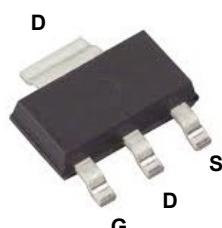
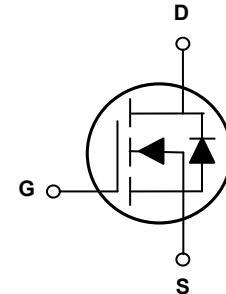


## Main Product Characteristics

$V_{(BR)DSS}$	60V
$R_{DS(ON)}$	60mΩ (Max.)
$I_D$	3.3A



SOT-223



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 GSFL6060 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 ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_A=25^\circ\text{C}$ )	$I_D$	3.3	A
Drain Current-Continuous ( $T_A=70^\circ\text{C}$ )		2.3	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	12.8	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	8	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	12.8	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	2.2	W
Power Dissipation-Derate above 25°C		0.017	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	60	°C/W
Operating Junction Temperature Range	$T_J$	-55 To +150	°C
Storage Temperature Range	$T_{STG}$	-55 To +150	°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	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	60	-	-	V
$\text{BV}_{\text{DSS}}$ Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_{\text{D}}=1\text{mA}$	-	0.05	-	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=60\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{\text{DS}}=48\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	$\text{nA}$
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=6\text{A}$	-	45	60	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=3\text{A}$	-	50	70	
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	1.2	1.8	2.5	V
$V_{\text{GS}(\text{th})}$ Temperature Coefficient	$\Delta V_{\text{GS}(\text{th})}$		-	-5	-	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$g_{\text{fs}}$	$V_{\text{DS}}=10\text{V}, I_{\text{D}}=3\text{A}$	-	7	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{\text{DS}}=48\text{V}, V_{\text{GS}}=10\text{V}, I_{\text{D}}=6\text{A}$	-	9.3	14	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{\text{gs}}$		-	2.1	4	
Gate-Drain Charge <sup>2,3</sup>	$Q_{\text{gd}}$		-	1.8	4	
Turn-On Delay Time <sup>2,3</sup>	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=30\text{V}, V_{\text{GS}}=10\text{V}, R_{\text{G}}=3.3\Omega, I_{\text{D}}=1\text{A}$	-	2.9	6	nS
Rise Time <sup>2,3</sup>	$t_r$		-	9.5	18	
Turn-Off Delay Time <sup>2,3</sup>	$t_{\text{d}(\text{off})}$		-	18.4	35	
Fall Time <sup>2,3</sup>	$t_f$		-	5.3	10	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=15\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	500	725	pF
Output Capacitance	$C_{\text{oss}}$		-	45	65	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	16	30	
Gate Resistance	$R_g$	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=0\text{V}, F=1\text{MHz}$	-	2	4	$\Omega$
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current	$I_s$	$V_G=V_D=0\text{V}$ , Force Current	-	-	3.3	A
Pulsed Source Current	$I_{\text{SM}}$		-	-	12.8	A
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_s=1\text{A}, T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time <sup>2</sup>	$T_{\text{rr}}$	$V_{\text{GS}}=30\text{V}, I_s=1\text{A}, d_i/d_t=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	-	23.4	-	nS
Reverse Recovery Charge <sup>2</sup>	$Q_{\text{rr}}$		-	14.5	-	nC

Notes:

- Repetitive rating: Pulsed width limited by maximum junction temperature.
- The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

