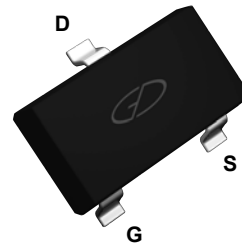
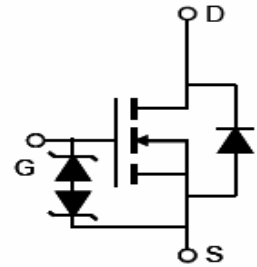


## Main Product Characteristics

$BV_{DSS}$	20V
$R_{DS(ON)}$	27m $\Omega$
$I_D$	6.5A



SOT23-3



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 GSF3416 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	Max.	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	6.5	A
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	30	A
Maximum Power Dissipation	$P_D$	1.4	W
Thermal Resistance, Junction-to-Ambient <sup>2</sup>	$R_{\theta JA}$	89	$^\circ\text{C/W}$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^\circ\text{C}$

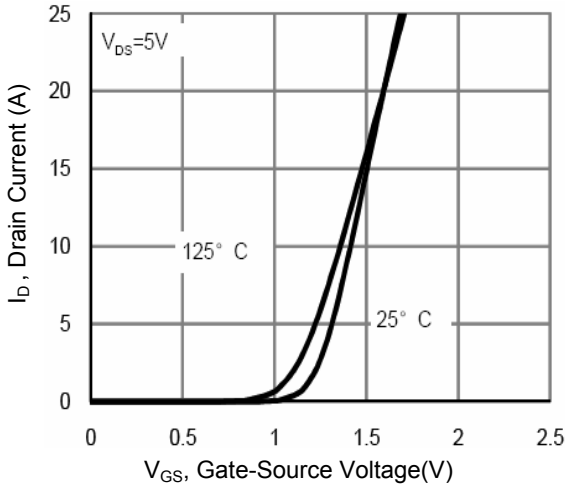
### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>On Characteristics<sup>3</sup></b>						
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=6.5A$	-	17	27	m $\Omega$
		$V_{GS}=2.5V, I_D=5.5A$	-	21	33	
		$V_{GS}=1.8V, I_D=5A$	-	28	40	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45	0.7	1.0	V
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=6.5A$	8	-	-	S
<b>Dynamic and Switching Characteristics<sup>4</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=6.5A, V_{GS}=4.5V$	-	8	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.5	-	
Gate-Drain Charge	$Q_{gd}$		-	3	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L=1.5\Omega, V_{GS}=5V, R_{GEN}=3\Omega$	-	0.5	-	nS
Turn-On Rise Time	$t_r$		-	1	-	
Turn-Off Delay Time	$t_{d(off)}$		-	12	-	
Turn-Off Fall Time	$t_f$		-	4	-	
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, F=1MHz$	-	660	-	pF
Output Capacitance	$C_{oss}$		-	160	-	
Reverse Transfer Capacitance	$C_{rss}$		-	87	-	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Current <sup>2</sup>	$I_S$		-	-	6.5	A
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=6.5A$	-	-	1.2	V

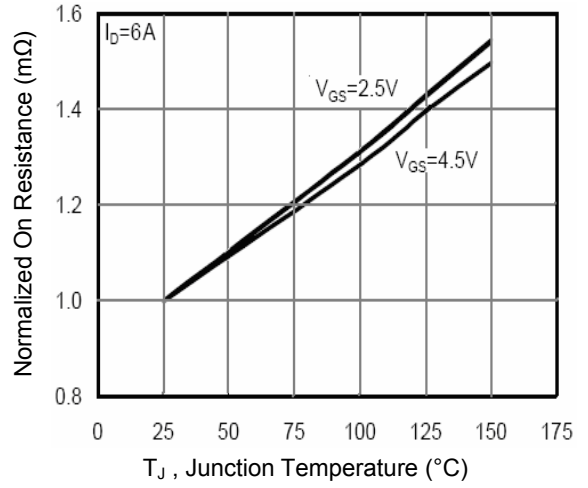
**Notes:**

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  $\leq 2\%$ .
4. Guaranteed by design

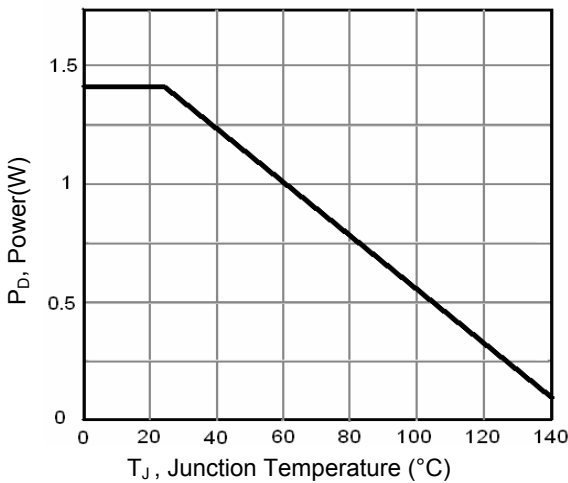
**Typical Electrical and Thermal Characteristic Curves**



