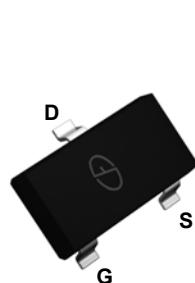
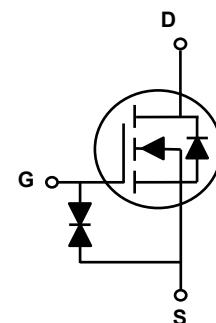


## Main Product Characteristics

$BV_{DSS}$	50V
$R_{DS(ON)}$	1.3Ω @10V (Typ)
	1.5Ω @4.5V (Typ)
$I_D$	0.3A



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 GSFC0500 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 ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	50	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous ( $T_A=25^\circ\text{C}$ )	$I_D$	0.3	A
Drain Current-Continuous ( $T_A=70^\circ\text{C}$ )		0.24	
Drain Current-Pulsed ( $T_A=25^\circ\text{C}$ ) <sup>1</sup>	$I_{DM}$	0.8	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	0.3	W
Power Dissipation ( $T_A=70^\circ\text{C}$ )		0.2	W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	400	°C/W
Operating Junction Temperature Range	$T_J$	-50 To +150	°C
Storage Temperature Range	$T_{STG}$	-50 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	50	-	-	V
Zero Gate Voltage Drain Current ( $T_A=25^\circ\text{C}$ )	$I_{\text{DSS}}$	$V_{\text{DS}}=50\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	$\mu\text{A}$
Zero Gate Voltage Drain Current ( $T_A=125^\circ\text{C}$ )		$V_{\text{DS}}=40\text{V}, V_{\text{GS}}=0\text{V}$	-	-	100	$\mu\text{A}$
Gate-Body Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm 10$	$\mu\text{A}$
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_D=250\mu\text{A}$	0.6	1.2	1.5	V
Drain-Source On-State Resistance <sup>2</sup>	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=0.3\text{A}$	-	1.3	4	$\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_D=0.2\text{A}$	-	1.5	5	$\Omega$
		$V_{\text{GS}}=3.3\text{V}, I_D=0.1\text{A}$	-	1.8	6	$\Omega$
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=4.5\text{V}, I_D=0.3\text{A}$	-	0.58	-	nC
Gate-Source Charge	$Q_{\text{gs}}$		-	0.12	-	
Gate-Drain Charge	$Q_{\text{gd}}$		-	0.21	-	
Turn-On Delay Time	$T_{\text{d}(\text{on})}$	$V_{\text{DD}}=30\text{V}, V_{\text{GS}}=10\text{V}, R_G=3.3\Omega, I_D=0.3\text{A}$	-	4.5	-	nS
Rise Time	$T_r$		-	3.1	-	
Turn-Off Delay Time	$T_{\text{d}(\text{off})}$		-	15	-	
Fall Time	$T_f$		-	3.3	-	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	12	-	pF
Output Capacitance	$C_{\text{oss}}$		-	3.2	-	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	0.8	-	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Source Drain Current (Body Diode)	$I_{\text{SD}}$	$T_A=25^\circ\text{C}$	-	-	0.2	A
Diode Forward Voltage <sup>2</sup>	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_{\text{SD}}=0.2\text{A}, T_J=25^\circ\text{C}$	-	0.87	1.2	V

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width  $\leq 300\text{us}$ , duty cycle  $\leq 2\%$ .

