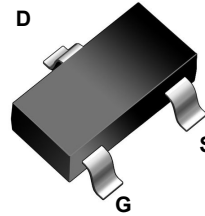
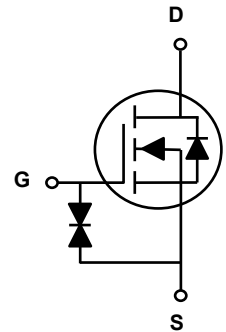


### Main Product Characteristics

$BV_{DSS}$	30V
$R_{DS(ON)}$	500mΩ
$I_D$	600mA



SOT-523



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 GSF0301 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 ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous( $T_C=25^\circ\text{C}$ )	$I_D$	600	mA
Drain Current-Continuous( $T_C=75^\circ\text{C}$ )		460	mA
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	2.4	A
Power Dissipation( $T_C=25^\circ\text{C}$ )	$P_D$	310	mW
Power Dissipation-Derate Above $25^\circ\text{C}$		2.5	mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	400	$^\circ\text{C}/\text{W}$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^\circ\text{C}$

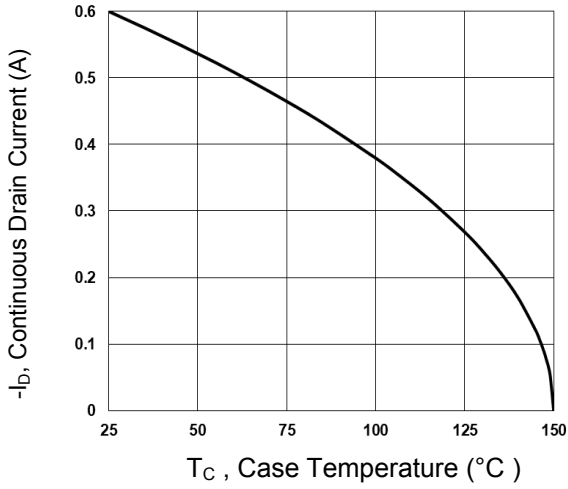
### Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

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	30	-	-	V
BV <sub>DSS</sub> Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Reference to 25°C, I <sub>D</sub> =1mA	-	-0.03	-	V/°C
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	-	-	1	μA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	-	-	10	μA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	-	-	±20	μA
		V <sub>GS</sub> =±5V, V <sub>DS</sub> =0V, T <sub>J</sub> =85°C	-	-	±1	μA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.3A	-	420	500	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.2A	-	550	700	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.8	1.2	V
V <sub>GS(th)</sub> Temperature Coefficient	ΔV <sub>GS(th)</sub>		-	-1.74	-	mV/°C
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =4V, I <sub>D</sub> =0.3A	-	1	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =0.3A, V <sub>GS</sub> =4.5V	-	2.6	5.2	nC
Gate-Source Charge <sup>2,3</sup>	Q <sub>gs</sub>		-	0.9	1.8	
Gate-Drain Charge <sup>2,3</sup>	Q <sub>gd</sub>		-	0.6	1.2	
Turn-On Delay Time <sup>2,3</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, R <sub>G</sub> =10Ω V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.3A	-	5.5	11	nS
Rise Time <sup>2,3</sup>	t <sub>r</sub>		-	4	8	
Turn-Off Delay Time <sup>2,3</sup>	t <sub>d(off)</sub>		-	14.5	29	
Fall Time <sup>2,3</sup>	t <sub>f</sub>		-	6.5	13	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1MHZ	-	72.9	146	PF
Output Capacitance	C <sub>oss</sub>		-	18.3	36.6	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	7.4	14.8	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	I <sub>S</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	-	-	0.6	A
Pulsed Source Current	I <sub>SM</sub>		-	-	1.2	
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =0.3A, T <sub>J</sub> =25°C	-	-	1	V
Reverse Recovery Time	T <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =0.3A, d <sub>i</sub> /d <sub>t</sub> =100A/μs, T <sub>J</sub> =25°C	-	13	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	6	-	nC

