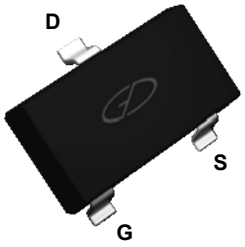
GOOD-ARK SEMICONDUCTOR

GSF2301

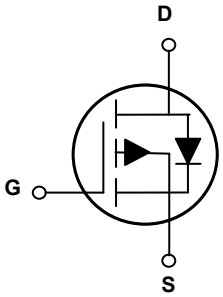
20V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-20V
$R_{DS(ON)}$	110mΩ @ -4.5V (Max.)
	140mΩ @ -2.5V (Max.)
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 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-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-3	A
Drain Current-Pulsed[1]	I_{DM}	-10	A
Maximum Power Dissipation	P_D	1	W
Thermal Resistance, Junction-to-Ambient[2]	$R_{\theta JA}$	125	°C/W
Storage Temperature Range	T_{STG}	-55 To +150	°C
Operating Junction Temperature Range	T_J	-55 To +150	°C

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

Parameter	Symbol	Conditions	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	
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-2A	5	-	-	S
Dynamic Characteristics[4]						
Input Capacitance	C_{lss}	V_{DS}=-10V, V_{GS}=0V, F=1MHz	-	405	-	pF
Output Capacitance	C_{oss}		-	75	-	
Reverse Transfer Capacitance	C_{rss}		-	55	-	
Switching Characteristics[4]						
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	-	
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	
Turn-Off Fall Time	t_f		-	10	-	
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	-	
Gate-Drain Charge	Q_{gd}		-	1.3	-	
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%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristic Curves