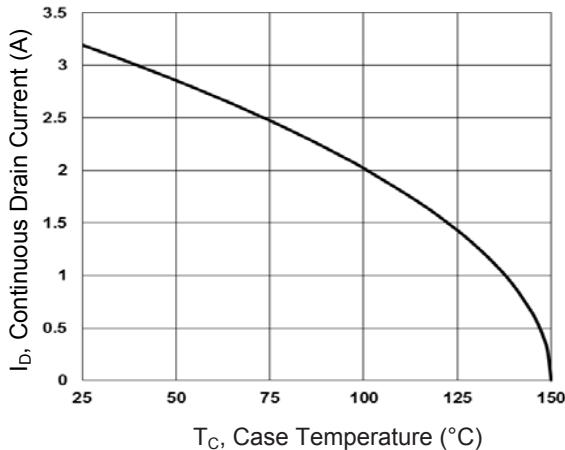


Figure 1. Continuous Drain Current Vs. T<sub>c</sub>

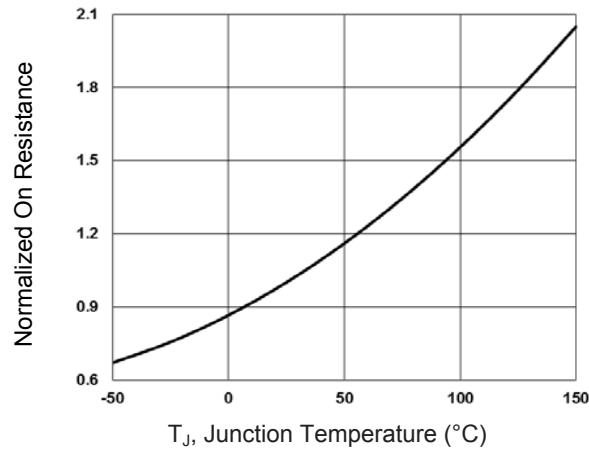


Figure 2. Normalized R<sub>DS(ON)</sub> Vs. T<sub>j</sub>

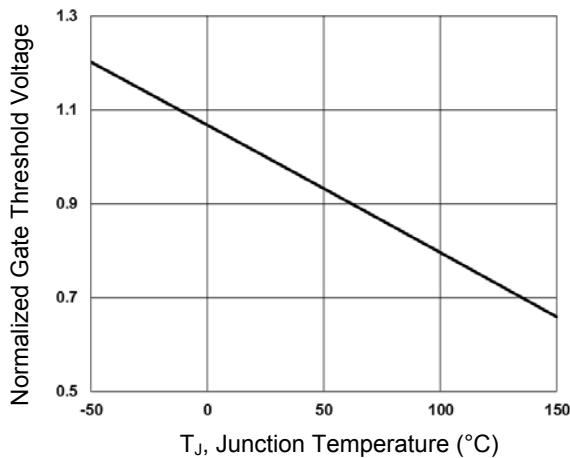


Figure 3. Normalized V<sub>th</sub> Vs. T<sub>j</sub>

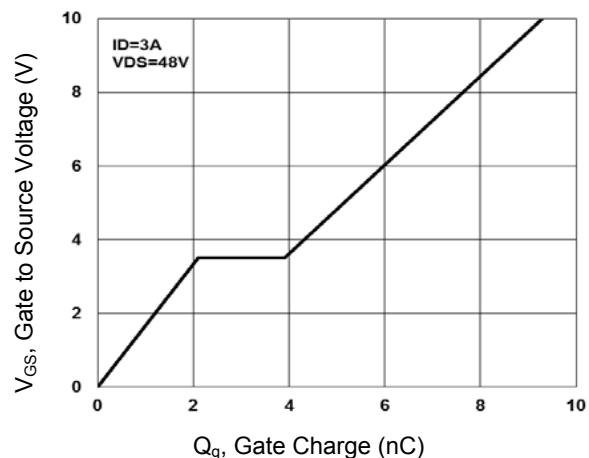


Figure 4. Gate Charge Waveform

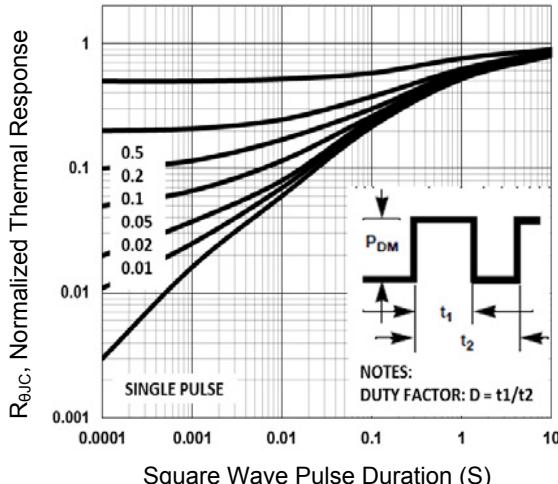


Figure 5. Normalized Transient Impedance

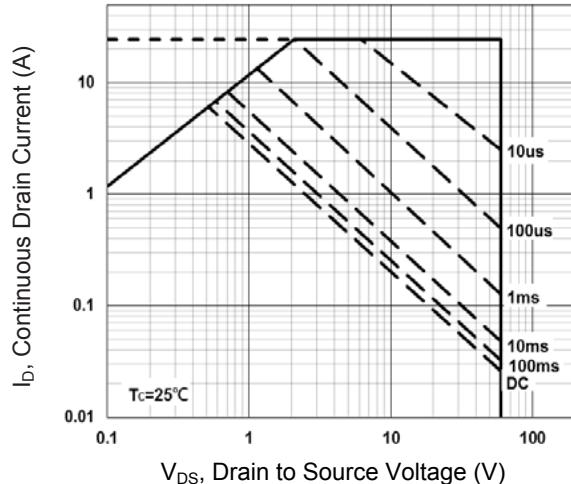
