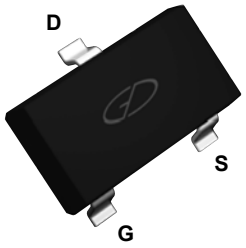
GOOD-ARK SEMICONDUCTOR

GSF2301

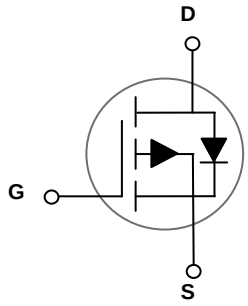
20V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-20V
$R_{DS(on)}$MAX	110mΩ@-4.5V
	140mΩ@-2.5V
I_D	-3A



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 supply and a wide variety of other applications.

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-3	A
Drain Current -Pulsed	I_{DM}	1	A
Maximum Power Dissipation	P_D	1	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance,Junction-to-Ambient [2]	$R_{\theta JA}$	125	°C/W

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-20	-24	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V		-	±100	nA
On Characteristics [3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-0.4	-0.7	-1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-3A		64	110	mΩ
		V_{GS}=-2.5V, I_D=-2A		89	140	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-2A	5	-	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	405	-	PF
Output Capacitance	C_{oss}		-	75	-	PF
Reverse Transfer Capacitance	C_{rss}		-	55	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V,I_D=-1A V_{GS}=-4.5V,R_{GEN}=10Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	35	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	V_{DS}=-10V,I_D=-3A, V_{GS}=-2.5V	-	3.3	12	nC
Gate-Source Charge	Q_{gs}		-	0.7	-	nC
Gate-Drain Charge	Q_{gd}		-	1.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [3]	V_{SD}	V_{GS}=0V,I_S=1.3A		-	-1.2	V
Diode Forward Current[2]	I_S		-	-	-3	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Typical Electrical and Thermal Characteristic Curves

