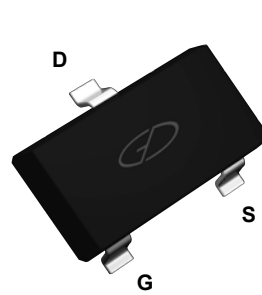
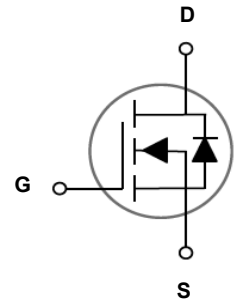


### Main Product Characteristics

$BV_{DSS}$	30V
$R_{DS(ON)}$	35m $\Omega$
$I_D$	5A



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 GSFC0302 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 ( $T_A=25^\circ\text{C}$ )	$I_D$	5	A
Drain Current-Continuous ( $T_A=70^\circ\text{C}$ )		4	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	20	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	9	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	13.4	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	1.56	W
Power Dissipation-De-rate above 25 $^\circ\text{C}$		12.5	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	80	$^\circ\text{C/W}$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^\circ\text{C}$

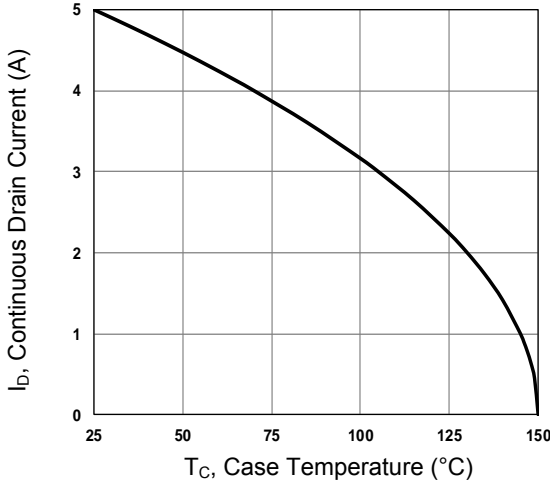
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V, T_J=100^{\circ}\text{C}$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2A$	-	29	35	m $\Omega$
		$V_{GS}=4.5V, I_D=1A$	-	35	42	
		$V_{GS}=2.5V, I_D=0.8A$	-	52	68	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.5	0.8	1.2	V
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{DS}=15V, I_D=2.5A, V_{GS}=10V$	-	3.5	6	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{gs}$		-	0.1	0.2	
Gate-Drain Charge <sup>3,4</sup>	$Q_{gd}$		-	1	1.5	
Turn-On Delay Time <sup>3,4</sup>	$t_{d(on)}$	$V_{DD}=15V, R_G=6\Omega, V_{GS}=10V, I_D=2.5A$	-	6	9	nS
Rise Time <sup>3,4</sup>	$t_r$		-	9	13	
Turn-Off Delay Time <sup>3,4</sup>	$t_{d(off)}$		-	33	50	
Fall Time <sup>3,4</sup>	$t_f$		-	4	6	
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$	-	240	360	pF
Output Capacitance	$C_{oss}$		-	40	60	
Reverse Transfer Capacitance	$C_{rss}$		-	30	45	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	1	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	-	-	5	A
Pulsed Source Current	$I_{SM}$		-	-	10	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	-	-	1	V
Reverse Recovery Time	$t_{rr}$	$V_R=30V, I_S=2.5A, di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	-	150	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	270	-	$\mu C$

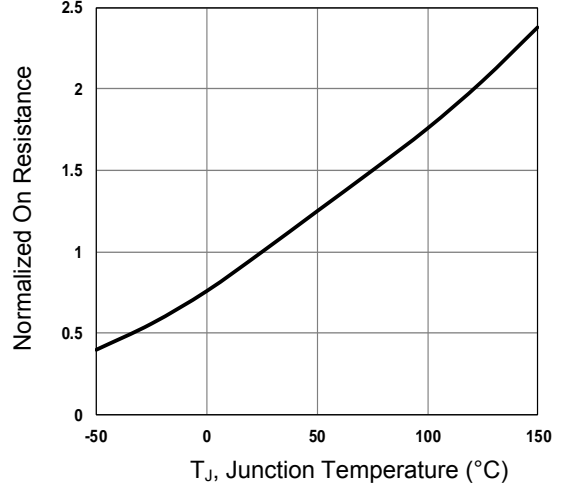
Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=13.4A, R_G=25\Omega, \text{starting } T_J=25^{\circ}\text{C}$ .
3. Pulse test: pulse width  $\leq 300\mu s, \text{duty cycle} \leq 2\%$ .
4. Essentially independent of operation temperature.

