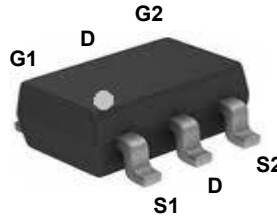
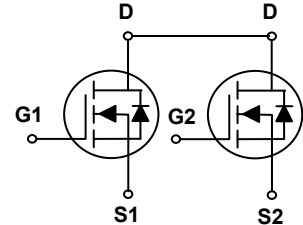


### Main Product Characteristics

$BV_{DSS}$	20V
$R_{DS(ON)}$	23m $\Omega$
$I_D$	6A



SOT-23-6L



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 GSFR0206 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	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current-Continuous ( $T_A=25^\circ\text{C}$ )	$I_D$	6	A
Drain Current-Continuous ( $T_A=70^\circ\text{C}$ )		4.8	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	24	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	1.25	W
Power Dissipation-Derate above 25 $^\circ\text{C}$		0.01	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	100	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	$T_J$	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^\circ\text{C}$

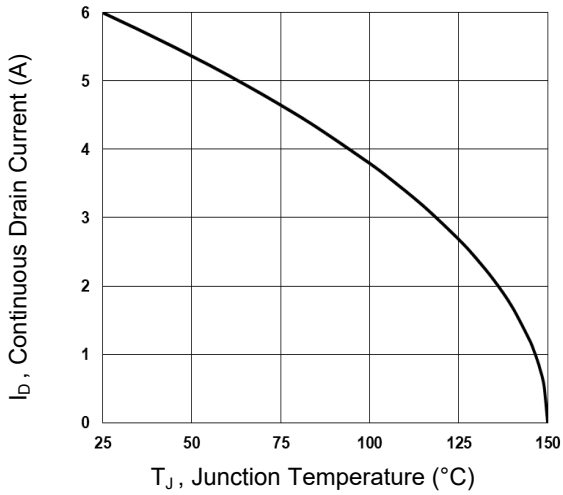
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	1	$\mu A$
		$V_{DS}=16V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	-	-	10	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=2.5A$	-	19	23	m $\Omega$
		$V_{GS}=2.5V, I_D=2A$	-	24	31	
		$V_{GS}=1.8V, I_D=1.5A$	-	34	44	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	0.6	0.8	V
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=1A$	-	4	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=10V, I_D=3A, V_{GS}=4.5V$	-	9.5	15	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		-	0.5	1.2	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		-	1.7	3.5	
Turn-On Delay Time <sup>2,3</sup>	$t_{d(on)}$	$V_{DD}=10V, R_G=6\Omega, V_{GS}=4.5V, I_D=3A$	-	4.1	6.2	nS
Rise Time <sup>2,3</sup>	$t_r$		-	11.6	18	
Turn-Off Delay Time <sup>2,3</sup>	$t_{d(off)}$		-	23.9	36	
Fall Time <sup>2,3</sup>	$t_f$		-	7.6	12	
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V, F=1\text{MHz}$	-	485	800	pF
Output Capacitance	$C_{oss}$		-	88	135	
Reverse Transfer Capacitance	$C_{rss}$		-	70	105	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	1.5	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	-	-	6	A
Pulsed Source Current	$I_{SM}$		-	-	12	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	-	-	1	V

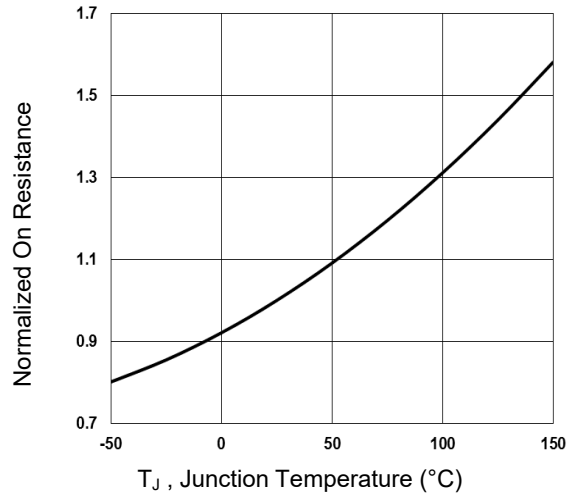
Note:

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 operation temperature.

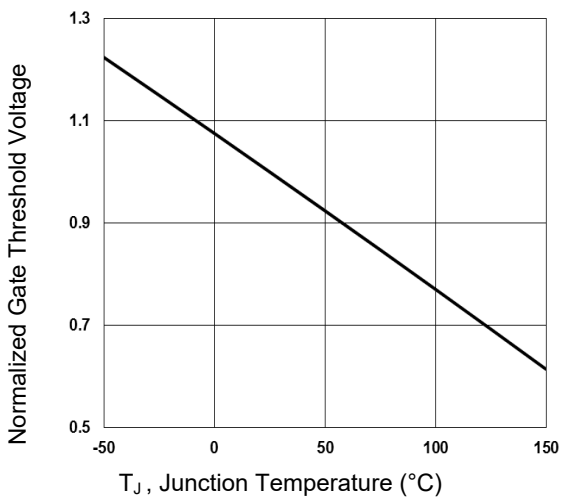
**Typical Electrical and Thermal Characteristic Curves**



