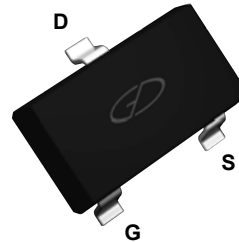
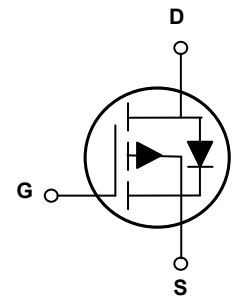


**Main Product Characteristics**

$V_{(BR)DSS}$	-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** ( $T_A=25^{\circ}C$  unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	-3	A
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	-10	A
Maximum Power Dissipation	$P_D$	1	W
Thermal Resistance, Junction-to-Ambient <sup>2</sup>	$R_{\theta JA}$	125	$^{\circ}C/W$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^{\circ}C$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^{\circ}C$

### Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-20	-24	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics<sup>3</sup></b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.4	-0.7	-1	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A	-	64	110	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2A	-	89	140	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-2A	5	-	-	S
<b>Dynamic Characteristics<sup>4</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, F=1MHz	-	405	-	pF
Output Capacitance	C <sub>oss</sub>		-	75	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	55	-	
<b>Switching Characteristics<sup>4</sup></b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-10V, I <sub>D</sub> =-1A, V <sub>GS</sub> =-4.5V, R <sub>GEN</sub> =10Ω	-	11	-	nS
Turn-On Rise Time	t <sub>r</sub>		-	35	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	30	-	
Turn-Off Fall Time	t <sub>f</sub>		-	10	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A, V <sub>GS</sub> =-2.5V	-	3.3	12	nC
Gate-Source Charge	Q <sub>gs</sub>		-	0.7	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	1.3	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>3</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1.3A	-	-	-1.2	V
Diode Forward Current <sup>2</sup>	I <sub>S</sub>		-	-	-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

