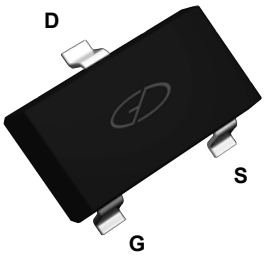
GOOD-ARK SEMICONDUCTOR

GSF1001

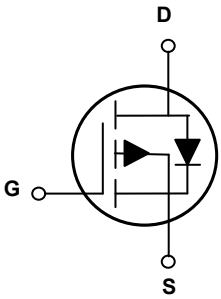
100V P-Channel MOSFET

Main Product Characteristics

BV_{DSS}	-100V
$R_{DS(ON)}$	650mΩ
I_D	-840mA



SOT-23



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 GSF1001 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}	-100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_A=25°C)	I_D	-840	mA
Drain Current-Continuous (T_A=70°C)		-670	
Drain Current-Pulsed[1]	I_{DM}	-3.36	A
Power Dissipation (T_A=25°C)	P_D	1.56	W
Power Dissipation-Derate above 25°C		0.008	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	125	°C/W
Operating Junction Temperature Range	T_J	-50 To +150	°C
Storage Temperature Range	T_{STG}	-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	-100	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1mA	-	0.08	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-100V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=-80V, 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=-600mA	-	540	650	mΩ
		V_{GS}=-4.5V, I_D=-400mA	-	590	760	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250μA	-1.2	-1.8	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-4.6	-	mV/°C
Forward Transconductance	g_{fs}	V_{DS}=-10V, I_D=-0.5A	-	2	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=-50V, I_D=-500mA, V_{GS}=-10V	-	4.4	8.8	nC
Gate-Source Charge[2,3]	Q_{gs}		-	0.5	1	
Gate-Drain Charge[2,3]	Q_{gd}		-	1.8	3.6	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=-50V, R_G=3.3Ω, V_{GS}=-10V, I_D=-0.5A	-	5	10	nS
Rise Time[2,3]	t_r		-	14.5	29	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	20	40	
Fall Time[2,3]	t_f		-	8	16	
Input Capacitance	C_{Iss}	V_{DS}=-50V, V_{GS}=-0V, F=1MHz	-	382	760	pF
Output Capacitance	C_{oss}		-	29	60	
Reverse Transfer Capacitance	C_{rss}		-	18	36	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	31	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-0.84	A
Pulsed Source Current	I_{SM}		-	-	-1.68	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 operation temperature.