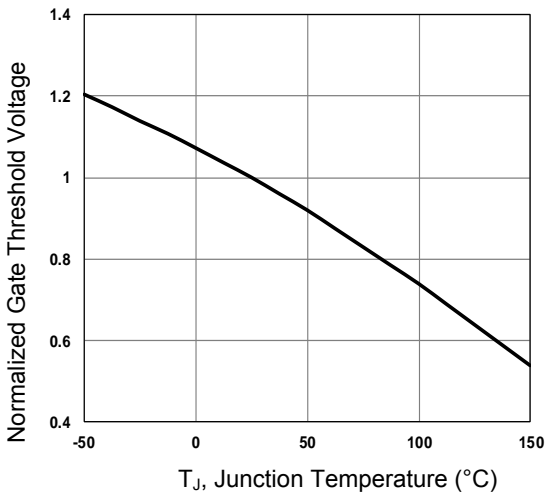
**Typical Electrical and Thermal Characteristic Curves**



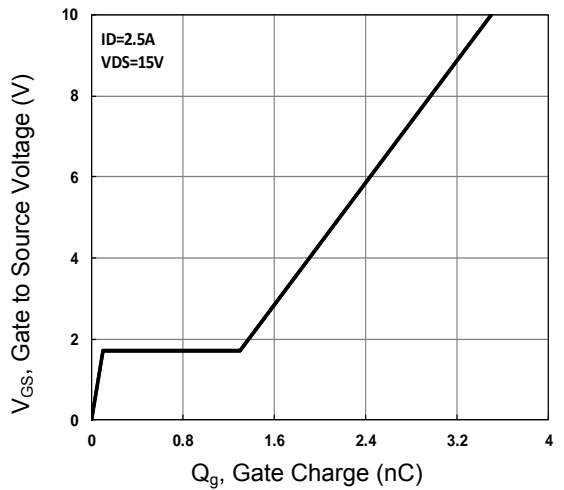
**Figure 1. Continuous Drain Current vs.  $T_C$**



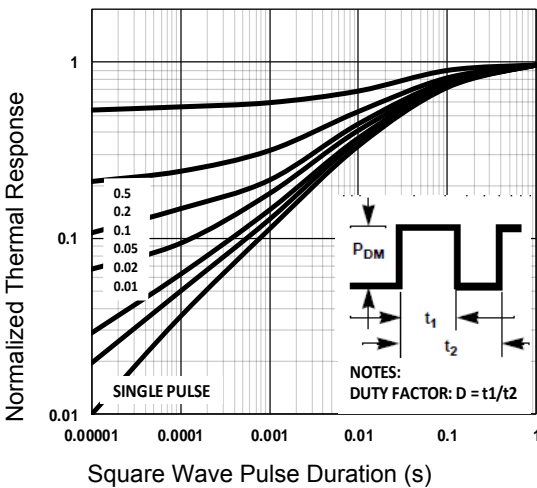
**Figure 2. Normalized  $R_{DSON}$  vs.  $T_J$**



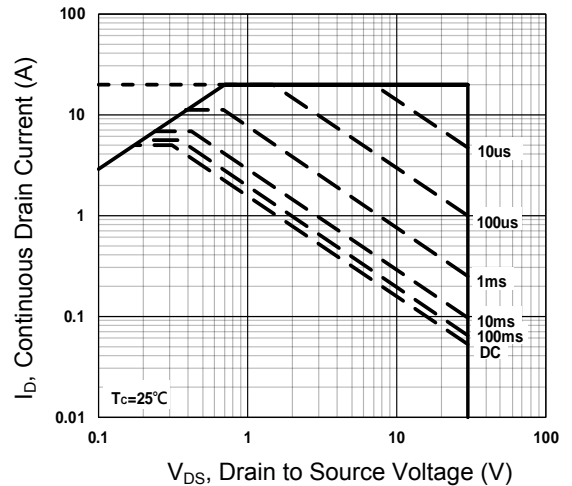
**Figure 3. Normalized  $V_{th}$  vs.  $T_J$**



