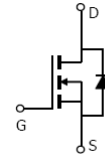


## Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)(MAX)}$	31mΩ@10V
	43mΩ@4.5V
$I_D$	5.8A



SOT-23



Schematic Diagram

## Features and Benefits

- Advanced MOSFET process technology
- Ideal for battery operated systems, load switching, power converters and other general purpose applications
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



## Description

The GSF3404 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 ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current-Continuous	$I_D$	5.8	A
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	20	A
Maximum Power Dissipation	$P_D$	1.4	W
Operating Junction and Storage Temperature	$T_J, T_{STG}$	-55 to +150	°C
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	89	°C/W

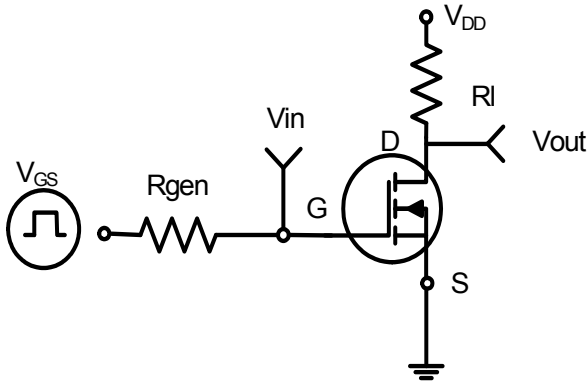
**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	33	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=5A$	-	25.5	31	m $\Omega$
		$V_{GS}=4.5V, I_D=4A$	-	36	43	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=5A$	-	15	-	S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	255	-	PF
Output Capacitance	$C_{oss}$		-	45	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	35	-	PF
<b>Switching Characteristics</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, R_L=3\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$	-	4.5	-	nS
Turn-on Rise Time	$t_r$		-	2.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	14.5	-	nS
Turn-Off Fall Time	$t_f$		-	3.5	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=5A,$ $V_{GS}=10V$	-	5.2	-	nC
Gate-Source Charge	$Q_{gs}$		-	0.85	-	nC
Gate-Drain Charge	$Q_{gd}$		-	1.3	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=5A$	-	-	1.2	V
Diode Forward Current <sup>2</sup>	$I_S$		-	-	5	A

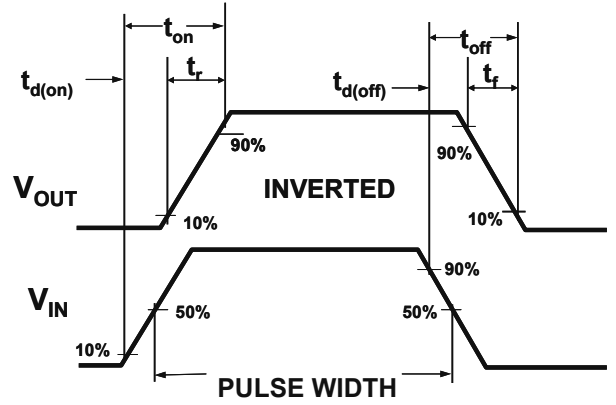
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

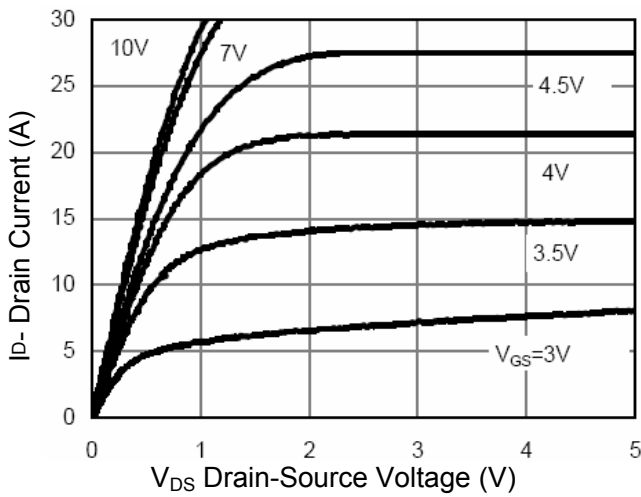
**Typical Electrical and Thermal Characteristic Curves**