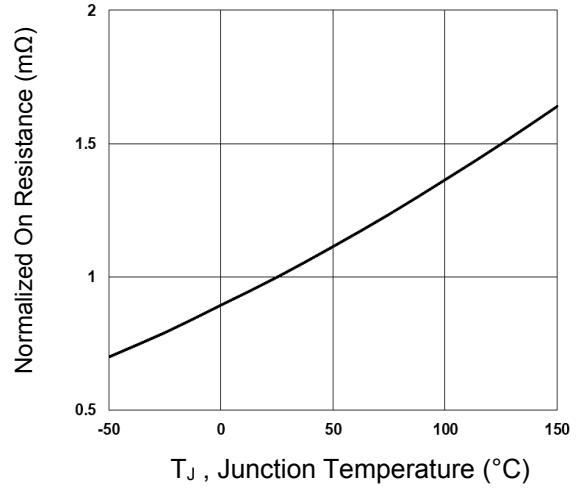
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

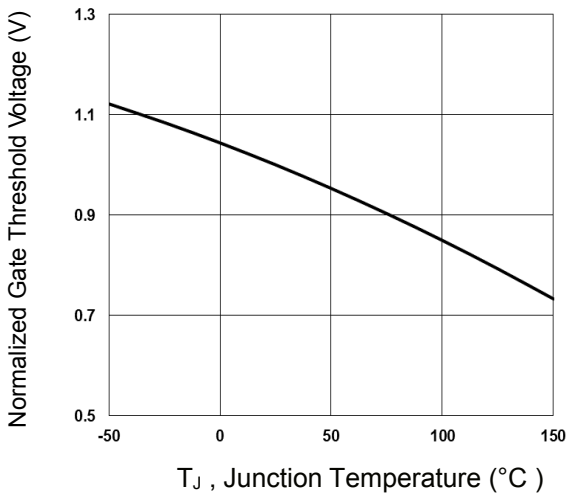
**Typical Electrical and Thermal Characteristic Curves**



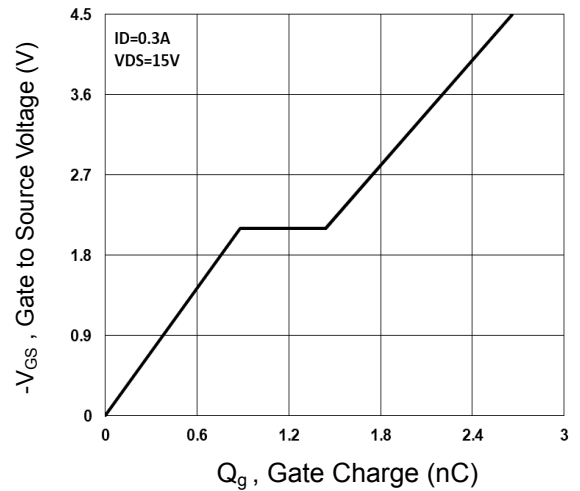
**Fig.1 Continuous Drain Current vs.  $T_c$**



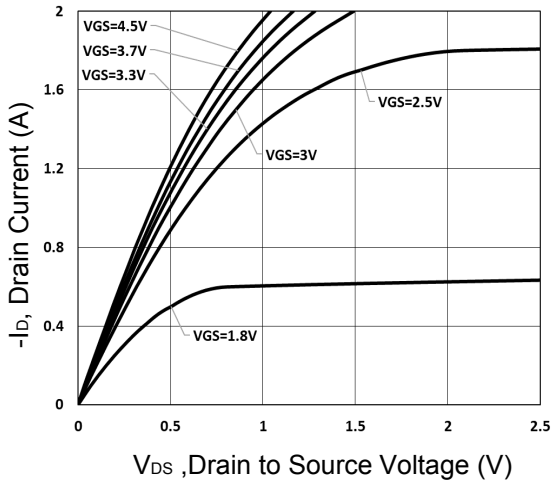
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_j$**



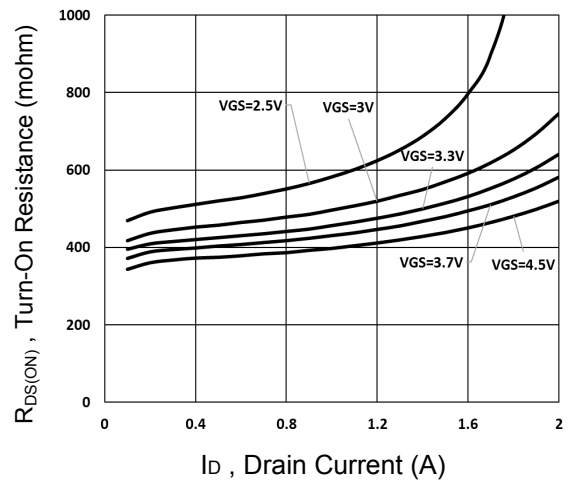
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Waveform**