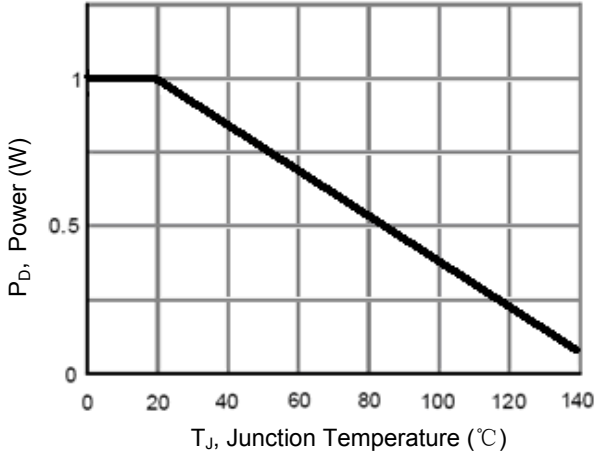


Figure 1. Power Dissipation

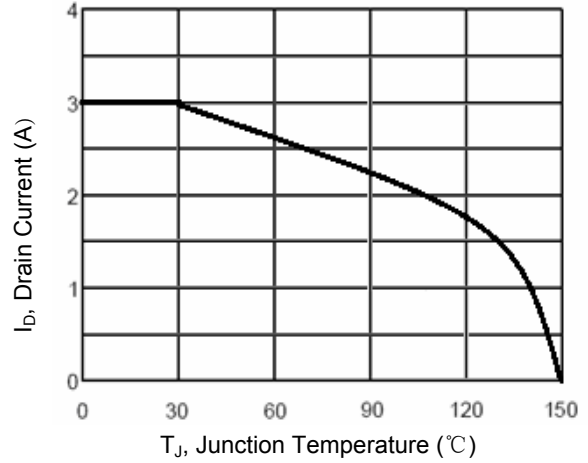


Figure 2. Drain Current

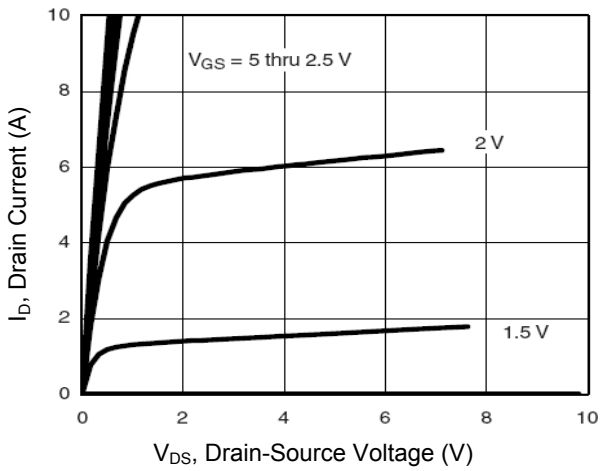


Figure 3. Output Characteristics

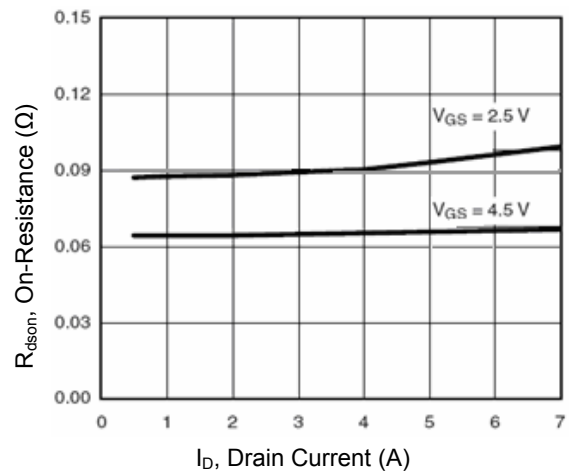


Figure 4. Drain-Source On-Resistance

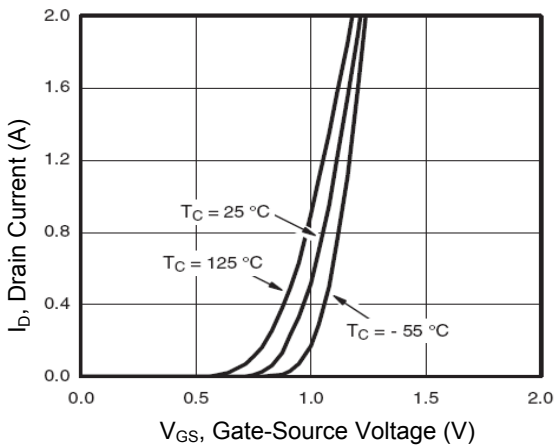


Figure 5. Transfer Characteristics

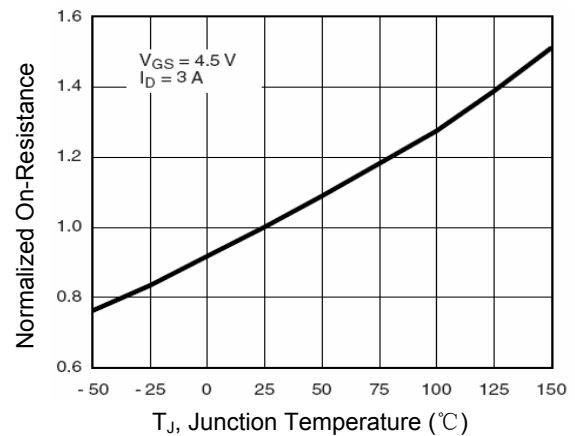
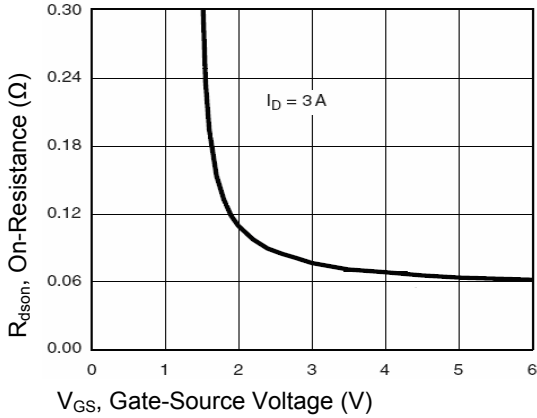
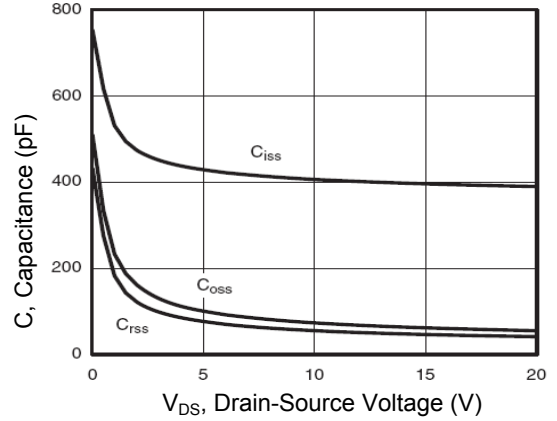