Typical Electrical and Thermal Characteristic Curves

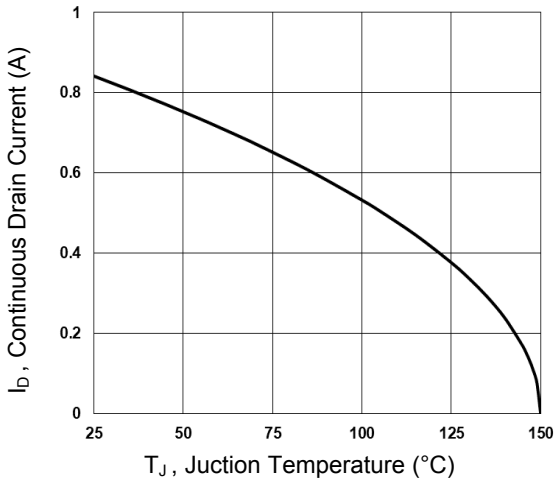


Figure 1. Continuous Drain Current vs. T_J

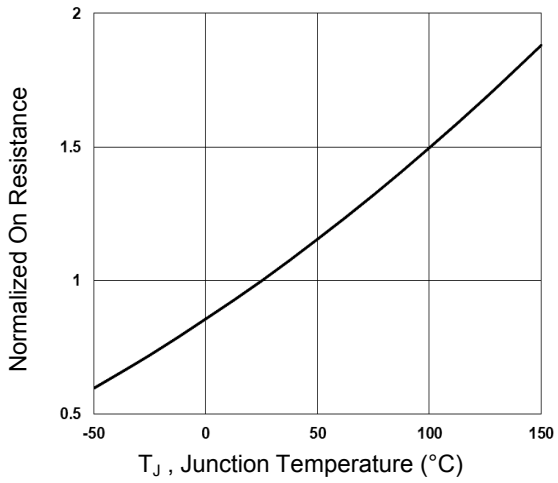


Figure 2. Normalized R_{DSON} vs. T_J

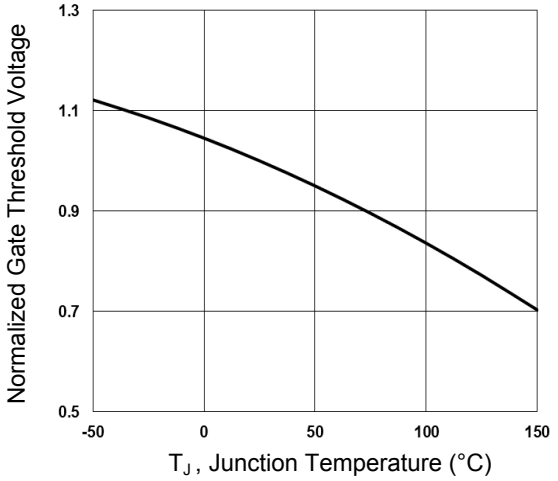


Figure 3. Normalized V_{th} vs. T_J

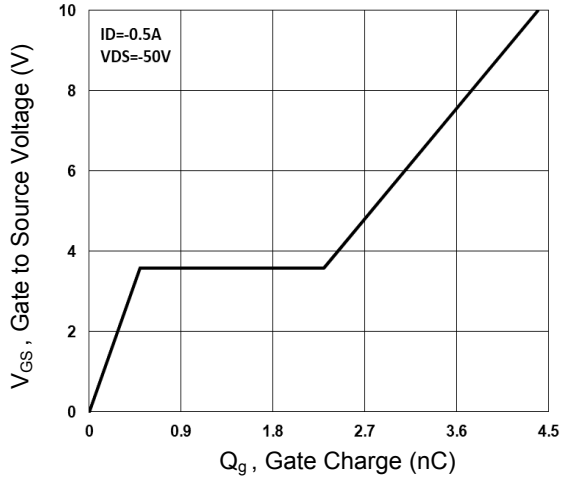


Figure 4. Gate Charge Characteristics

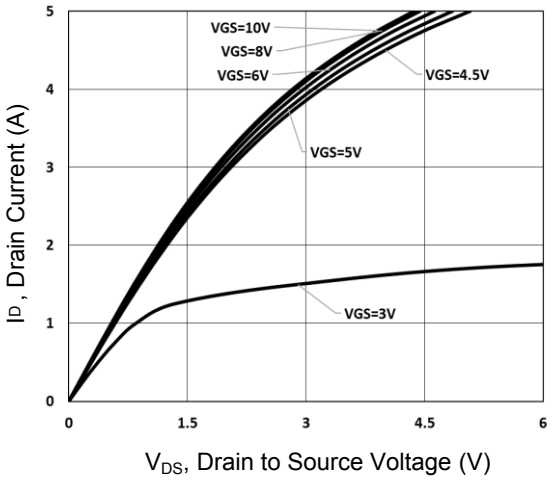