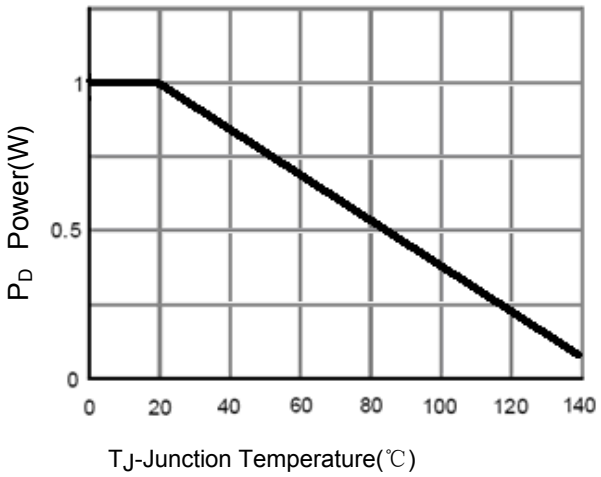


Figure 1. Power Dissipation

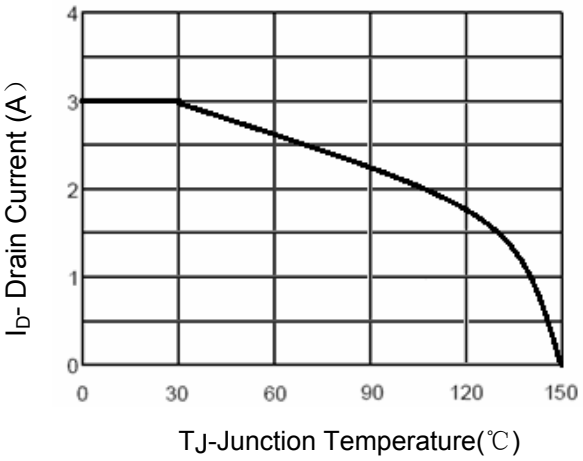


Figure 2. Drain Current

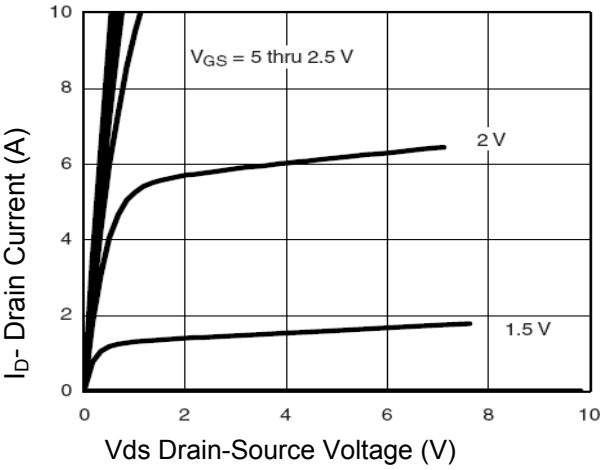


Figure 3. Output Characteristics

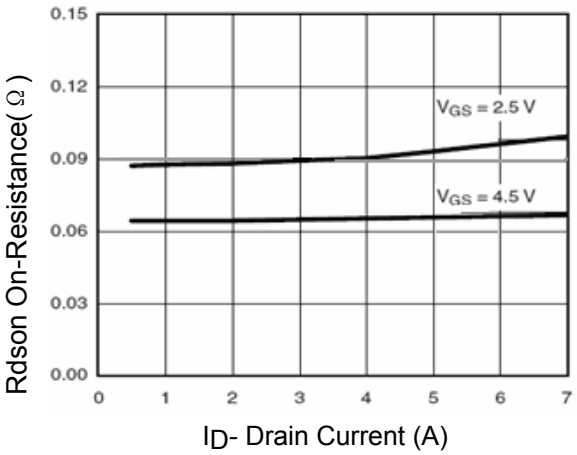


Figure 4. Drain-Source On-Resistance

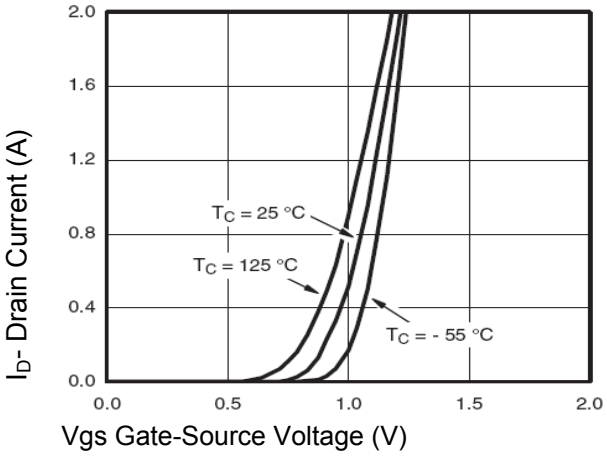


Figure 5. Transfer Characteristics

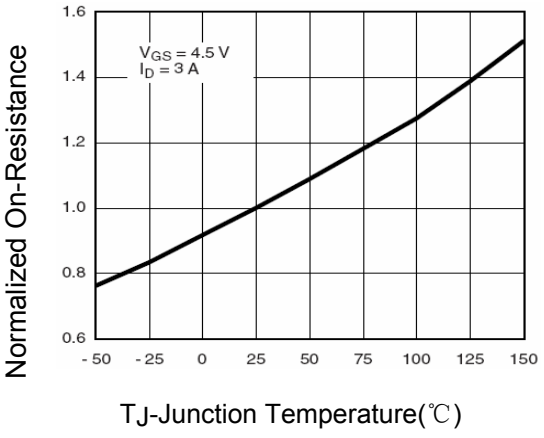


Figure 6. Drain-Source On-Resistance