Figure 6. Drain-Source On-Resistance

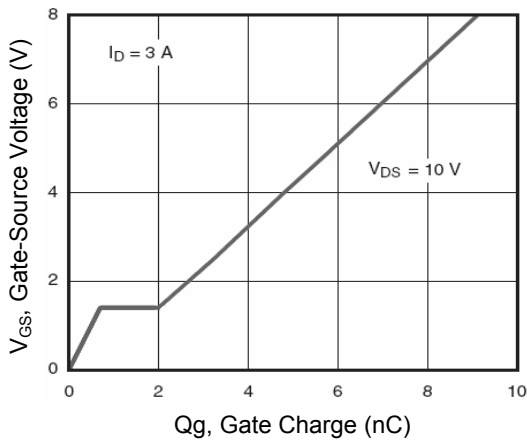
### Typical Electrical and Thermal Characteristic Curves



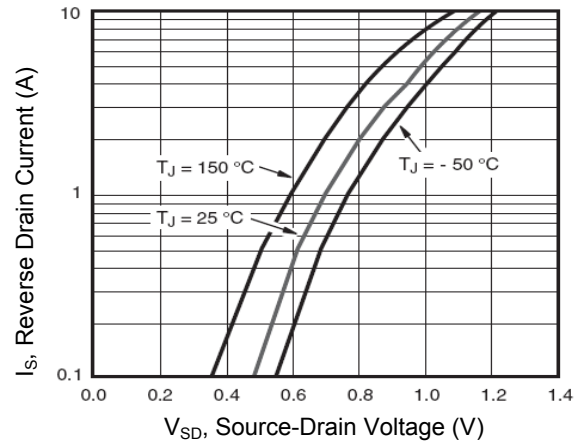
**Figure 7.  $R_{ds(on)}$  vs  $V_{GS}$**



