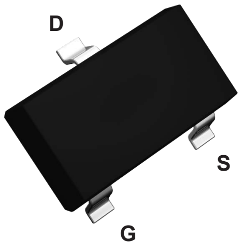
GSF2301

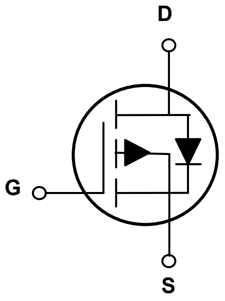
20V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-20V
$R_{DS(ON)}$	53mΩ (max.)
I_D	-3.8A



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 GSF2301 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}	-20	V
Gate-to-Source Voltage	V_{GS}	±12	V
Continuous Drain Current, @ Steady-State (T_A=25°C)[1]	I_D	-3.8	A
Continuous Drain Current, @ Steady-State (T_A=70°C)		-3.0	A
Pulsed Drain Current[2]	I_{DM}	-27	A
Power Dissipation (T_A=25°C)	P_D	1.0	W
Linear Derating Factor (T_A=25°C)		0.008	mW/°C
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)[3]	$R_{\theta JA}$	125	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-20	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V	-	-	-1	μA
		T_J=125°C	-	-	-50	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=10V	-	-	100	nA
		V_{GS}=-10V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	V_{GS}=-4.5V, I_D=-3.4A	-	42	53	mΩ
		V_{GS}=-2.5V, I_D=-3.0A	-	55	69	
		V_{GS}=-1.8V, I_D=-2.5A	-	75	91	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.62	-1.0	V
Forward Transconductance	gfs	V_{DS}=5V, I_D=-3.0A	-	13	-	S
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, f=1MHz	-	438	-	pF
Output Capacitance	C_{oss}		-	76	-	
Reverse Transfer Capacitance	C_{rss}		-	63	-	
Total Gate Charge	Q_g	I_D=-3.4A, V_{DS}=-10V, V_{GS}=-10V	-	5.4	-	nC
Gate-to-Source Charge	Q_{gs}		-	1.2	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	1.3	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-1A, R_{GEN}=3.0Ω	-	6.5	-	nS
Rise Time	t_r		-	21	-	
Turn-Off Delay Time	$t_{d(off)}$		-	37	-	
Fall Time	t_f		-	34	-	
Gate Resistance	R_g	f=1MHz	-	4.1	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	-3.8	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	-17.2	A
Diode Forward Voltage	V_{SD}	I_S=-3.4A, V_{GS}=0V	-	-0.8	-1.2	V

Note:

