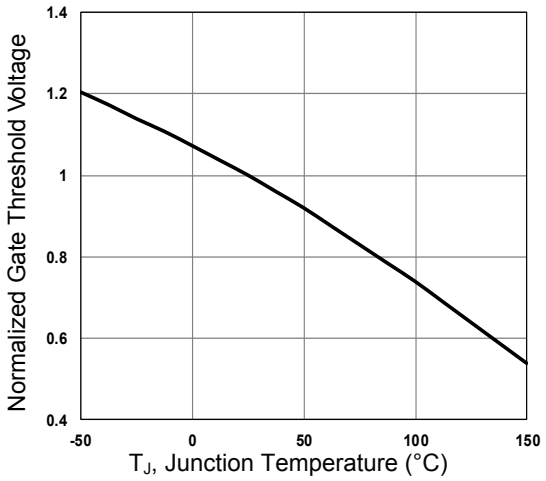


Figure 3. Normalized V_{th} vs. T_J

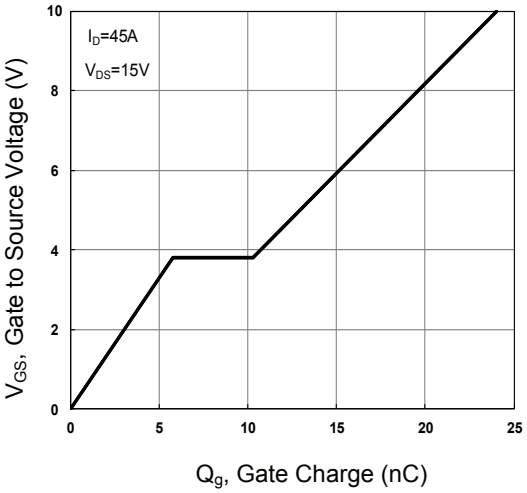


Figure 4. Gate Charge Characteristics

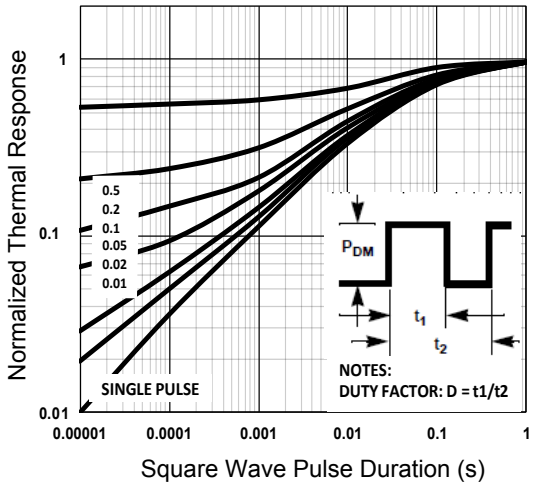


Figure 5. Normalized Transient Impedance

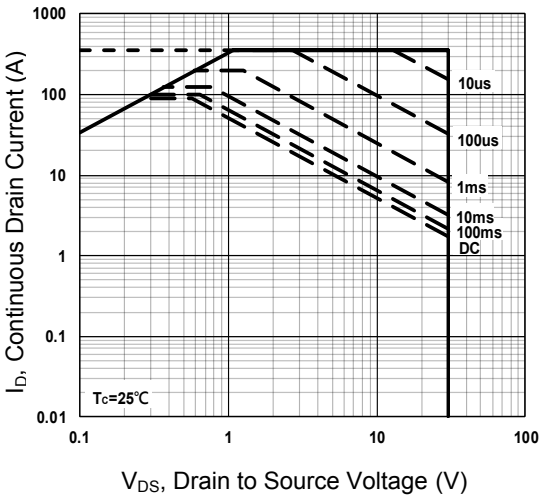


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

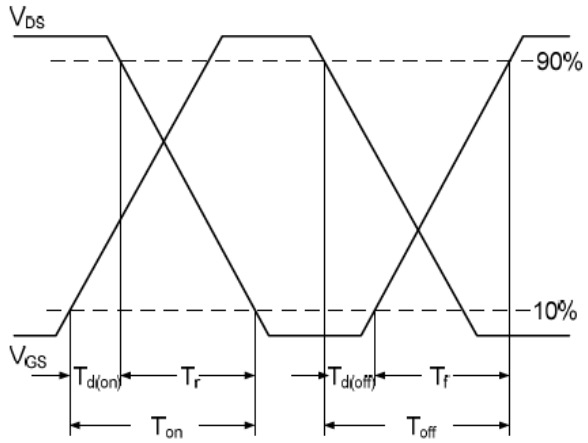


Figure 7. Switching Time Waveform

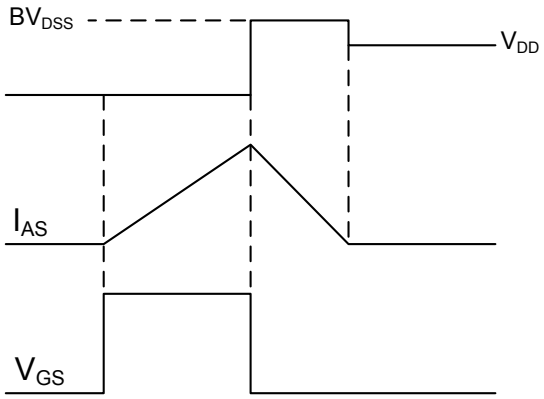
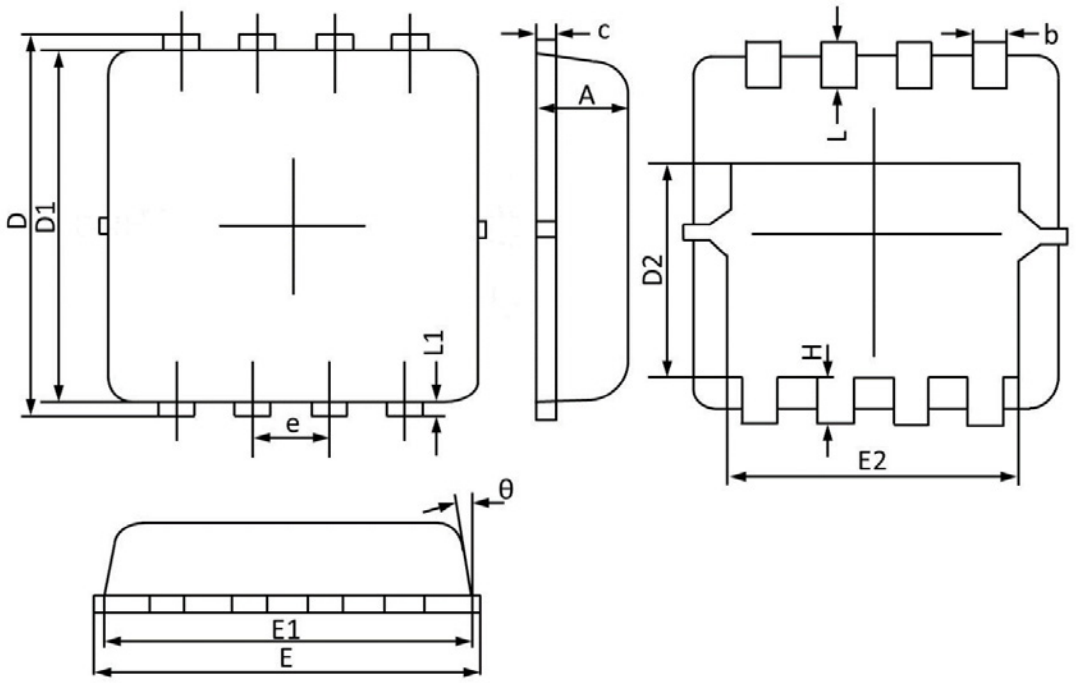


Figure 8. EAS Waveform

Package Outline Dimensions PPAK3x3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Max	Min	Max	Min
A	0.900	0.700	0.035	0.028
b	0.350	0.250	0.014	0.010
c	0.250	0.100	0.010	0.004
D	3.500	3.050	0.138	0.120
D1	3.200	2.900	0.126	0.114
D2	1.950	1.350	0.077	0.053
E	3.400	3.000	0.134	0.118
E1	3.300	2.900	0.130	0.114
E2	2.600	2.350	0.102	0.093
e	0.650 BSC		0.026 BSC	
H	0.750	0.300	0.030	0.012
L	0.600	0.300	0.024	0.012
L1	0.200	0.060	0.008	0.002
θ	14°	6°	14°	6°