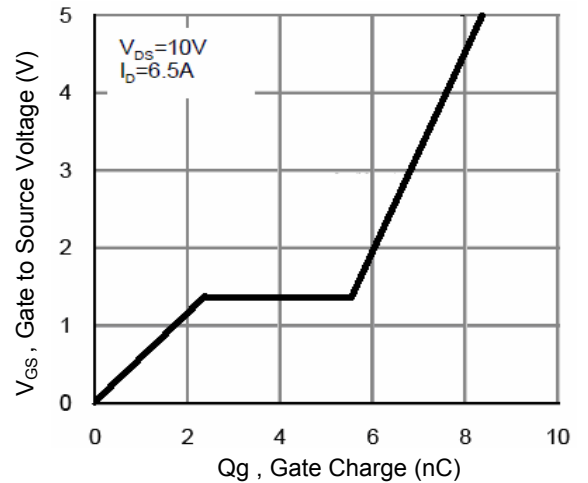
**Figure 1. Transfer Characteristics**



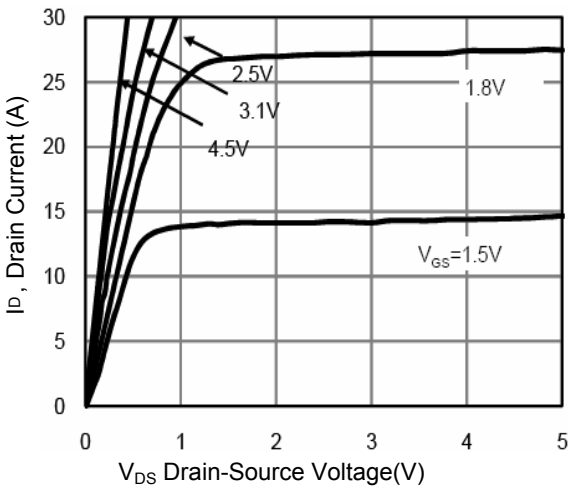
**Figure 2.  $R_{dson}$ -Junction Temperature**