## Typical Electrical and Thermal Characteristic Curves

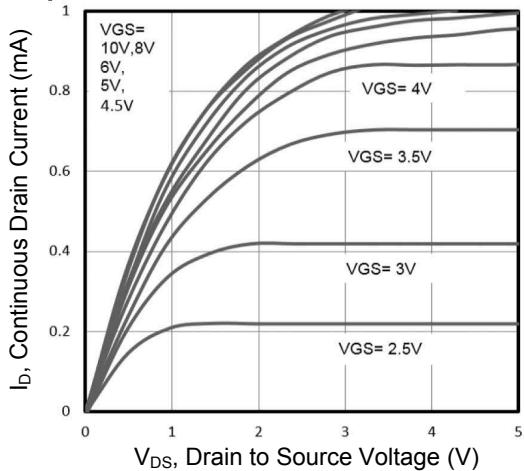


Figure 1. Typical Output Characteristics

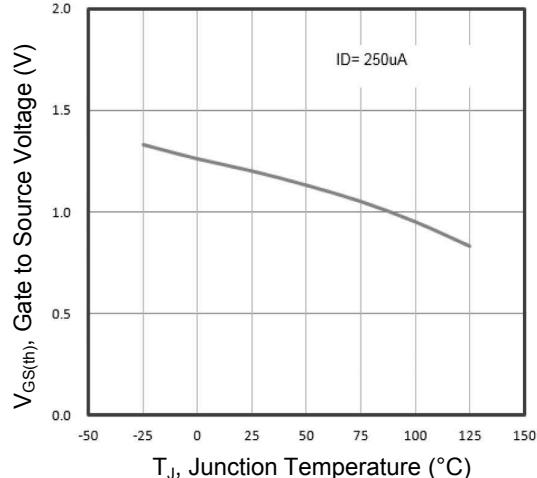


Figure 2. Normalized Threshold Voltage vs.  $T_J$

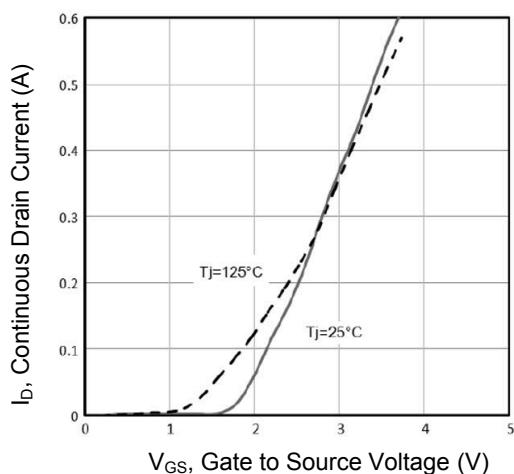


Figure 3. Typical Transfer Characteristics

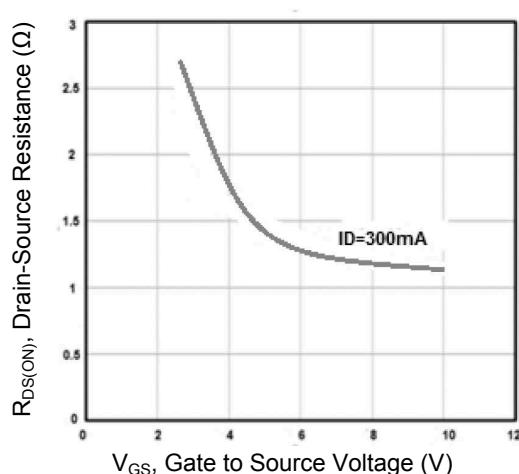


Figure 4.  $R_{DS(ON)}$  vs.  $V_{GS}$

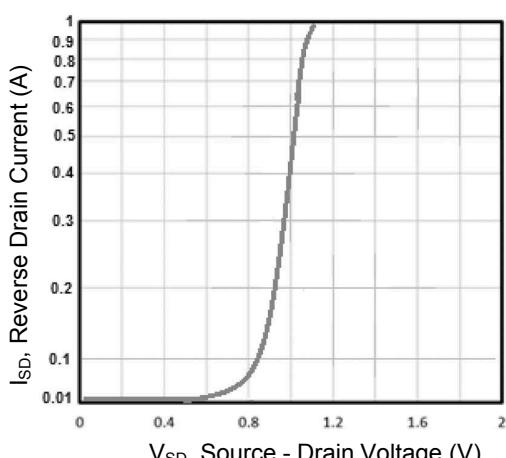


Figure 5. Typical Source - Drain Diode Forward Voltage