Typical Electrical and Thermal Characteristic Curves

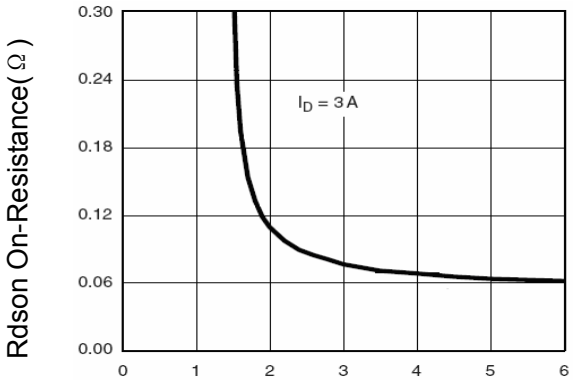


Figure 7. Rdson vs Vgs

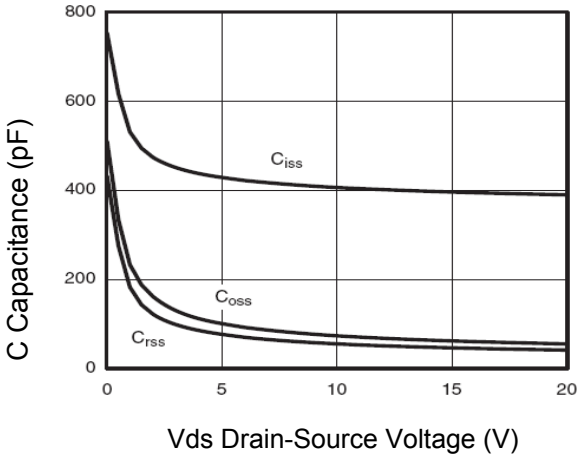


Figure 8. Capacitance vs Vds

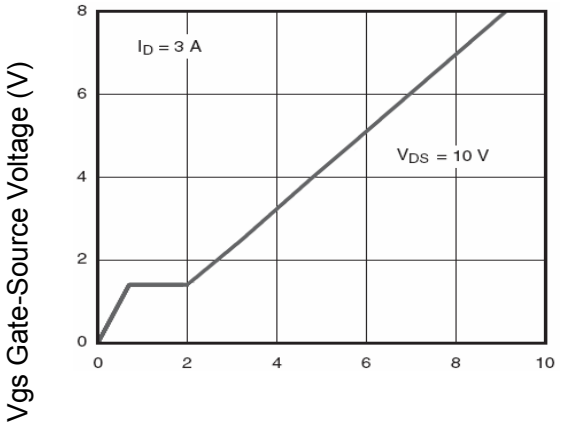


Figure 9. Gate Charge

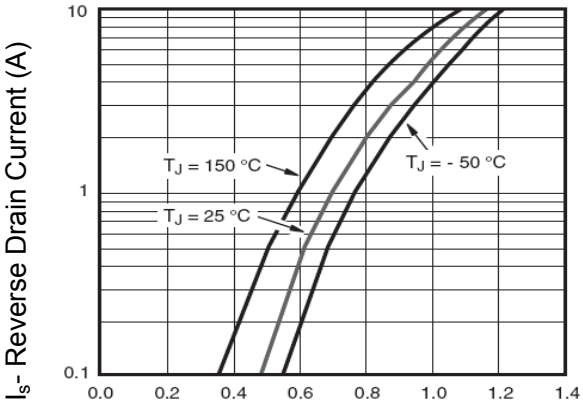


Figure 10. Source- Drain Diode Forward

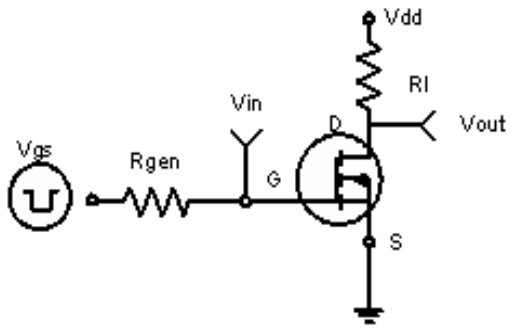


Figure 11. Switching Test Circuit

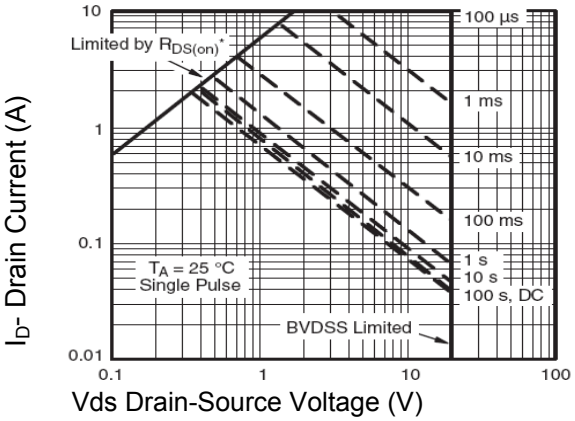


Figure 12. Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