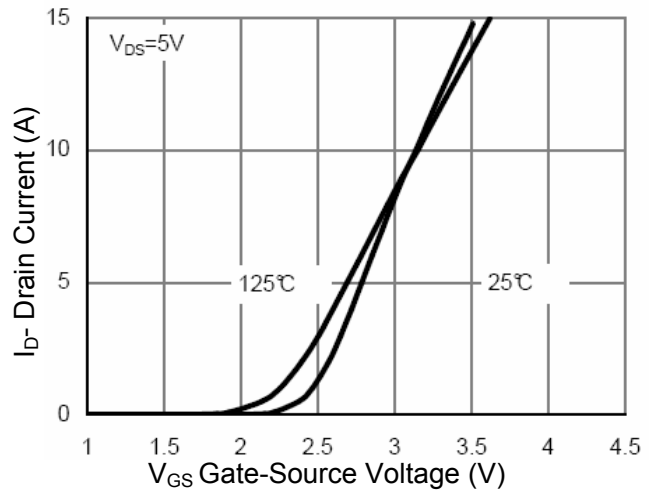
**Figure 1 Switching Test Circuit**



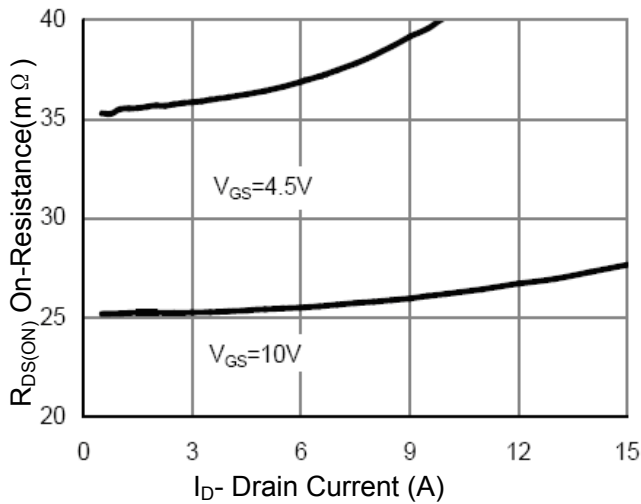
**Figure 2 Switching Waveforms**



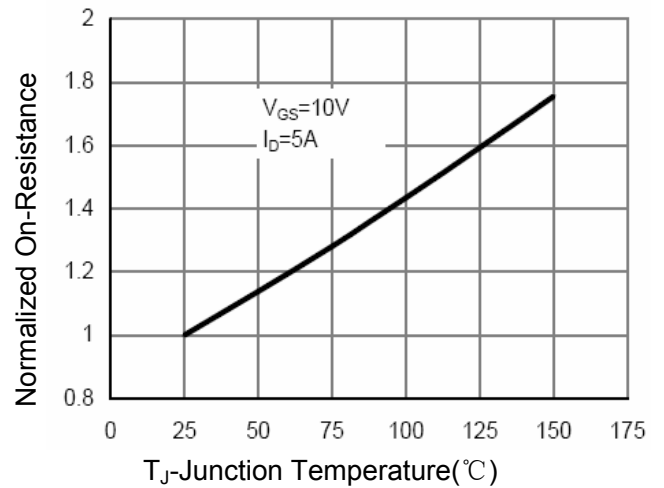
**Figure 3 Output Characteristics**



**Figure 4 Transfer Characteristics**

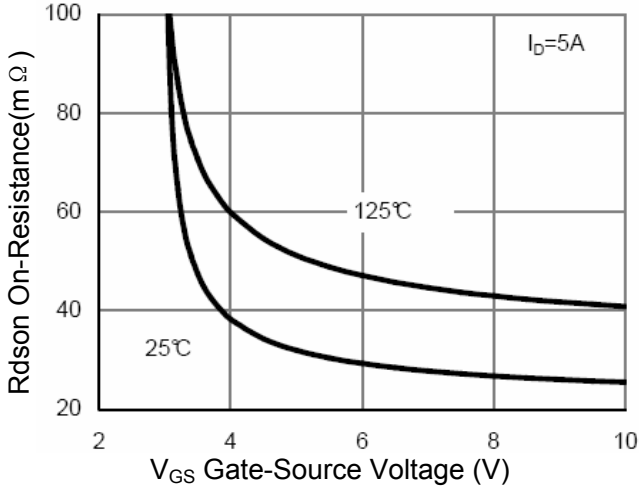


