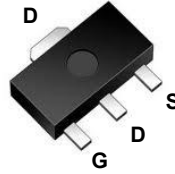
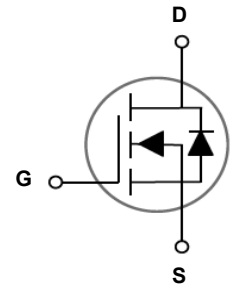


### Main Product Characteristics

$BV_{DSS}$	30V
$R_{DS(ON)}$	32m $\Omega$
$I_D$	6.5A



SOT-89



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 GSFX0306 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	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous ( $T_C=25^{\circ}C$ )	$I_D$	6.5	A
Drain Current-Continuous ( $T_C=100^{\circ}C$ )		4.1	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	26	A
Power Dissipation ( $T_C=25^{\circ}C$ )	$P_D$	1.47	W
Power Dissipation-Derate above 25 $^{\circ}C$		0.012	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	85	$^{\circ}C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	30	$^{\circ}C/W$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^{\circ}C$

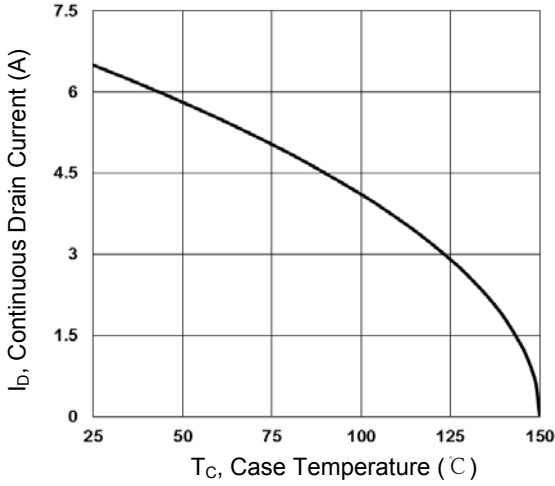
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

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
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^{\circ}\text{C}$ , $I_D=1mA$	-	0.02	-	$V/^{\circ}\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V,$ $T_J=25^{\circ}\text{C}$	-	-	1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V,$ $T_J=85^{\circ}\text{C}$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4A$	-	27	32	m $\Omega$
		$V_{GS}=4.5V, I_D=3A$	-	29	36	
		$V_{GS}=2.5V, I_D=2A$	-	34	45	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	0.6	1	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-2	-	$mV/^{\circ}\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_S=2A$	-	7	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=10V, I_D=4A,$ $V_{GS}=4.5V$	-	8.4	12	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	1	2	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	2.2	4	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=10V, R_G=25\Omega,$ $V_{GS}=4.5V, I_D=1A$	-	4.5	9	nS
Rise Time <sup>2,3</sup>	$t_r$		-	13	25	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	27	51	
Fall Time <sup>2,3</sup>	$t_f$		-	8.3	16	
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V,$ $F=1MHz$	-	695	1000	pF
Output Capacitance	$C_{oss}$		-	45	65	
Reverse Transfer Capacitance	$C_{rss}$		-	36	50	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V,$ Force Current	-	-	6.5	A
Pulsed Source Current	$I_{SM}$		-	-	13	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A,$ $T_J=25^{\circ}\text{C}$	-	-	1	V

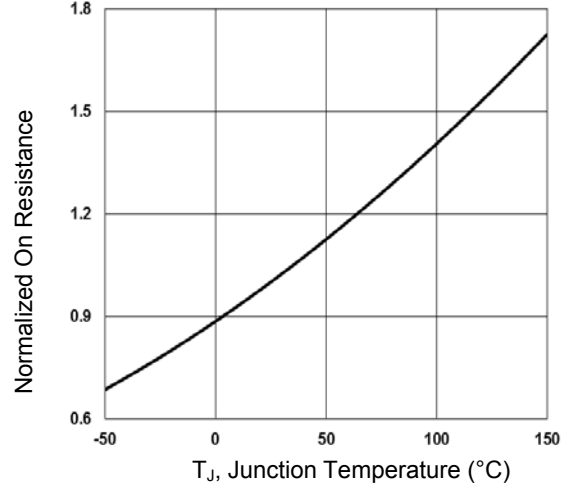
Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