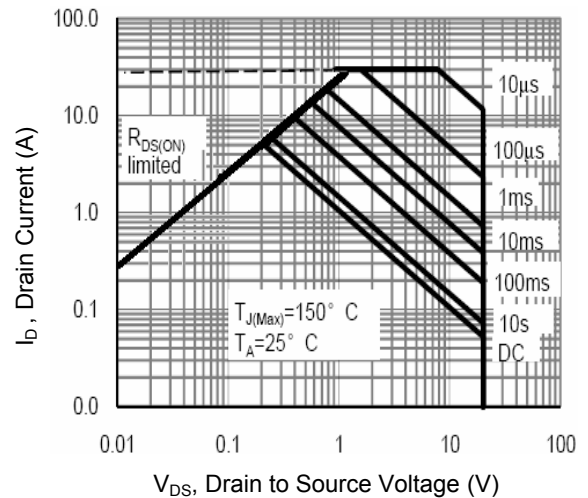
**Figure 3. Power De-Rating**



**Figure 4. Gate Charge**

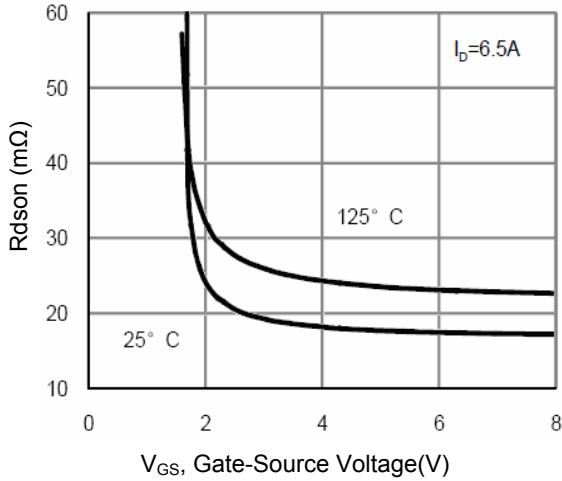


**Figure 5. Output Characteristics**

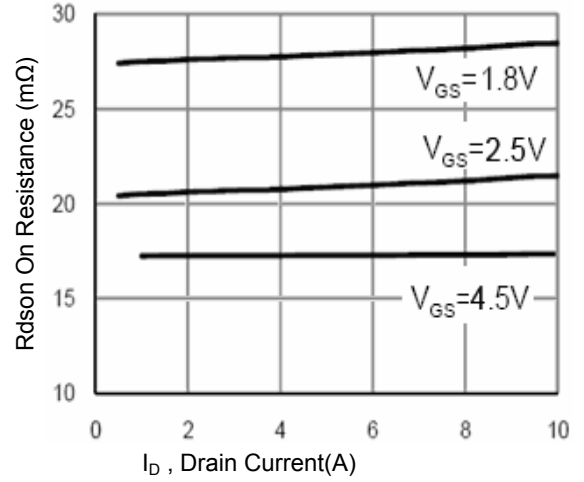


**Figure 6. Safe Operation Area**

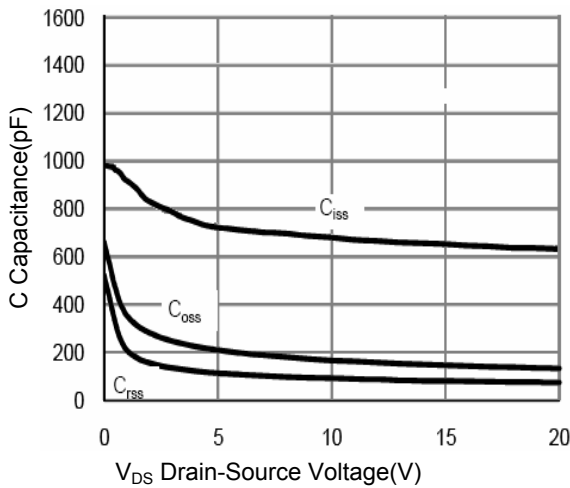
**Typical Electrical and Thermal Characteristic Curves**