**Figure 5 Drain-Source On-Resistance**

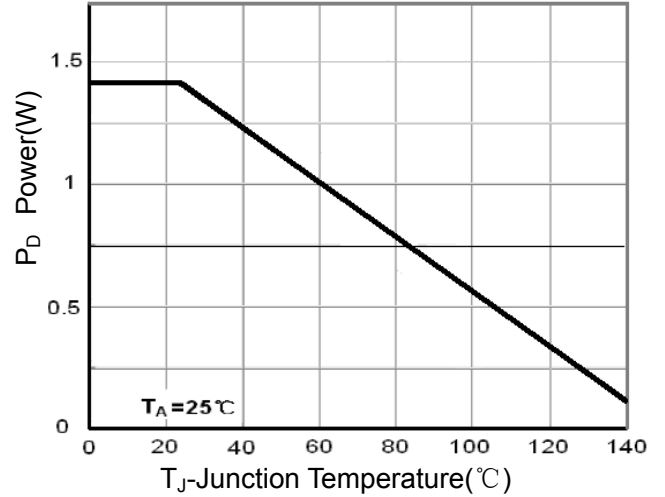


**Figure 6 Drain-Source On-Resistance**

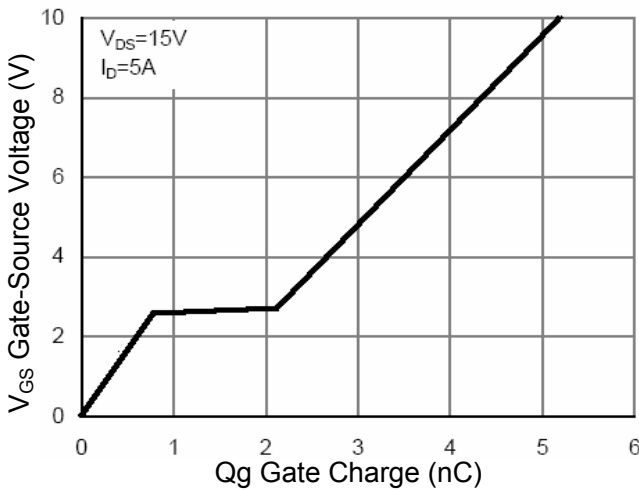
**Typical Electrical and Thermal Characteristic Curves**



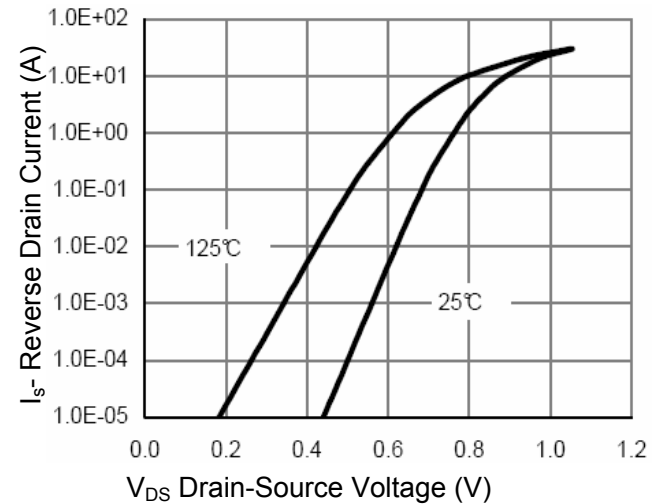
**Figure 7  $R_{DS(ON)}$  vs  $V_{GS}$**