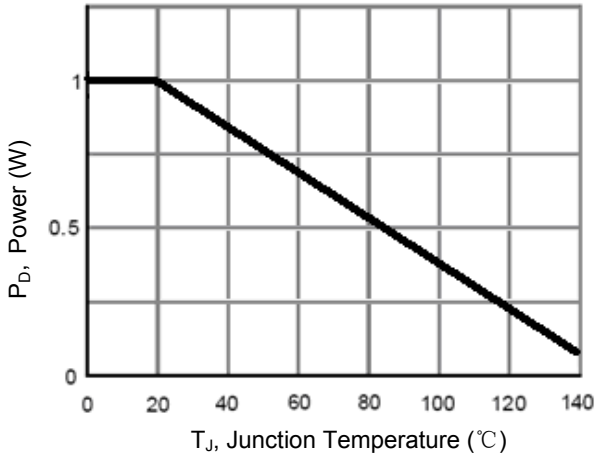


Figure 1. Power Dissipation

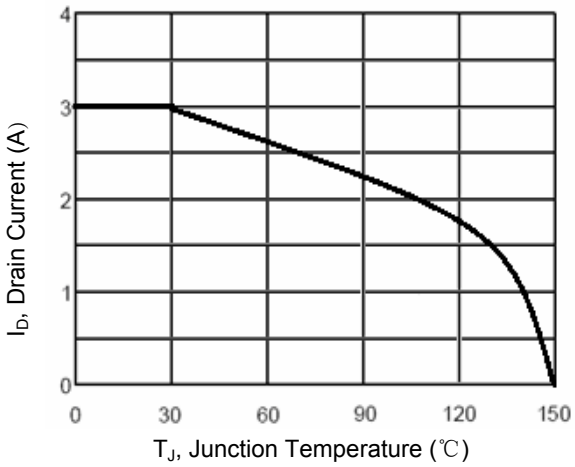


Figure 2. Drain Current

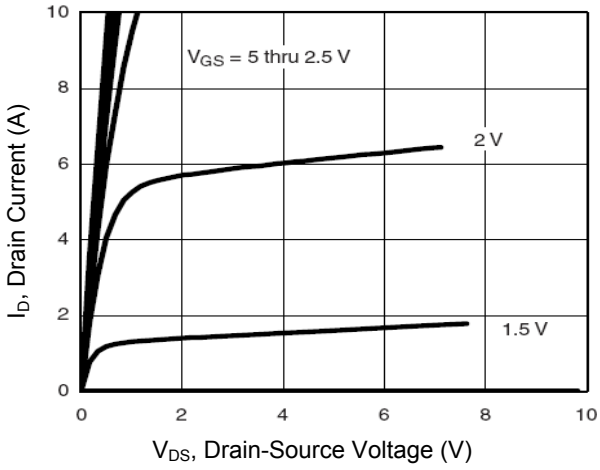


Figure 3. Output Characteristics

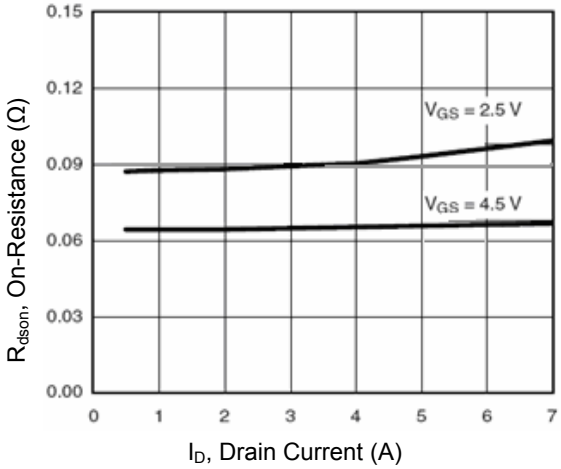


Figure 4. Drain-Source On-Resistance

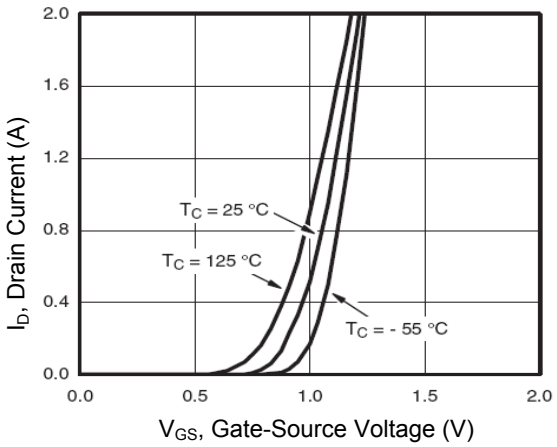


Figure 5. Transfer Characteristics

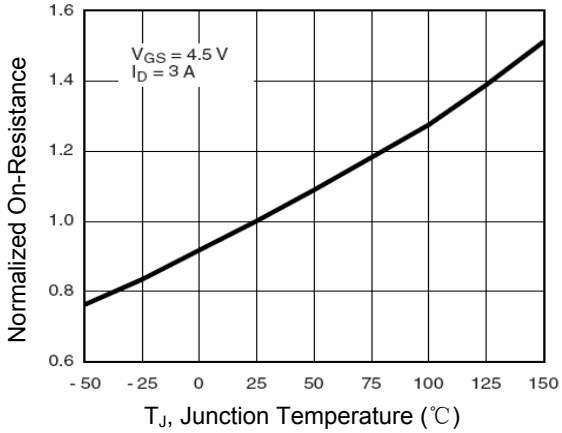


Figure 6. Drain-Source On-Resistance