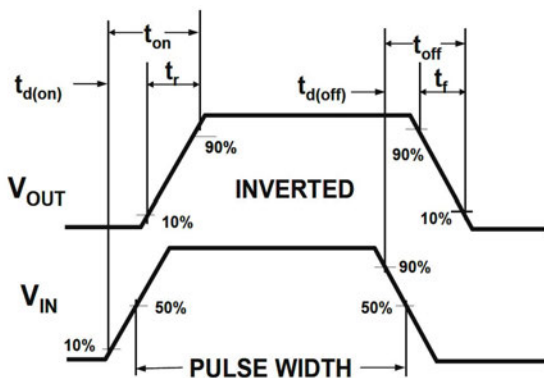
**Figure 8. Capacitance vs  $V_{DS}$**



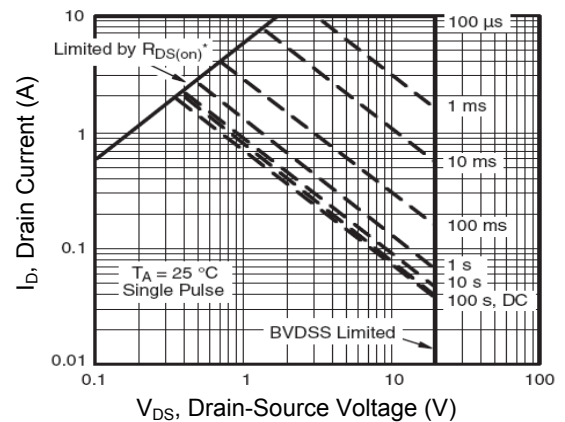
**Figure 9. Gate Charge**



**Figure 10. Source-Drain Diode Forward**

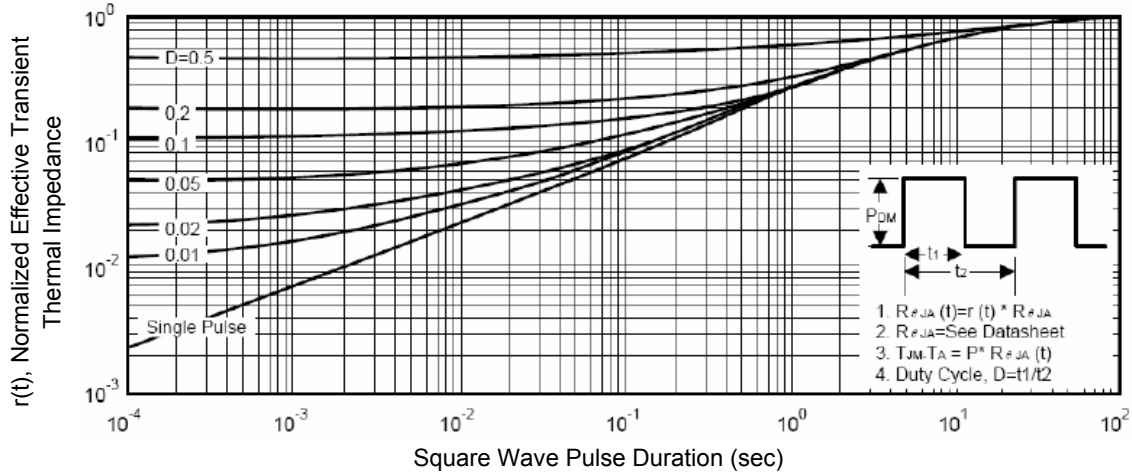


**Figure 11. Switching Waveforms**



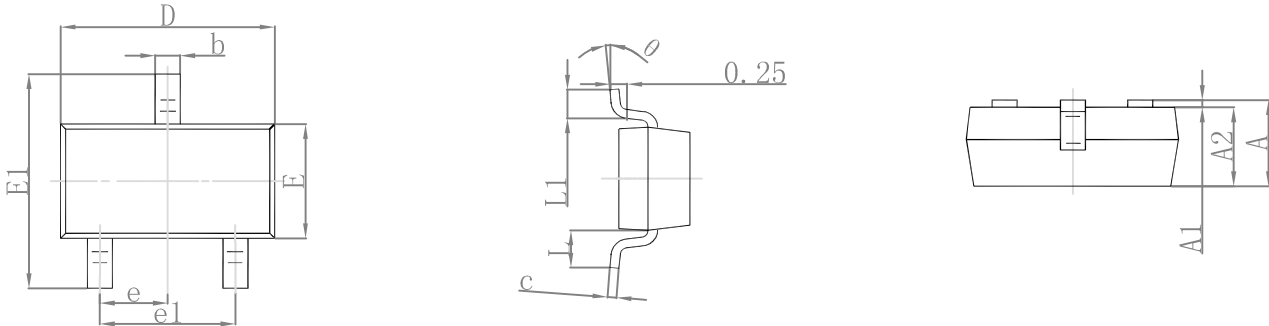
**Figure 12. Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**



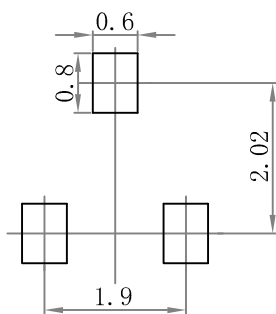
**Figure 13. Normalized Maximum Transient Thermal Impedance**

**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