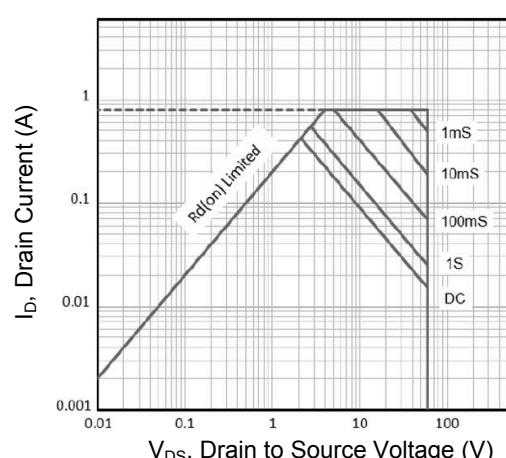


Figure 6. Maximum Safe Operating Area

## Typical Electrical and Thermal Characteristic Curves

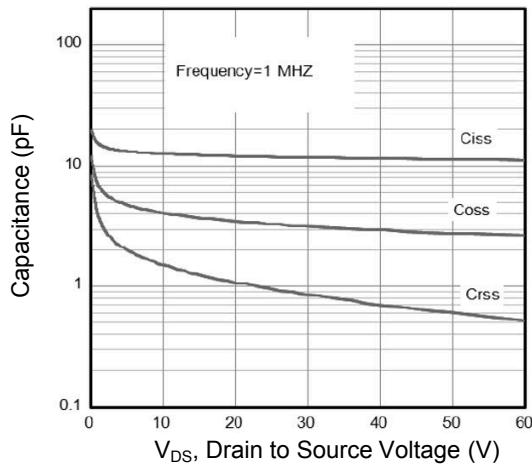


Figure 7. Capacitance Characteristics

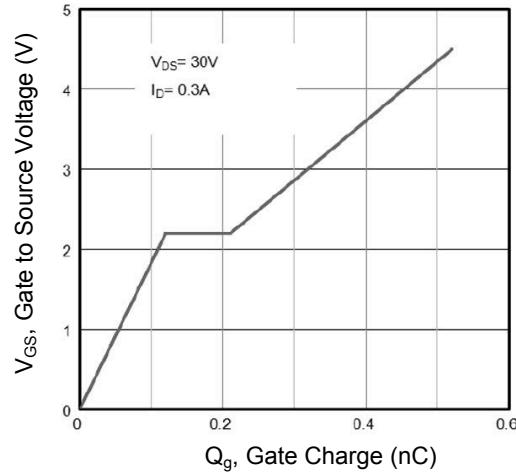


Figure 8. Gate Charge Characteristics

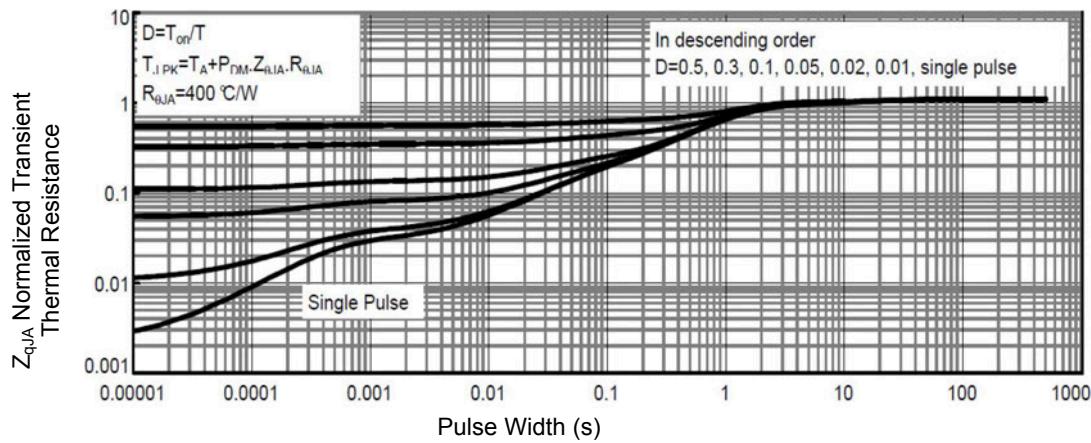


Figure 9. Normalized Maximum Transient Thermal Impedance

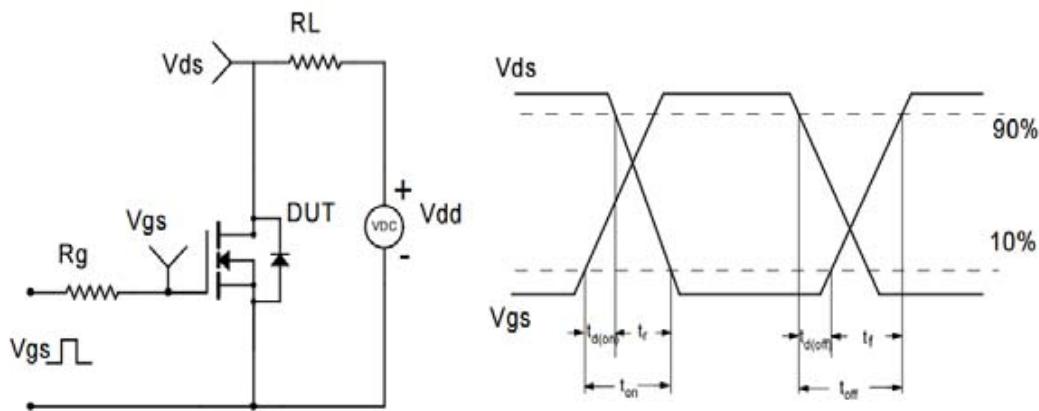
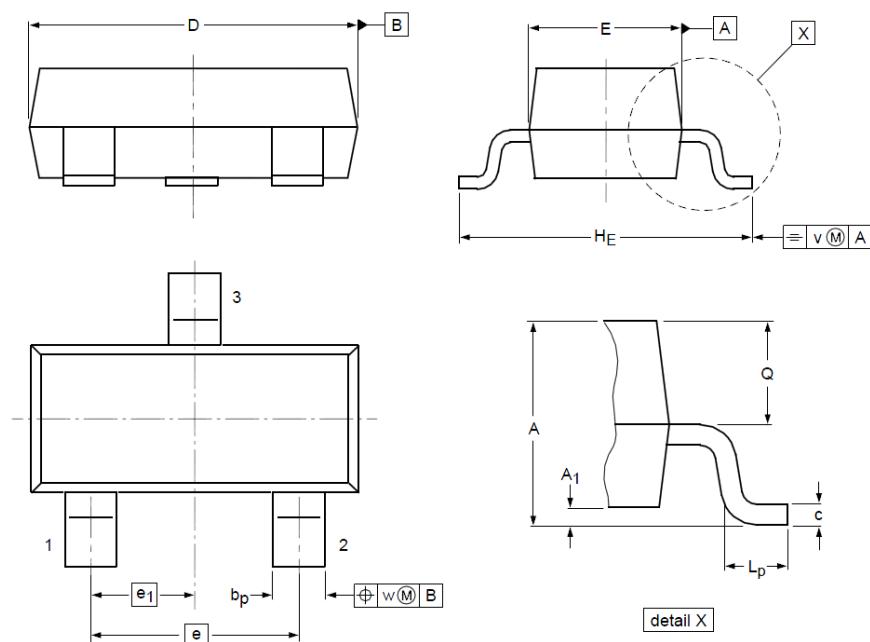


Figure 10. Switching Time Test Circuit and Waveforms

### Package Outline Dimensions (SOT-23)



Symbol	Dimensions in Millimeters			Symbol	Dimensions in Millimeters		
	Min	Typ	Max		Min	Typ	Max
A	0.90	1.01	1.15	A <sub>1</sub>	0.01	0.05	0.10
b <sub>P</sub>	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	-	1.90	-	e <sub>1</sub>	-	0.95	-
H <sub>E</sub>	2.25	2.40	2.55	L <sub>P</sub>	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	-	0.20	-
w	-	0.10	-				

### Order Information

Device	Package	Marking	Carrier	Quantity
GSFC0500	SOT-23	KN	Tape & Reel	3,000 pcs / Reel