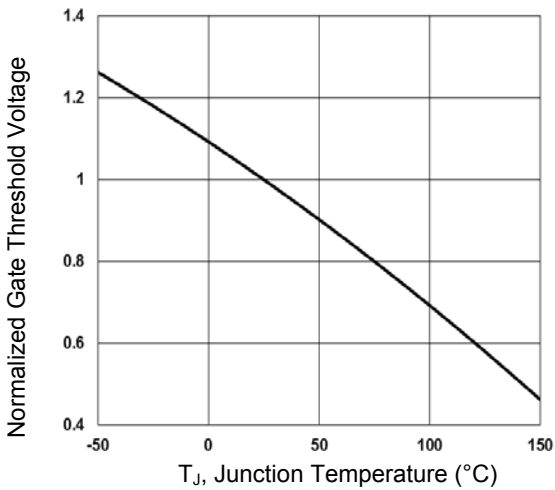
**Typical Electrical and Thermal Characteristic Curves**



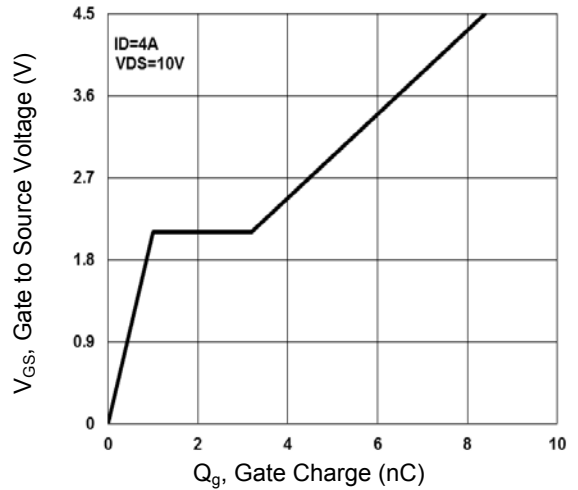
**Figure 1. Continuous Drain Current vs.  $T_c$**



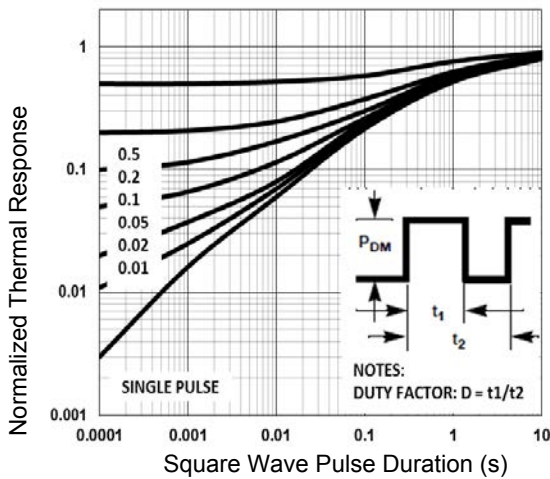
**Figure 2. Normalized  $R_{DSON}$  vs.  $T_j$**



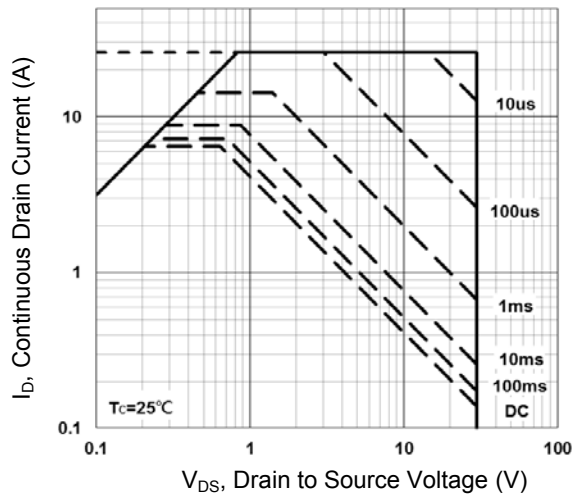
**Figure 3. Normalized  $V_{th}$  vs.  $T_j$**



**Figure 4. Gate Charge Waveform**



**Figure 5. Normalized Transient Impedance**



**Figure 6. Maximum Safe Operation Area**