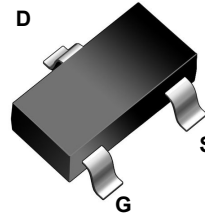
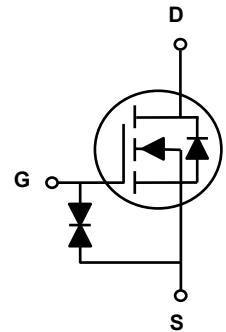


Main Product Characteristics

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

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

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1mA$	-	-0.03	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V,$ $T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{DS}=24V, V_{GS}=0V,$ $T_J=125^\circ\text{C}$	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 20	μA
		$V_{GS}=\pm 5V, V_{DS}=0V,$ $T_J=85^\circ\text{C}$	-	-	± 1	μA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=0.3A$	-	420	500	m Ω
		$V_{GS}=2.5V, I_D=0.2A$	-	550	700	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.8	1.2	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-1.74	-	mV/ $^\circ\text{C}$
Forward Transconductance	g_{FS}	$V_{DS}=4V, I_D=0.3A$	-	1	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q_g	$V_{DS}=15V, I_D=0.3A,$ $V_{GS}=4.5V$	-	2.6	5.2	nC
Gate-Source Charge ^{2,3}	Q_{gs}		-	0.9	1.8	
Gate-Drain Charge ^{2,3}	Q_{gd}		-	0.6	1.2	
Turn-On Delay Time ^{2,3}	$t_{d(on)}$	$V_{DD}=15V, R_G=10\Omega$ $V_{GS}=4.5V, I_D=0.3A$	-	5.5	11	nS
Rise Time ^{2,3}	t_r		-	4	8	
Turn-Off Delay Time ^{2,3}	$t_{d(off)}$		-	14.5	29	
Fall Time ^{2,3}	t_f		-	6.5	13	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1MHz$	-	72.9	146	PF
Output Capacitance	C_{oss}		-	18.3	36.6	
Reverse Transfer Capacitance	C_{rss}		-	7.4	14.8	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V,$ Force Current	-	-	0.6	A
Pulsed Source Current	I_{SM}		-	-	1.2	
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=0.3A,$ $T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time	T_{rr}	$V_{GS}=0V, I_S=0.3A,$ $d_i/d_t=100A/\mu s,$ $T_J=25^\circ\text{C}$	-	13	-	nS
Reverse Recovery Charge	Q_{rr}		-	6	-	nC

Note:

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

Typical Electrical and Thermal Characteristic Curves

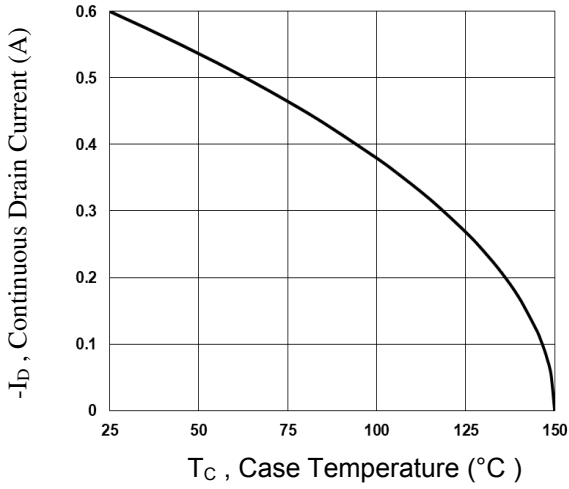


Fig.1 Continuous Drain Current vs. T_c

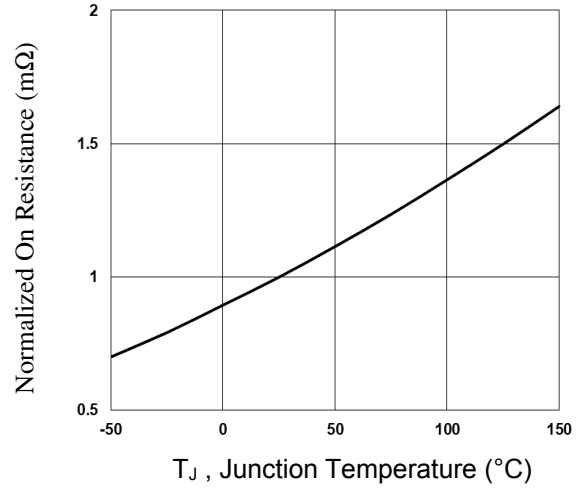


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

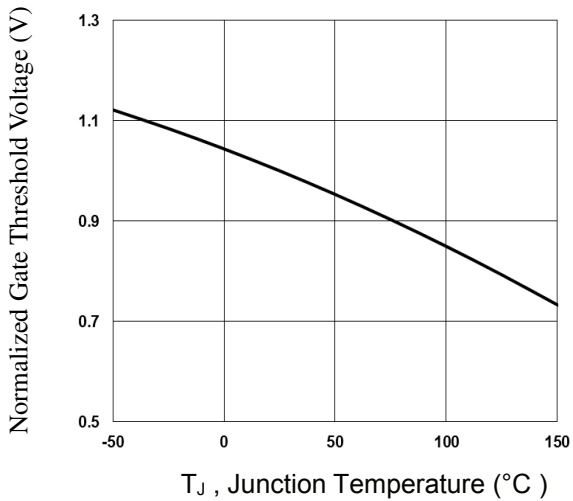


Fig.3 Normalized V_{th} vs. T_j