Figure 5. Typical Output Characteristics

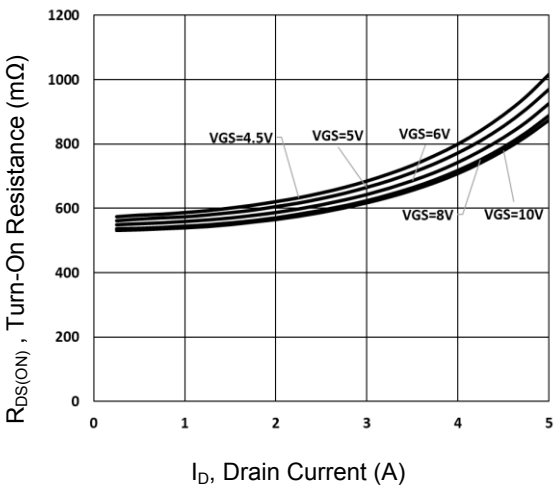


Figure 6. Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

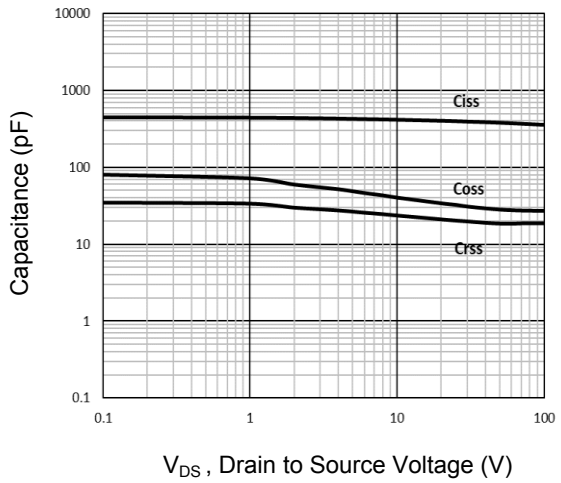


Figure 7. Capacitance Characteristics

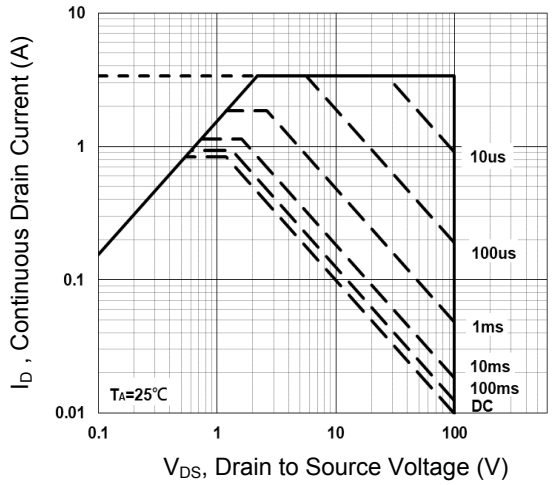


Figure 8. Maximum Safe Operation Area

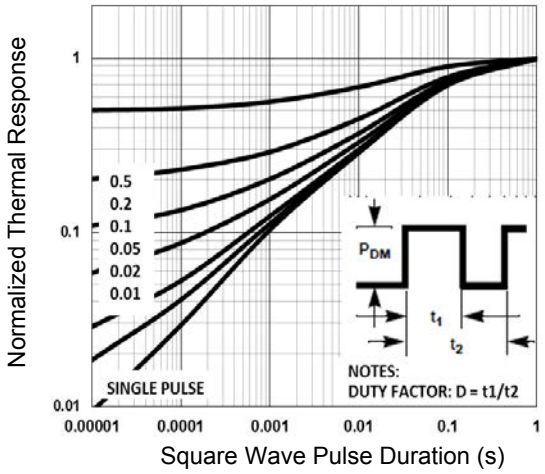
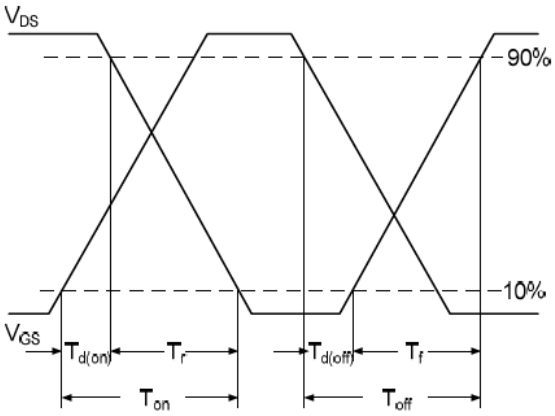
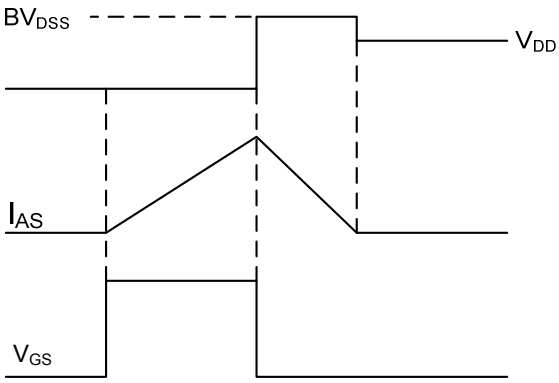