Typical Electrical and Thermal Characteristic Curves

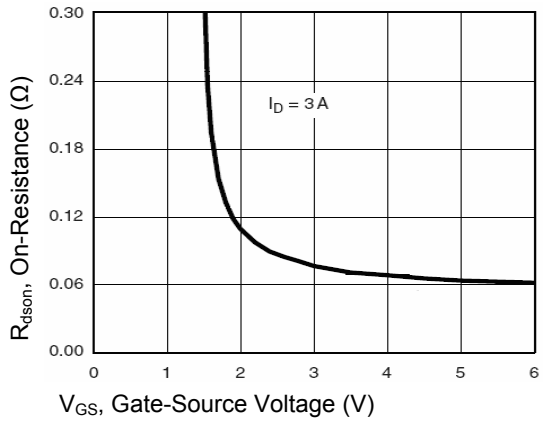


Figure 7. R_{dson} vs V_{GS}

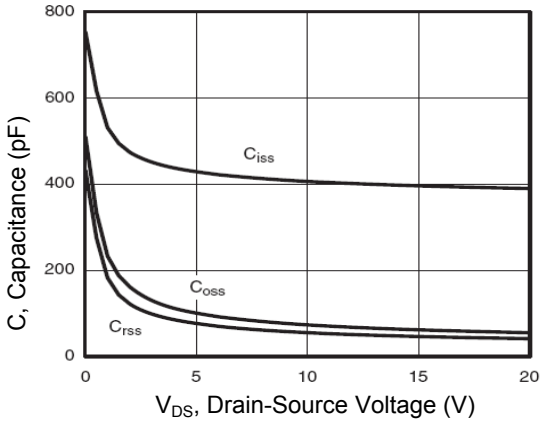


Figure 8. Capacitance vs V_{DS}

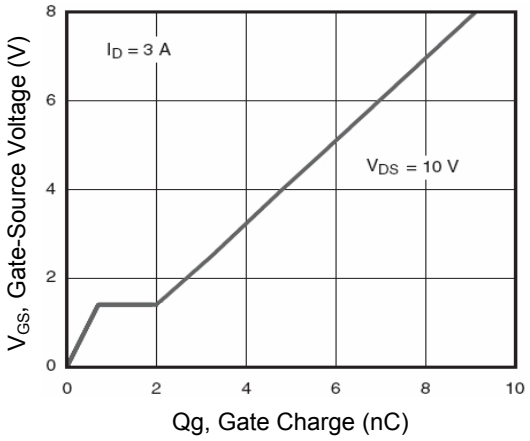


Figure 9. Gate Charge

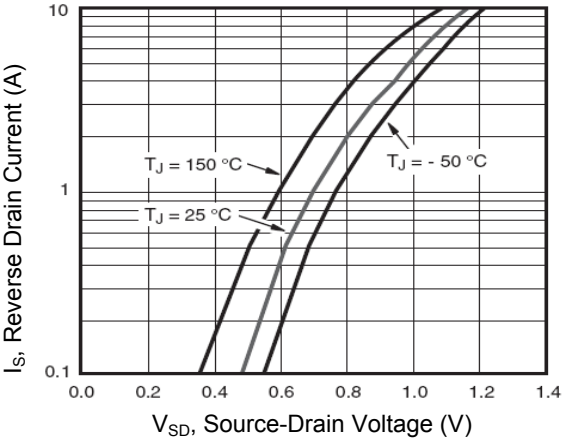


Figure 10. Source-Drain Diode Forward

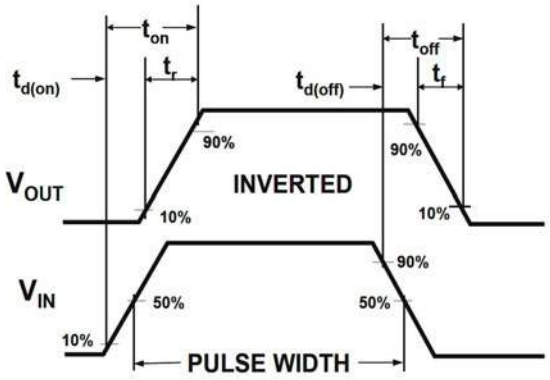


Figure 11. Switching Waveforms

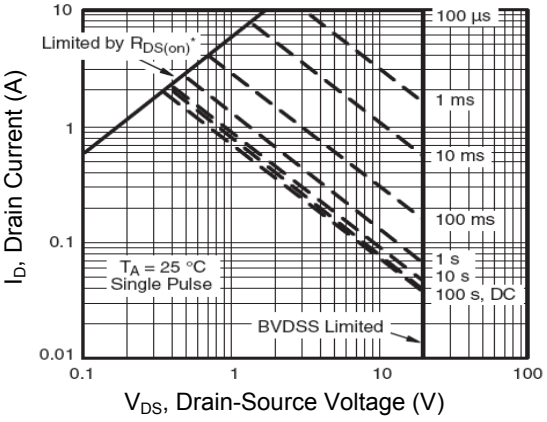