1. Pulse test: Pulse width ≤300us, duty cycle ≤2%.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

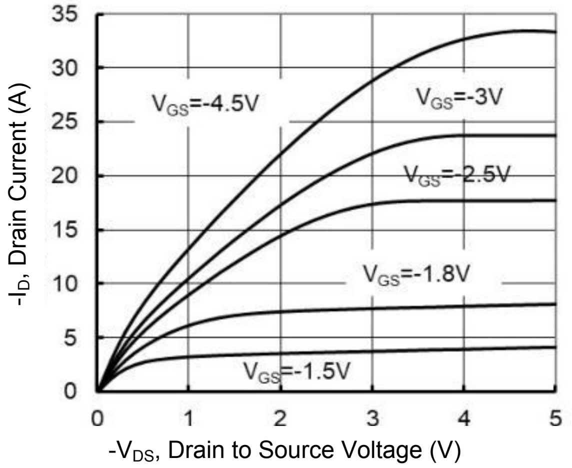


Figure 1. Typical Output Characteristics

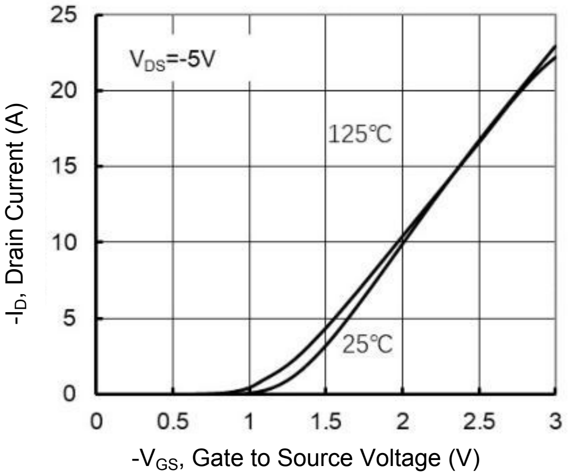


Figure 2. Typical Transfer Characteristics

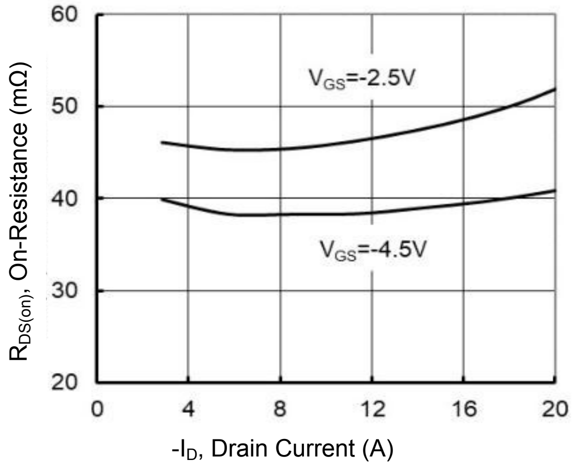


Figure 3. On-Resistance vs. Drain Current

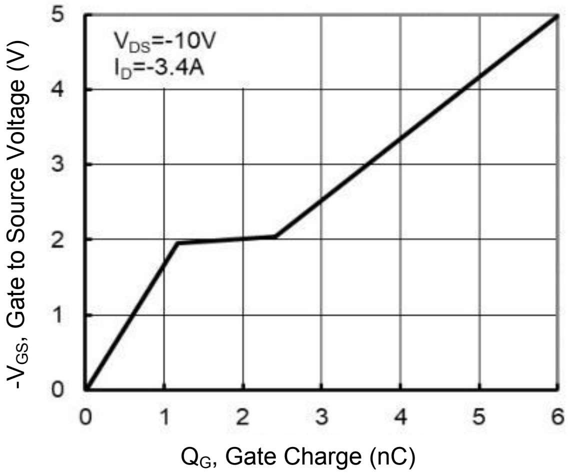


Figure 4. Gate Charge

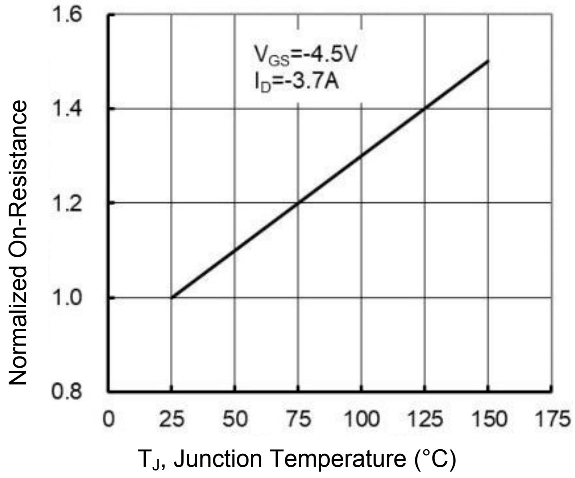


Figure 5. Normalized $R_{DS(on)}$ vs. T_J

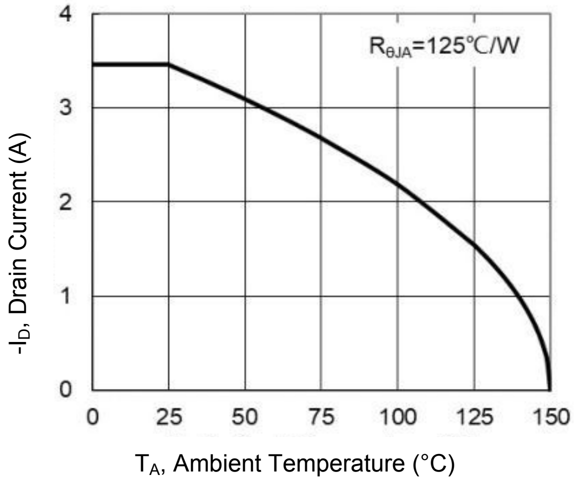


Figure 6. Drain Current vs. T_A

Typical Electrical and Thermal Characteristic Curves

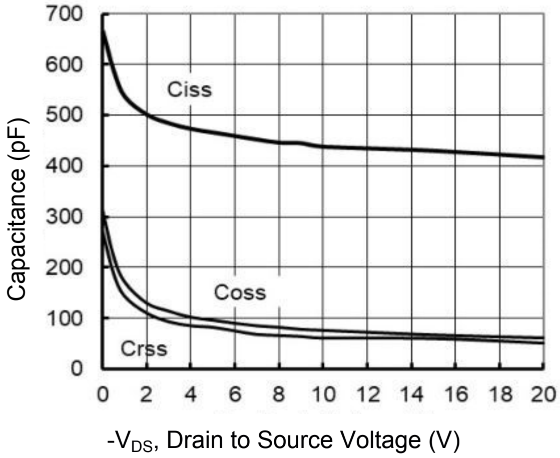


