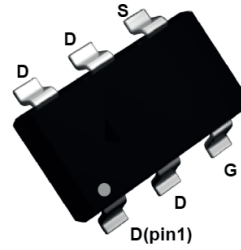
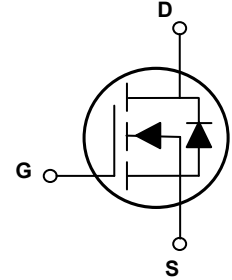


Main Product Characteristics

$V_{(BR)DSS}$	60V
$R_{DS(ON)}$	90mΩ (Max.)
I_D	5A



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

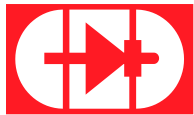


Description

The GSFR6090 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 ($T_C=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous ($T_A=25^{\circ}C$)	I_D	5	A
Drain Current-Continuous ($T_A=70^{\circ}C$)		4	
Drain Current-Pulsed ¹	I_{DM}	20	A
Single Pulse Avalanche Energy ²	E_{AS}	8	mJ
Single Pulse Avalanche Current ²	I_{AS}	12.8	A
Power Dissipation ($T_A=25^{\circ}C$)	P_D	2.1	W
Power Dissipation-Derate above 25°C		0.017	
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°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
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$	-	0.05	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$	-	75	90	m Ω
		$V_{GS}=4.5V, I_D=3A$	-	86	118	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.1	1.7	2.8	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-5	-	mV/ $^\circ\text{C}$
Forward Transconductance	gfs	$V_{DS}=10V, I_D=3A$	-	7	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q_g	$V_{DS}=30V, I_D=3A, V_{GS}=10V$	-	4.6	-	nC
Gate-Source Charge ^{2,3}	Q_{gs}		-	0.4	-	
Gate-Drain Charge ^{2,3}	Q_{gd}		-	2	-	
Turn-On Delay Time ^{2,3}	$t_{d(on)}$	$V_{DD}=30V, R_G=6\Omega, V_{GS}=10V, I_D=3A$	-	2.9	-	nS
Rise Time ^{2,3}	t_r		-	9.5	-	
Turn-Off Delay Time ^{2,3}	$t_{d(off)}$		-	18.4	-	
Fall Time ^{2,3}	t_f		-	5.3	-	
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V, F=1\text{MHz}$	-	380	-	pF
Output Capacitance	C_{oss}		-	30	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	2	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current	I_S	$V_G=V_D=0V$, Force Current	-	-	5	A
Pulsed Source Current	I_{SM}		-	-	20	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time ²	T_{rr}	$V_R=50V, I_S=3A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	-	25	-	nS
Reverse Recovery Charge ²	Q_{rr}		-	15	-	nC

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=12.8A, R_G=25\Omega$, starting $T_J=25^\circ\text{C}$.
3. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Typical Electrical and Thermal Characteristic Curves