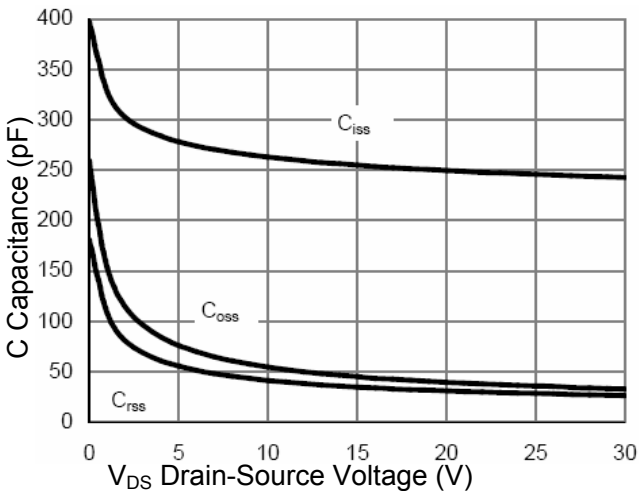
**Figure 8 Power Dissipation**



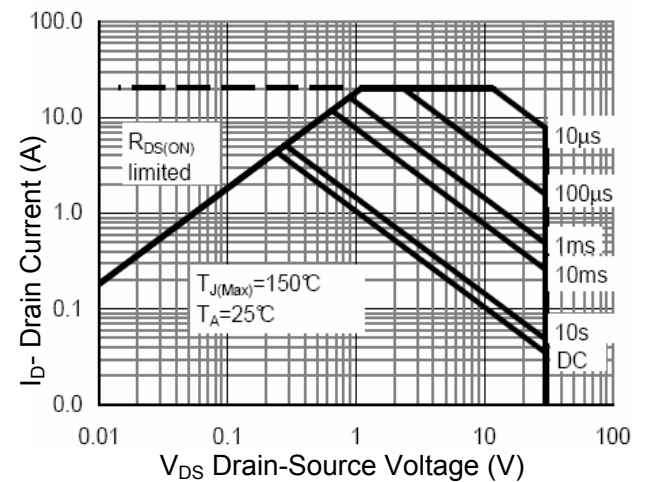
**Figure 9 Gate Charge**



**Figure 10 Source-Drain Diode Forward**

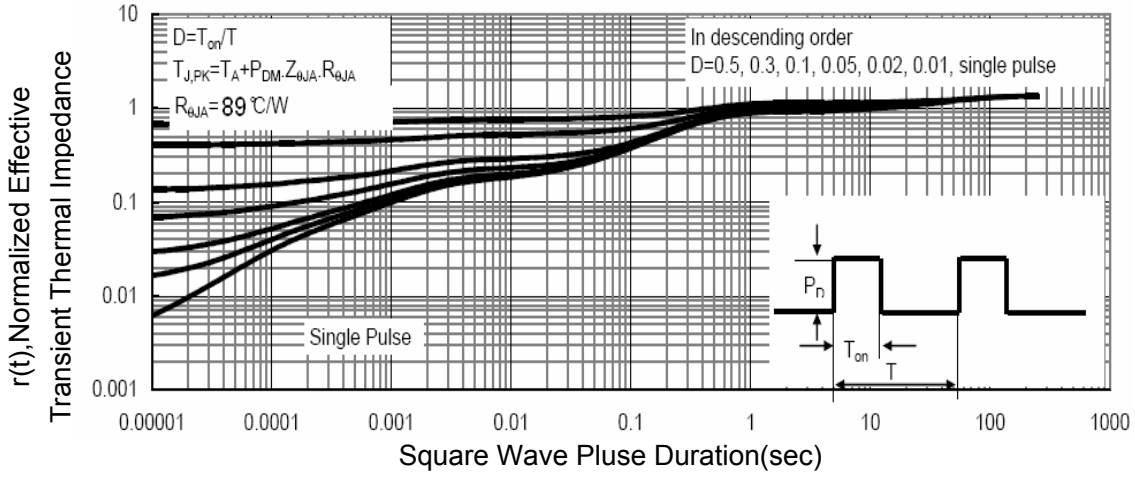


**Figure 11 Capacitance vs  $V_{DS}$**



**Figure 12 Safe Operation Area**

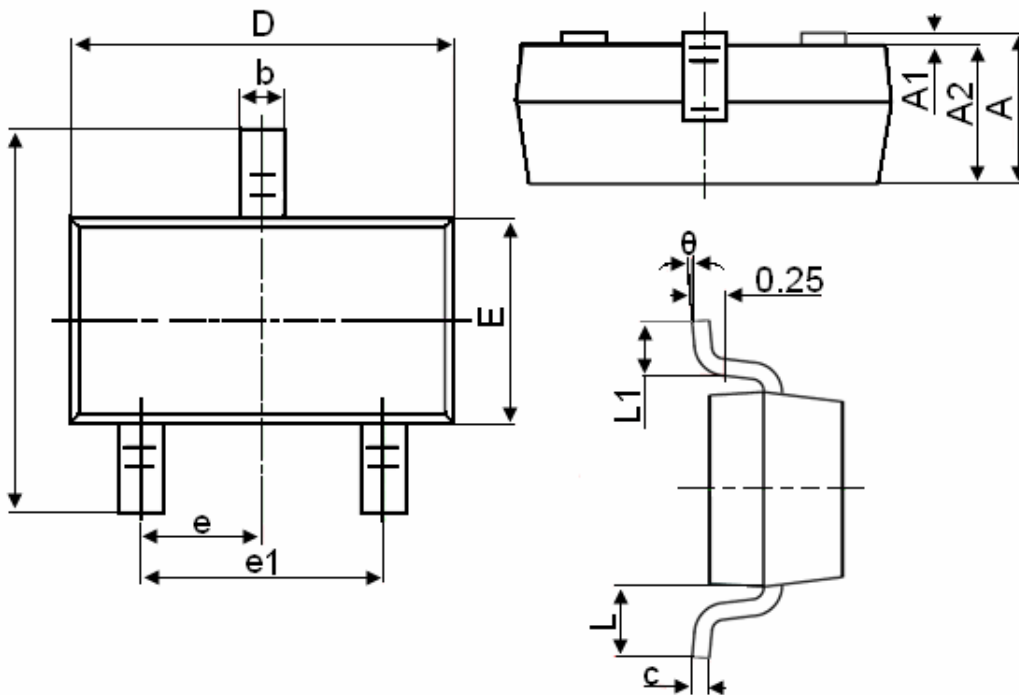
**Typical Electrical and Thermal Characteristic Curves**



**Figure 13 Normalized Maximum Transient Thermal Impedance**

**Package Outline Dimensions**

**SOT-23**



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
theta	0°	8°

**Notes**

1. All dimensions are in millimeters.
2. Tolerance  $\pm 0.10\text{mm}$  (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.