Figure 7. Capacitance Characteristics

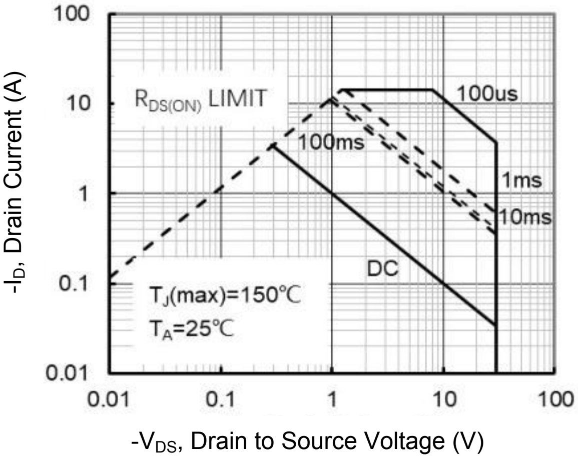
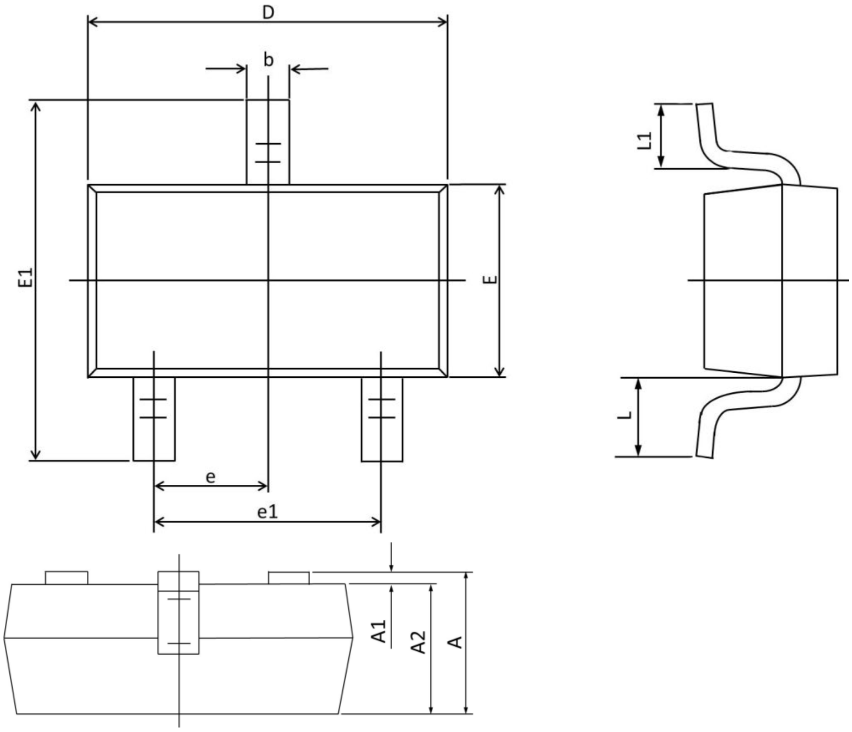


Figure 8. Safe Operation Area

Package Outline Dimensions (SOT-23)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.047
A1	0.000	0.100	0.000	0.004
A2	0.900	1.150	0.035	0.045
b	0.300	0.500	0.012	0.020
D	2.800	3.040	0.110	0.120
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.95 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.55 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020

Order Information

Device	Package	Marking	Carrier	Quantity
GSF2301	SOT-23	2301*(* varied by lot)	Tape & Reel	3,000 pcs / Reel

For more information, please contact us at: inquiry@goodarksemi.com