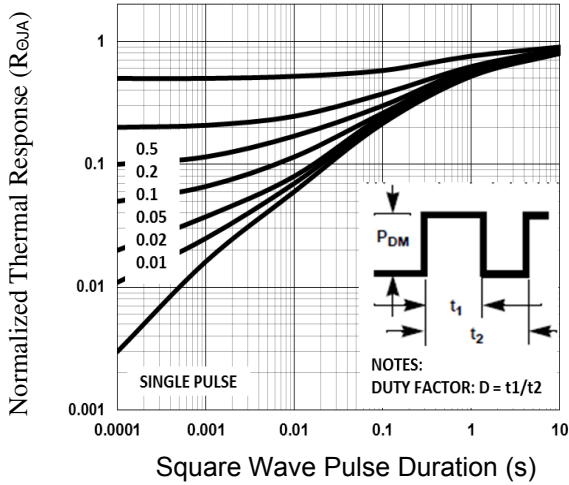


**Fig.5 Typical Output Characteristics**

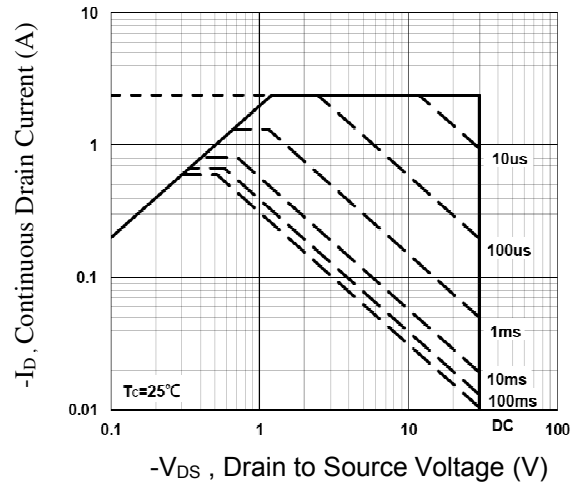


**Fig.6 Turn-On Resistance vs.  $I_D$**

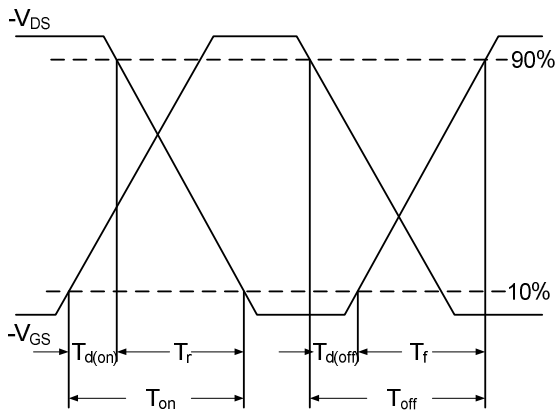
**Typical Electrical and Thermal Characteristic Curves**