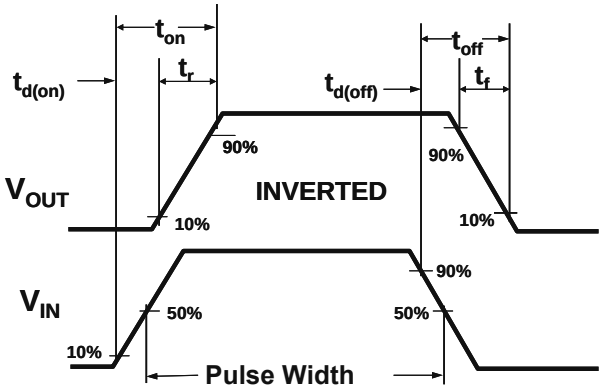


Figure 13. Switching Waveforms

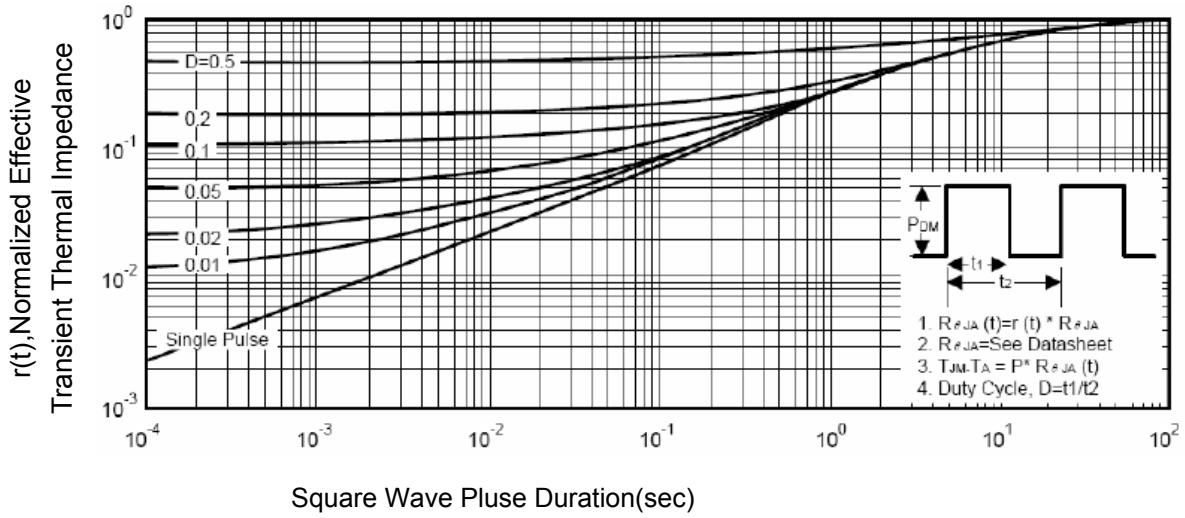
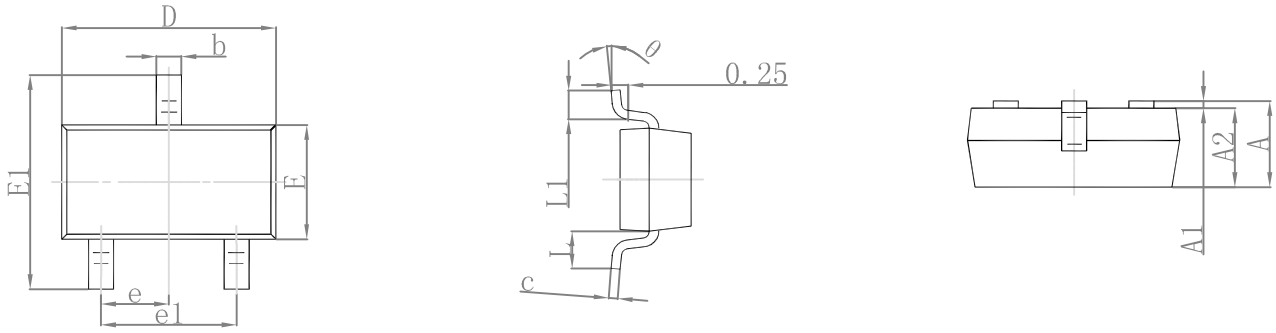


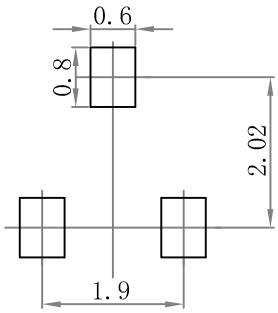
Figure 14. Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions SOT-23



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
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	0°	8°	0°	8°

Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.