**Figure 4. Gate Charge Waveform**

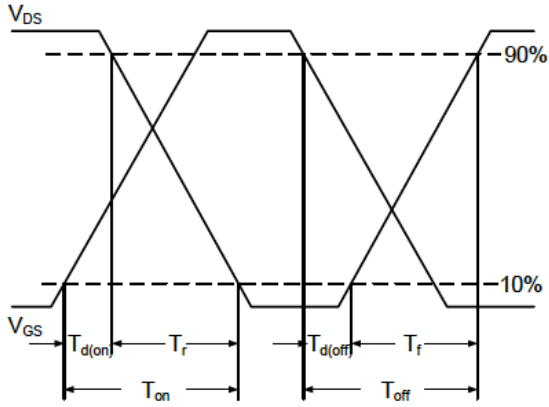


**Figure 5. Normalized Transient Impedance**

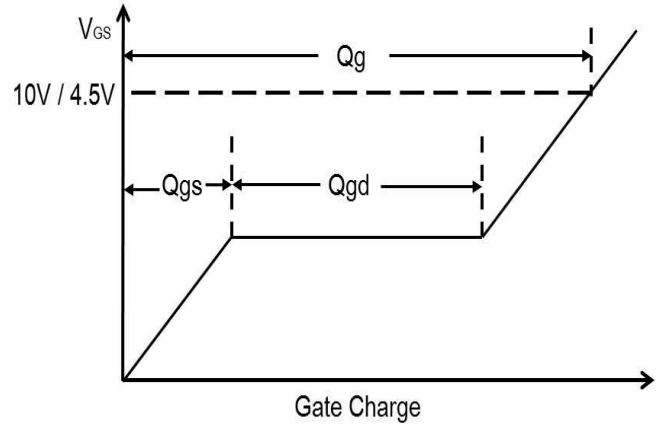


**Figure 6. Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**

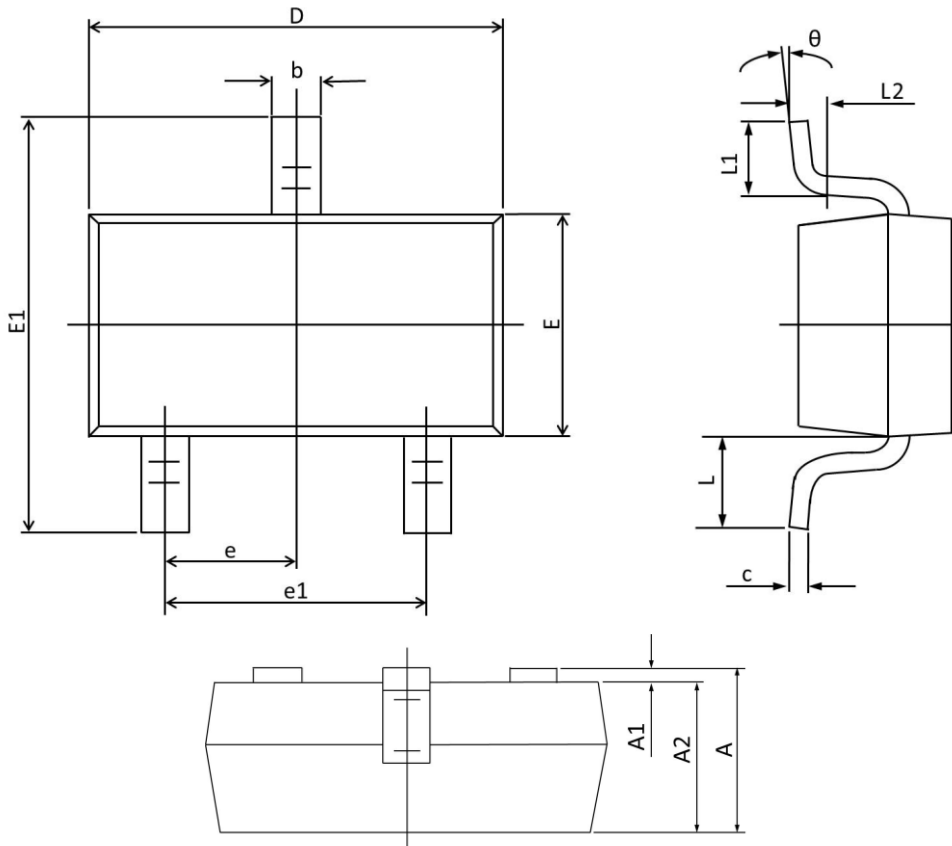


**Figure 7. Switching Time Waveform**



**Figure 8. Gate Charge Waveform**

**Package Outline Dimensions (SOT-23)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.110	0.035	0.044
A1	0.001	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.080	0.180	0.003	0.008
D	2.800	3.040	0.110	0.120
E	1.200	1.400	0.047	0.055
E1	2.100	2.640	0.080	0.104
e	0.950 TYP.		0.037 TYP.	
e1	1.780	2.040	0.070	0.080
L	0.550 REF.		0.022 REF.	
L1	0.100	0.500	0.004	0.020
$\theta$	1°	10°	1°	10°