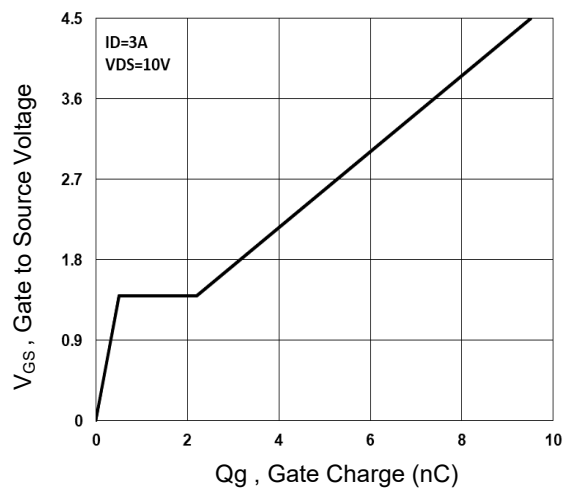
**Figure 1. Continuous Drain Current vs. T<sub>J</sub>**



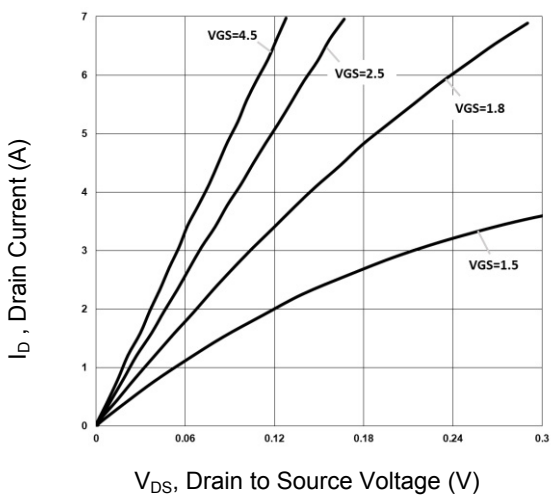
**Figure 2. Normalized R<sub>DSON</sub> vs. T<sub>J</sub>**



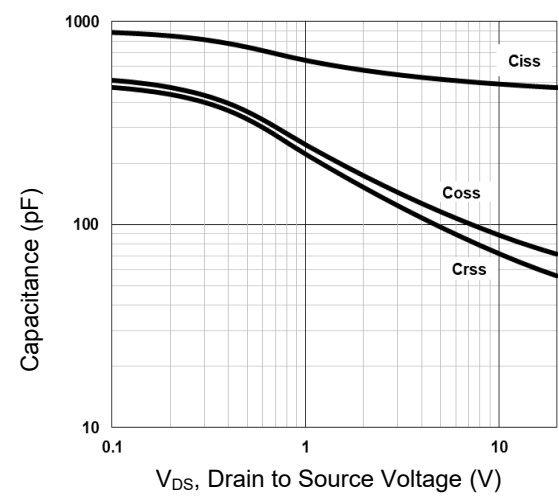
**Figure 3. Normalized V<sub>th</sub> vs. T<sub>J</sub>**