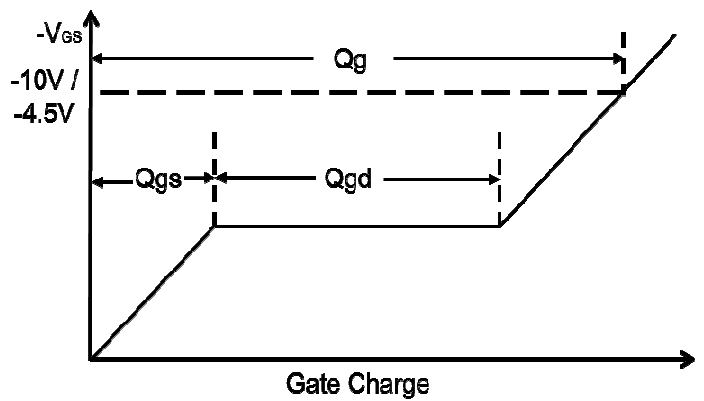
**Fig.7 Normalized Transient Response**



**Fig.8 Maximum Safe Operation Area**

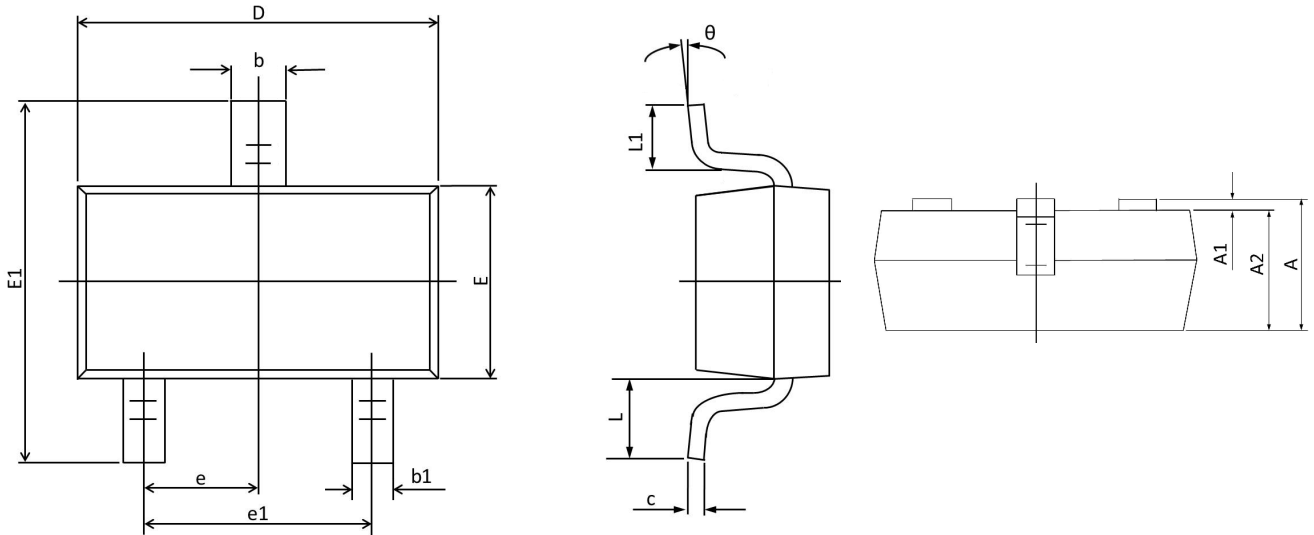


**Fig.9 Switching Time Waveform**



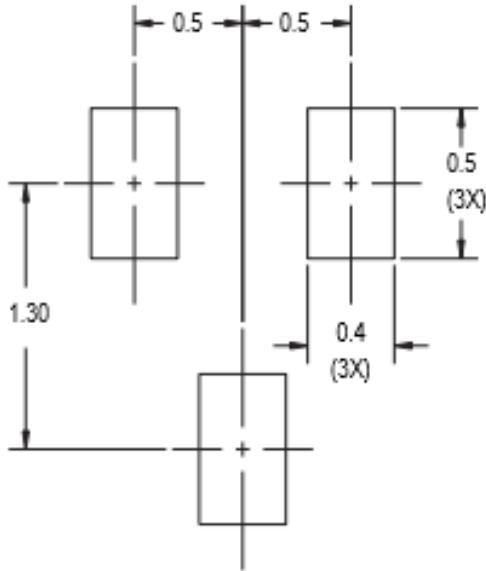
**Fig.10 Gate Charge Waveform**

**Package Outline Dimensions (SOT-523)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
A1	0.100	0.000	0.004	0.000
A2	0.800	0.700	0.031	0.028
b	0.350	0.250	0.014	0.010
b1	0.250	0.150	0.010	0.006
c	0.200	0.100	0.008	0.004
D	1.750	1.500	0.069	0.059
E	0.900	0.700	0.035	0.028
E1	1.750	1.400	0.069	0.055
e	0.5TYP.		0.02TYP.	
e1	1.100	0.900	0.043	0.035
L	0.460	0.300	0.018	0.012
L1	0.460	0.260	0.018	0.010
θ	8°	0°	8°	0°

### Recommended Pad Layout (SOT-523)



1. Controlling dimension: in mm
2. General tolerance:  $\pm 0.05\text{mm}$
3. The pad layout is for reference only

### Order Information

Device	Package	Marking Code	Carrier	Quantity	HSF Status
GSF0301	SOT-523	O** ** varied by lot	Tape & Reel	3,000 pcs / Reel	RoHS Compliant