Figure 9. Normalized Transient Response



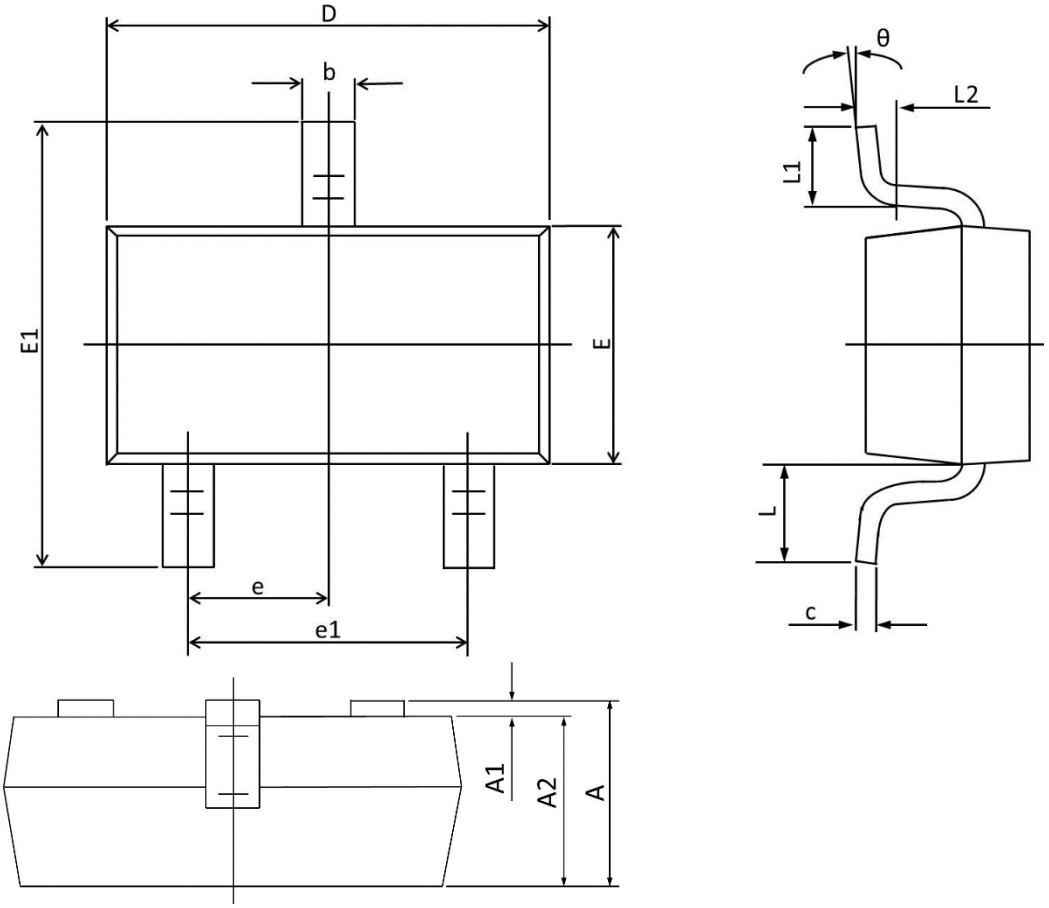
Firgure 10. Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$



Firgure 11. EAS Waveform

Package Outline Dimensions (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°