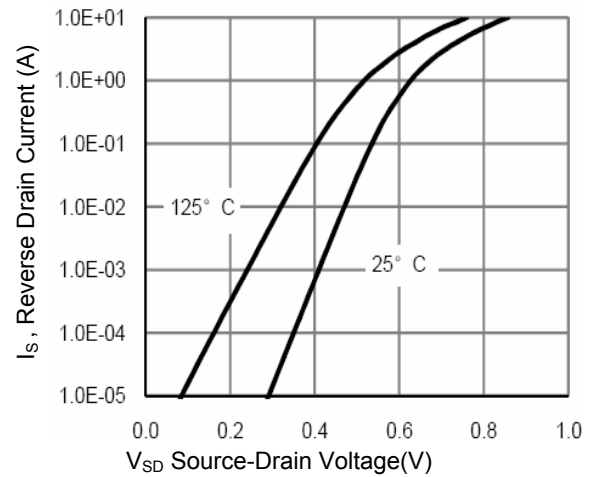
**Figure 7. Rdson vs. V<sub>GS</sub>**



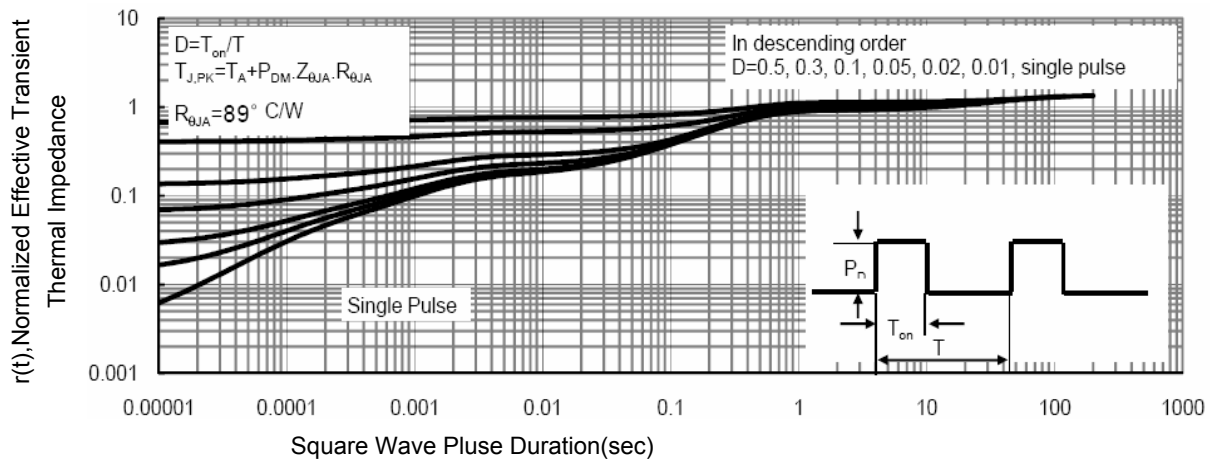
**Figure 8. Rdson-Drain Current**



**Figure 9. Capacitance vs. V<sub>DS</sub>**

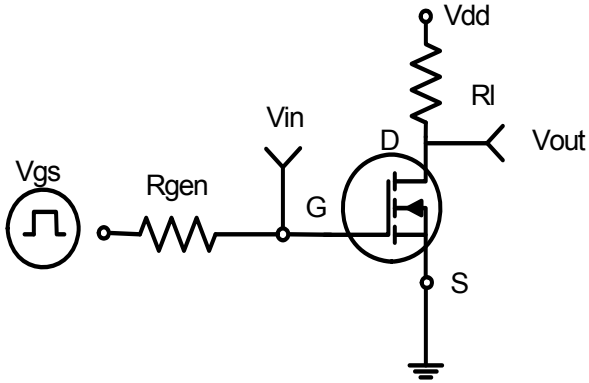


**Figure 10. Source-Drain Diode Forward**

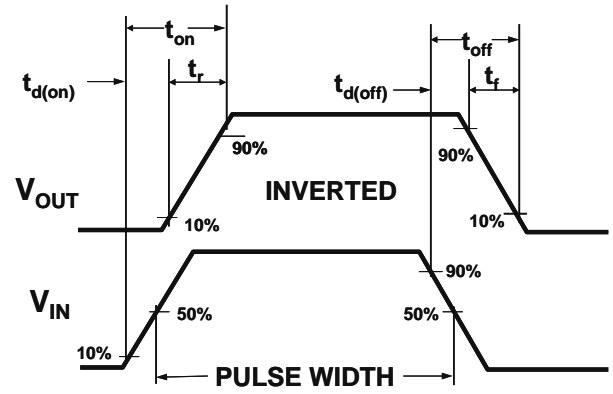


**Figure 11. Normalized Maximum Transient Thermal Impedance**

**Typical Electrical and Thermal Characteristic Curves**

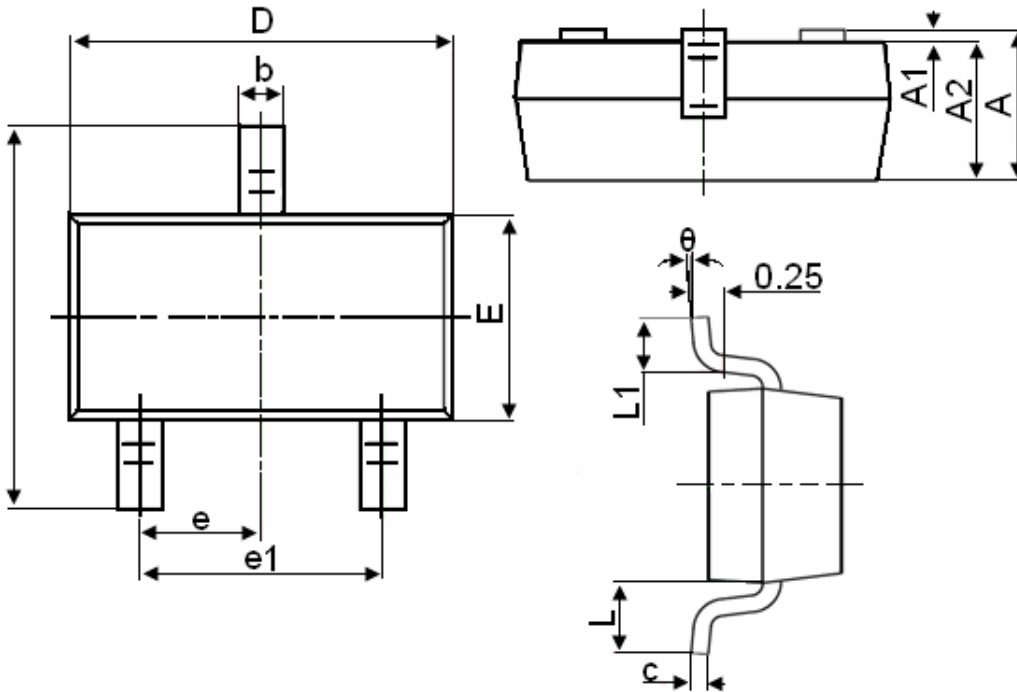


**Figure 12. Switching Test Circuit**



**Figure 13. Switching Waveform**

**Package Outline Dimensions (SOT23)**



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
θ	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.