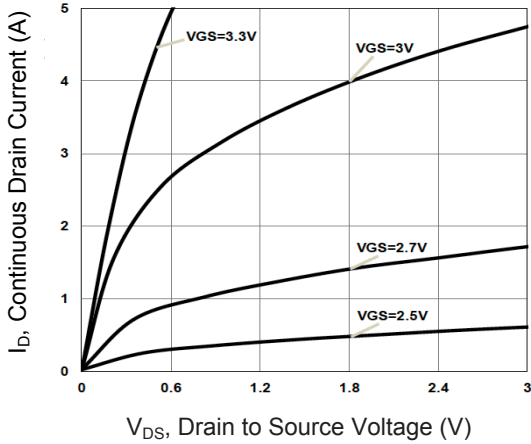


Figure 1. Typical Output Characteristics

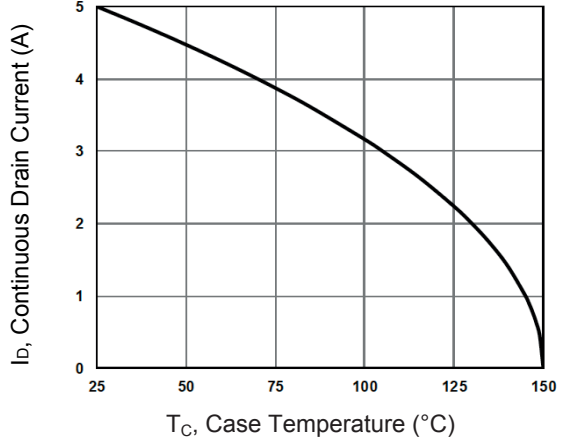


Figure 2. Continuous Drain Current vs. T_C

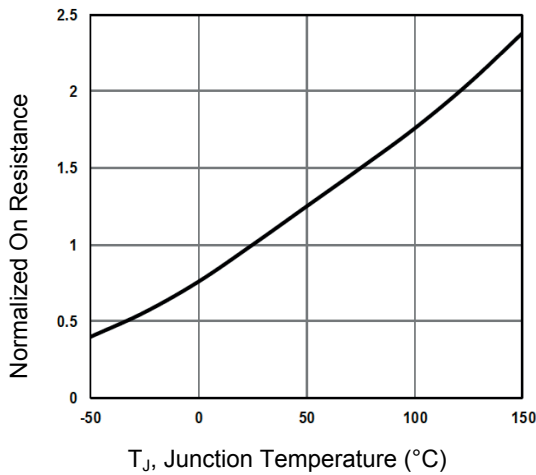


Figure 3. Normalized $R_{DS(ON)}$ vs. T_J

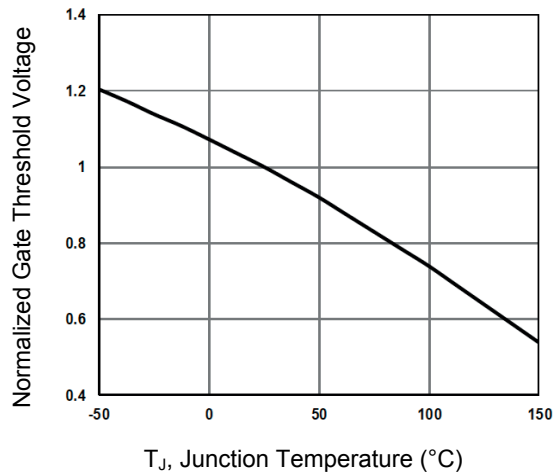


Figure 4. Normalized V_{th} vs. T_J

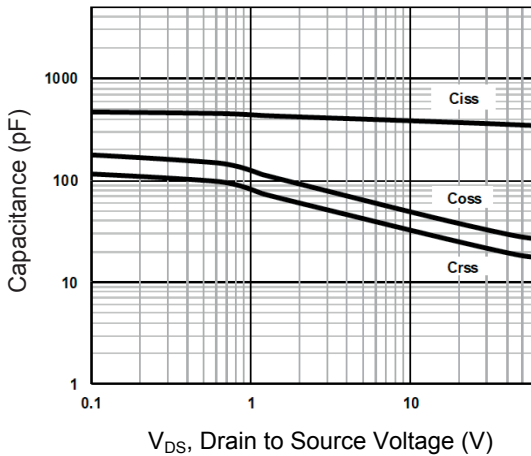


Figure 5. Capacitance Characteristics

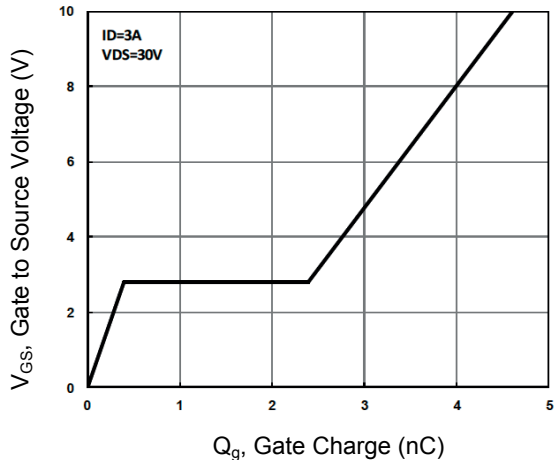


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

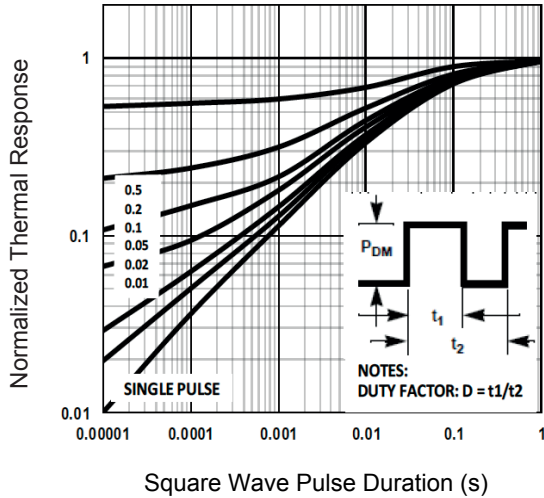


Figure 7. Normalized Transient Impedance