Figure 12. Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

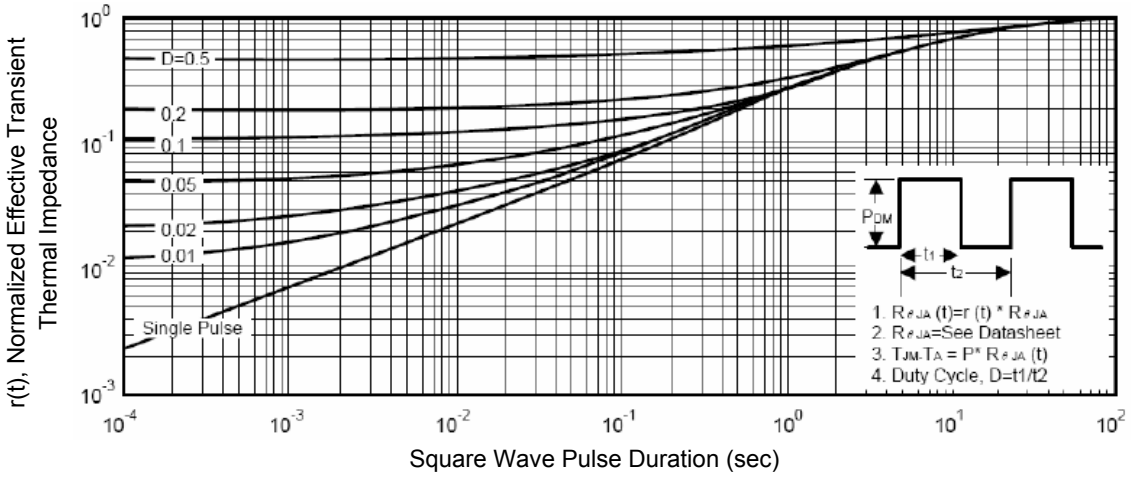
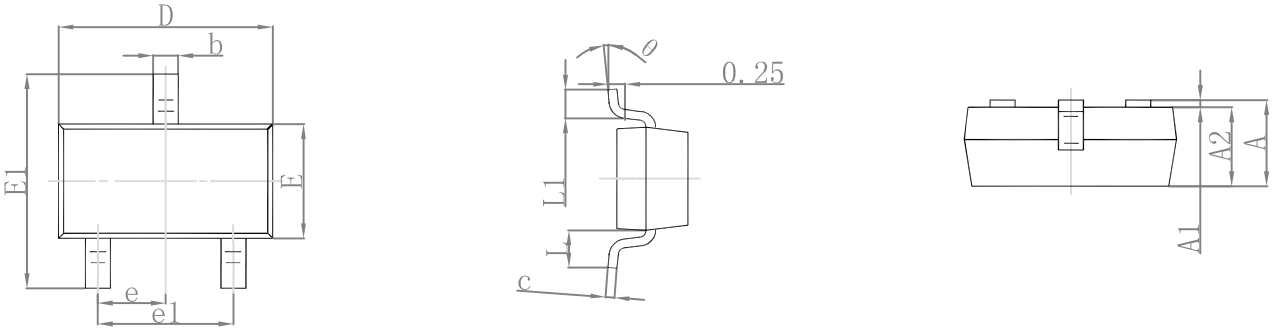


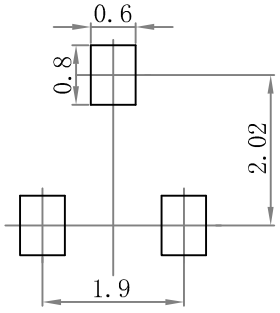
Figure 13. Normalized Maximum Transient Thermal Impedance

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°

Recommended Pad Layout



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

Order Information

Device	Package	Marking	Carrier	Quantity
GSF2301	SOT-23	2301	Tape & Reel	3,000 pcs / Reel