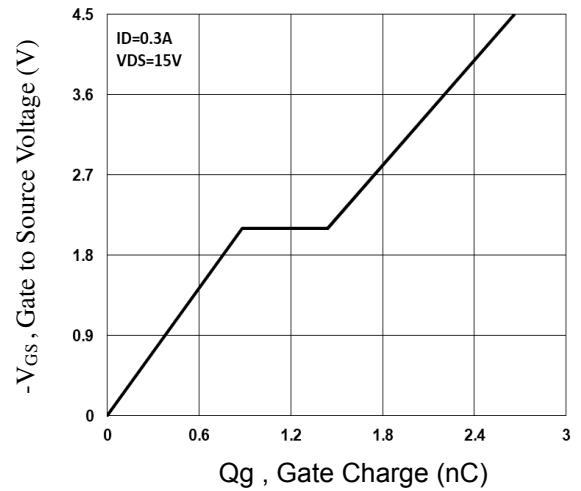


Fig.4 Gate Charge Waveform

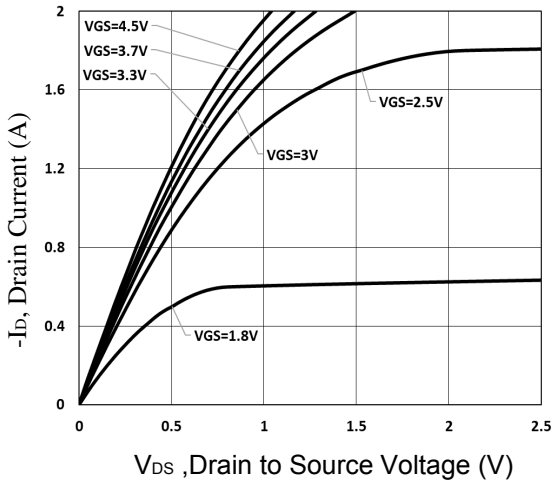


Fig.5 Typical Output Characteristics

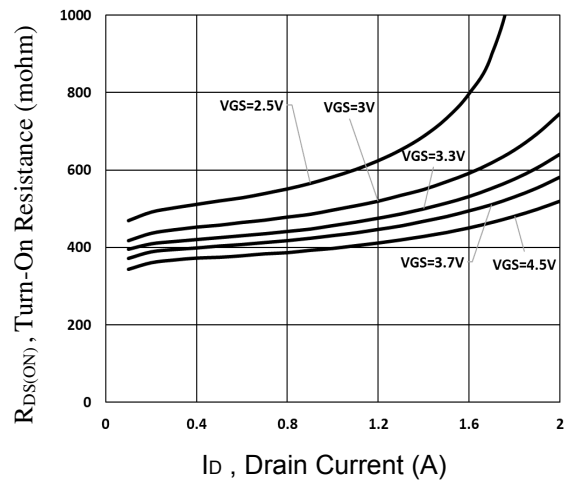


Fig.6 Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

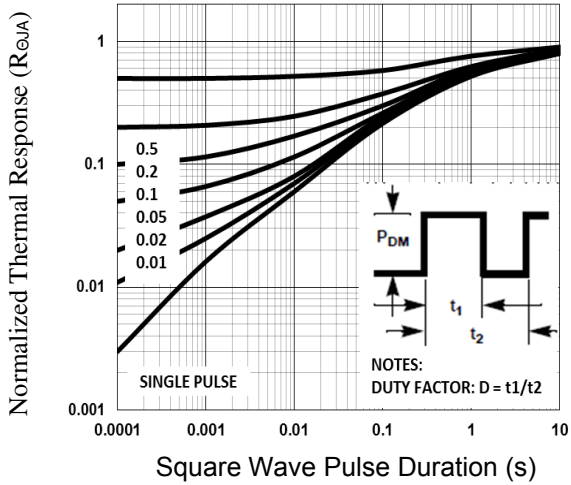


Fig.7 Normalized Transient Response

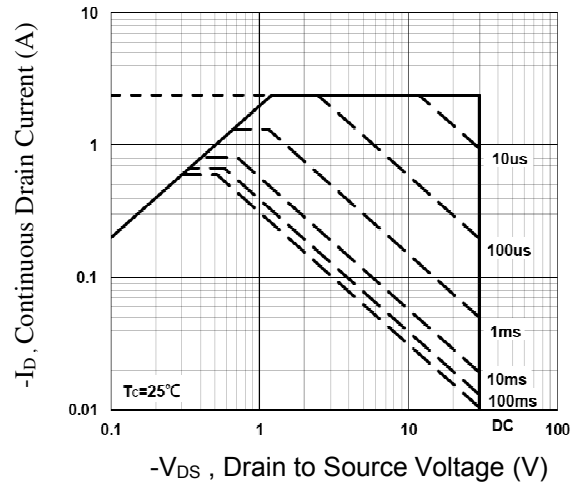