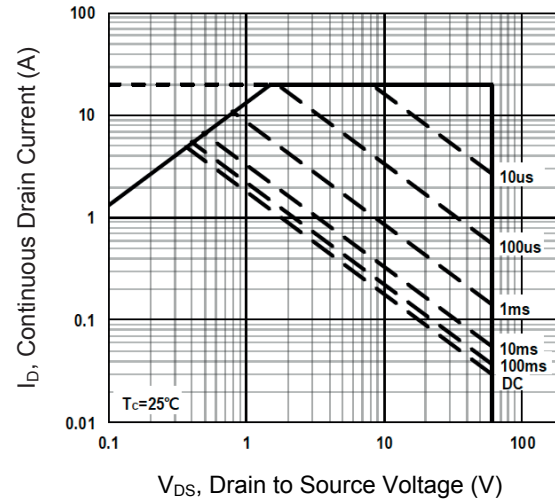
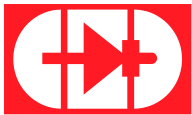
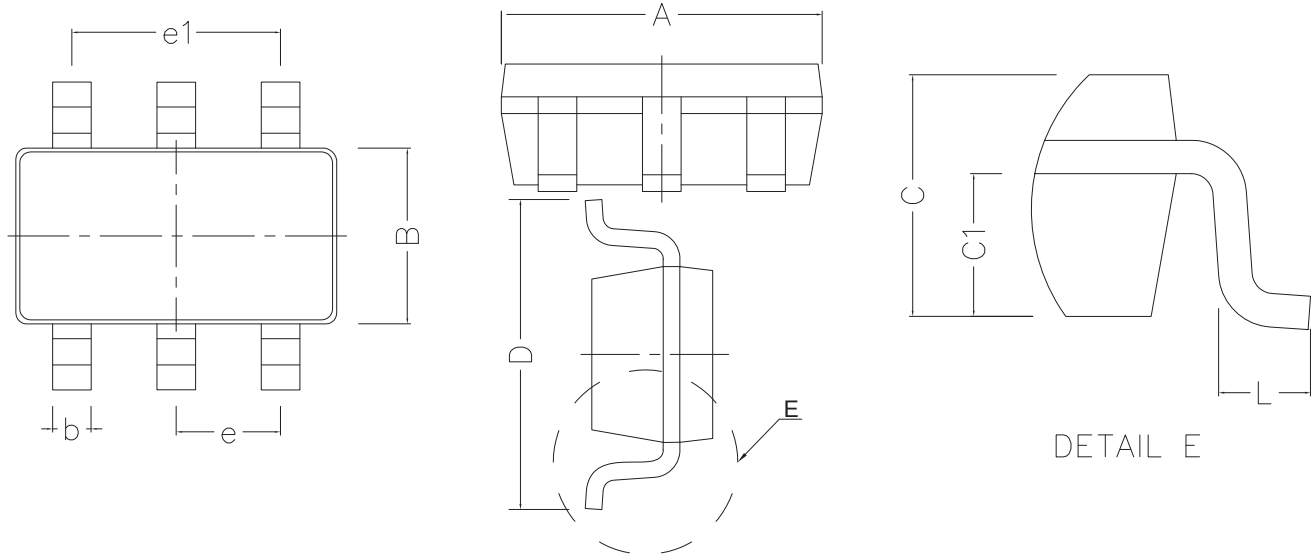


Figure 8. Maximum Safe Operation Area



Package Outline Dimensions (SOT-23-6L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.82	3.02	0.111	0.119
B	1.50	1.70	0.059	0.067
C	1.05	1.15	0.041	0.045
C1	0.60	0.70	0.024	0.028
D	2.65	2.95	0.104	0.116
L	0.30	0.60	0.012	0.024
b	0.28	0.42	0.011	0.017
e	0.95 TYP		0.037 TYP	
e1	1.90 TYP		0.075 TYP	

Order Information

Device	Package	Marking	Packaging	SPQ
GSFR6090	SOT-23-6L	R6090	Tape & Reel	3,000 pcs / Reel