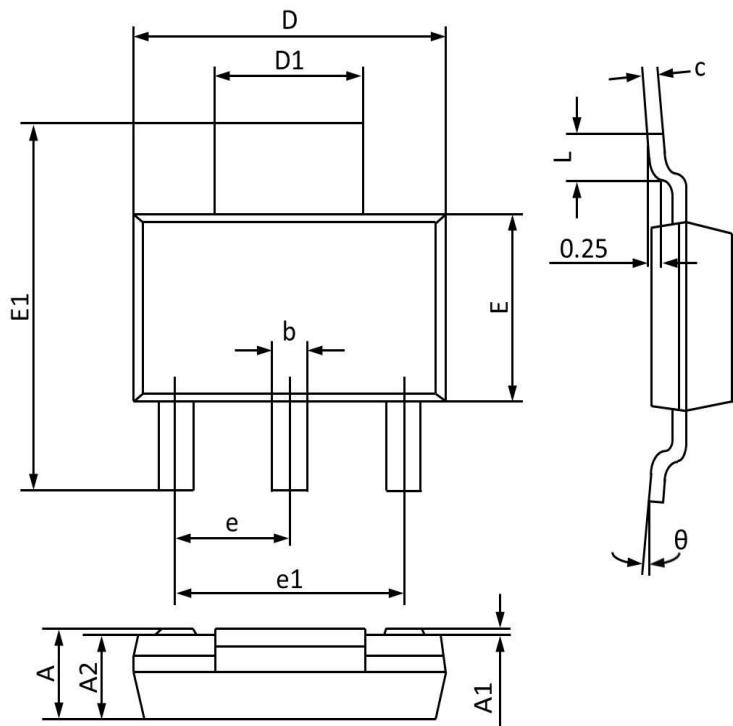


Figure 6. Maximum Safe Operation Area

### Package Outline Dimensions (SOT-223)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.52	1.80	0.060	0.071
A1	0.00	0.10	0.000	0.004
A2	1.50	1.70	0.059	0.067
b	0.66	0.82	0.026	0.032
c	0.25	0.35	0.010	0.014
D	6.20	6.40	0.244	0.252
D1	2.90	3.10	0.114	0.122
E	3.30	3.70	0.130	0.146
E1	6.83	7.07	0.269	0.278
e	2.30 BSC		0.091 BSC	
e1	4.50	4.70	0.177	0.185
L	0.90	1.15	0.035	0.045
θ	0°	10°	0°	10°