Fig.8 Maximum Safe Operation Area

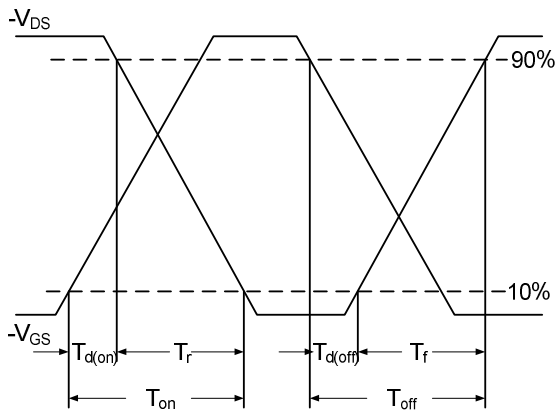


Fig.9 Switching Time Waveform

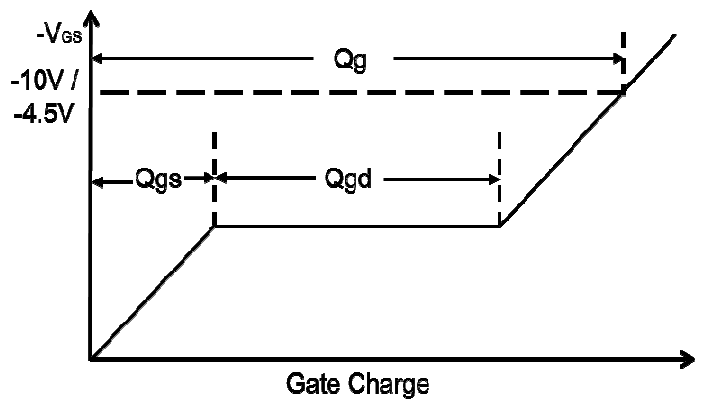
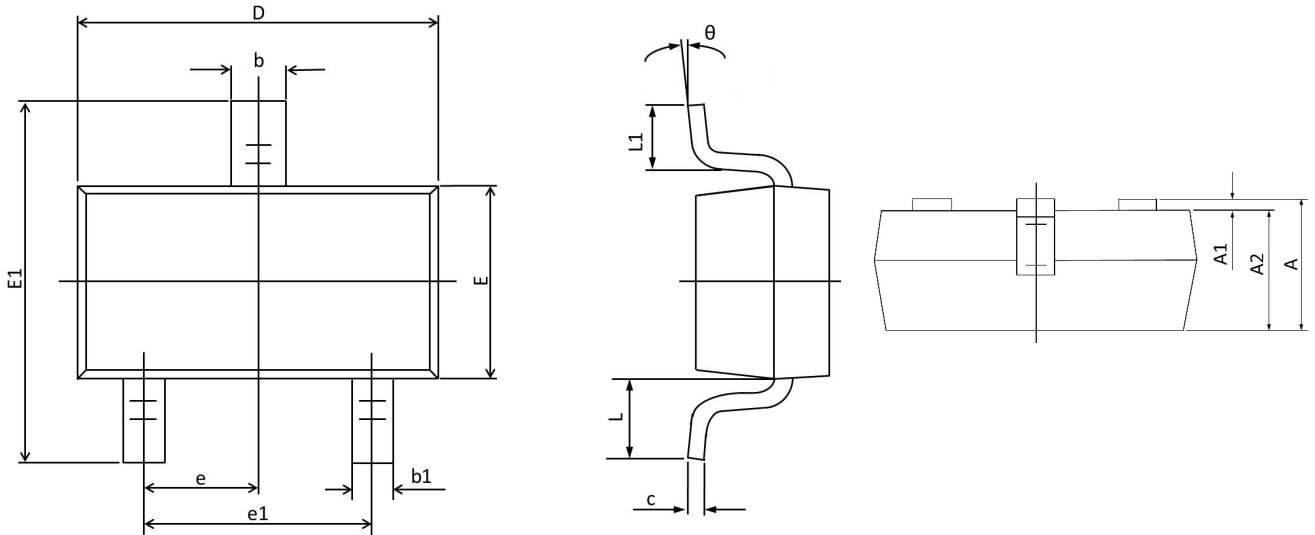


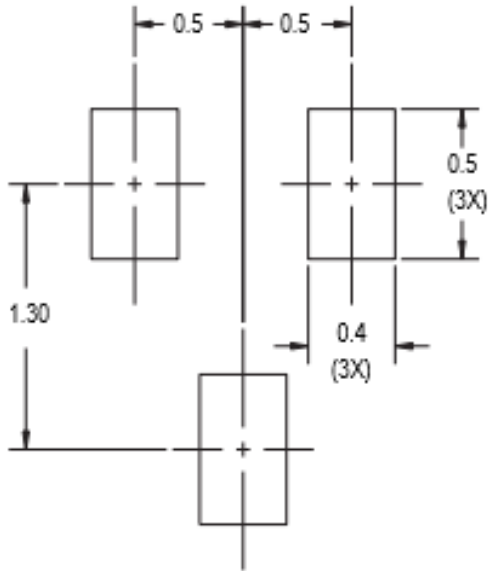
Fig.10 Gate Charge Waveform

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	Tape & Reel	3000/Reel	RoHS Compliant