**Figure 4. Gate Charge Waveform**



**Figure 5. Typical Output Characteristics**



**Figure 6. Capacitance Characteristics**

## Typical Electrical and Thermal Characteristic Curves

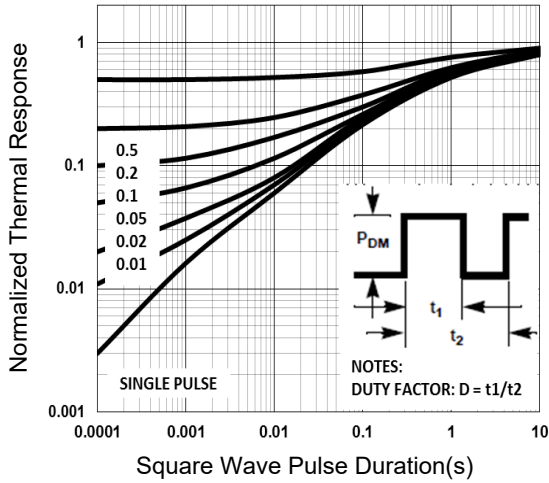


Figure 7. Normalized Transient Response

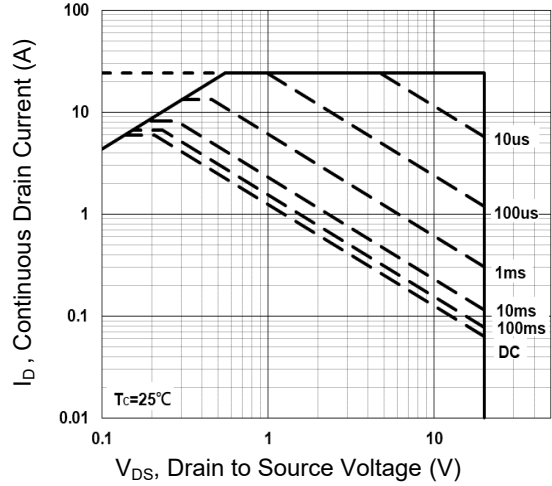


Figure 8. Maximum Safe Operation Area

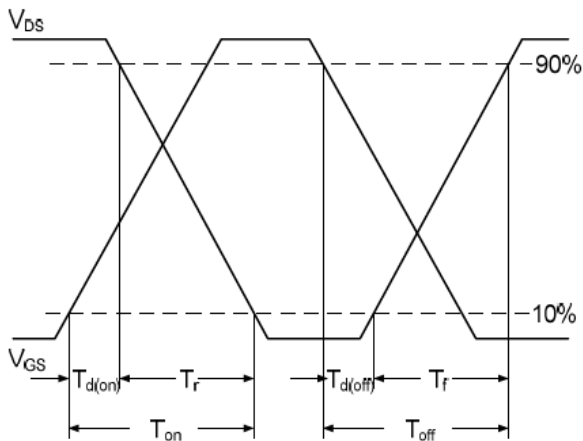


Figure 9. Switching Time Waveform

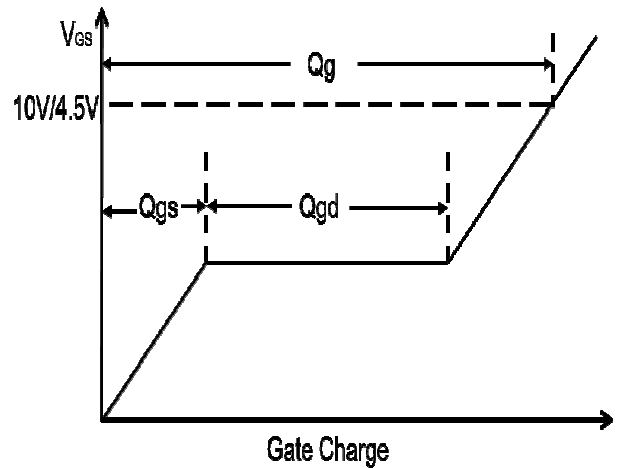
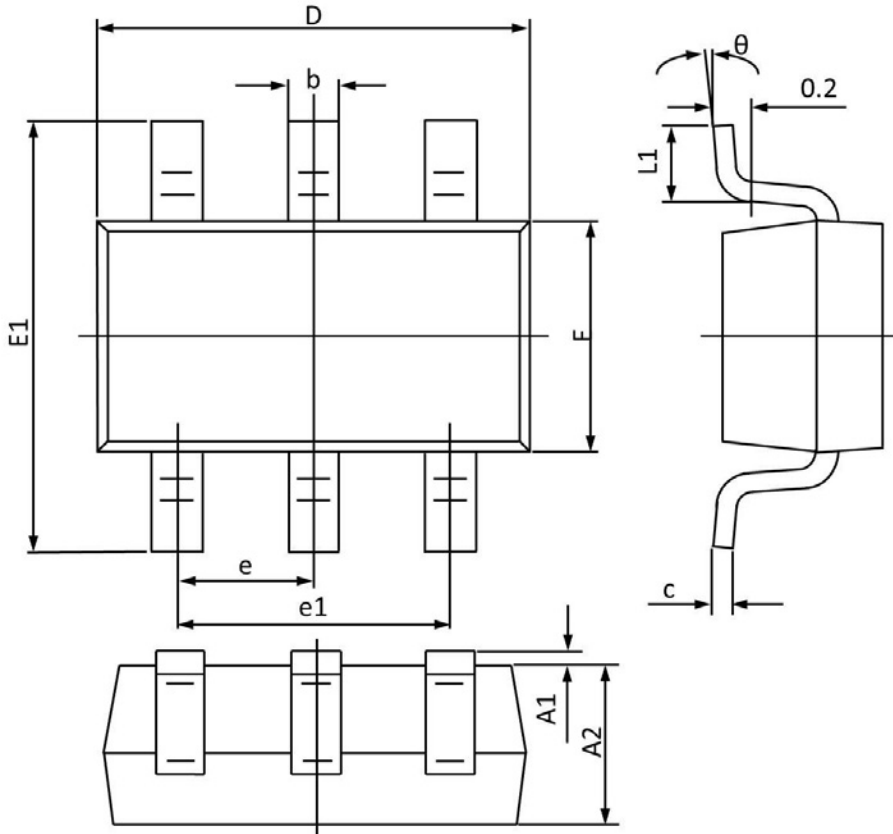


Figure 10. Gate Charge Waveform

**Package Outline Dimensions (SOT-23-6L)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	-	0.150	-	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.500	0.012	0.019
c	0.100	0.200	0.004	0.008
D	2.800	3.050	0.110	0.120
E1	2.600	3.000	0.103	0.118
F	1.500	1.800	0.059	0.071
e	0.950 TYP		0.037 TYP	
e1	1.900 TYP		0.075 TYP	
L1	0.250	0.600	0.010	0.024
$\theta$	0°	8°	0°	8°