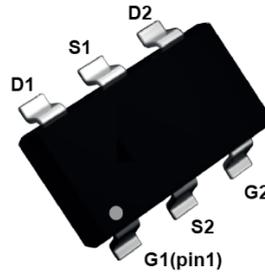
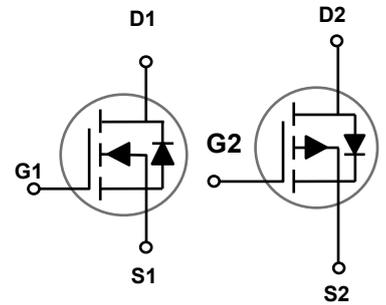


Main Product Characteristics

Polarity	N-Channel	P-Channel
BV_{DSS}	30V	-20V
$R_{DS(ON)}$	54mΩ (Max.)	73mΩ (Max.)
I_D	4A	-3.6A



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 GSFR3954 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	Value		Unit
		N-Channel	P-Channel	
Drain-Source Voltage	V_{DS}	30	-20	V
Gate-Source Voltage	V_{GS}	± 12	± 12	V
Drain Current-Continuous ($T_C=25^\circ\text{C}$)	I_D	4	-3.6	A
Drain Current-Continuous ($T_C=70^\circ\text{C}$)		2.8	-2.5	A
Drain Current-Pulsed ¹	I_{DM}	16	-13	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	1.27	1.27	W
Power Dissipation-Derate above 25°C		0.01	0.01	W/°C
Max. Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100		°C/W
Operating Junction Temperature Range	T_J	-55 to +150		°C
Storage Temperature Range	T_{STG}	-55 to +150		°C

N-Channel Electrical Characteristics (T_J=25°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 =250uA	30	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V, T _J =25°C	-	-	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C	-	-	10	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =4A	-	40	54	mΩ
		V _{GS} =4.5V, I _D =3A	-	48	70	
		V _{GS} =2.5V, I _D =2A	-	59	88	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250uA	0.5	0.88	1.4	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		-	-4	-	mV/°C
Forward Transconductance	g _{fs}	V _{DS} =10V, I _D =3A	-	6.5	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q _g	V _{DS} =15V, V _{GS} =4.5V, I _D =6A	-	4.1	8	nC
Gate-Source Charge ^{2,3}	Q _{gs}		-	1	-	
Gate-Drain Charge ^{2,3}	Q _{gd}		-	2.1	-	
Turn-On Delay Time ^{2,3}	t _{d(on)}	V _{DD} =15V, V _{GS} =10V, R _G =6Ω, I _D =1A	-	2.8	-	nS
Rise Time ^{2,3}	t _r		-	7.2	-	
Turn-Off Delay Time ^{2,3}	t _{d(off)}		-	15.8	-	
Fall Time ^{2,3}	t _f		-	4.6	-	
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, F=1MHz	-	345	-	pF
Output Capacitance	C _{oss}		-	55	-	
Reverse Transfer Capacitance	C _{rss}		-	32	-	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	3.2	6.4	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	4	A
Pulsed Source Current	I _{SM}		-	-	8	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1A, T _J =25°C	-	-	1.2	V

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

P-Channel Electrical Characteristics (T_J=25°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 =-250uA	-20	-	-	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =-1mA	-	-0.01	-	V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	-	-	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =125°C	-	-	-10	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	-	±100	nA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-3.3A	-	55	73	mΩ
		V _{GS} =-2.5V, I _D =-2.5A	-	73	101	
		V _{GS} =-1.8V, I _D =-1A	-	93	133	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250uA	-0.4	-0.62	-1.0	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		-	3	-	mV/°C
Forward Transconductance	g _{fs}	V _{DS} =-10V, I _D =-1A	-	2.2	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q _g	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-2A	-	4.8	-	nC
Gate-Source Charge ^{2,3}	Q _{gs}		-	0.5	-	
Gate-Drain Charge ^{2,3}	Q _{gd}		-	1.9	-	
Turn-On Delay Time ^{2,3}	t _{d(on)}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =25Ω, I _D =-1A	-	3.5	-	nS
Rise Time ^{2,3}	t _r		-	12.6	-	
Turn-Off Delay Time ^{2,3}	t _{d(off)}		-	32.6	-	
Fall Time ^{2,3}	t _f		-	8.4	-	
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, F=1MHz	-	350	-	pF
Output Capacitance	C _{oss}		-	65	-	
Reverse Transfer Capacitance	C _{rss}		-	50	-	
Source-Drain Ratings and Characteristics						
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	-3.6	A
Pulsed Source Current	I _{SM}		-	-	-6.5	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-1A, T _J =25°C	-	-	-1.2	V

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

N-Channel Typical Characteristic Curves

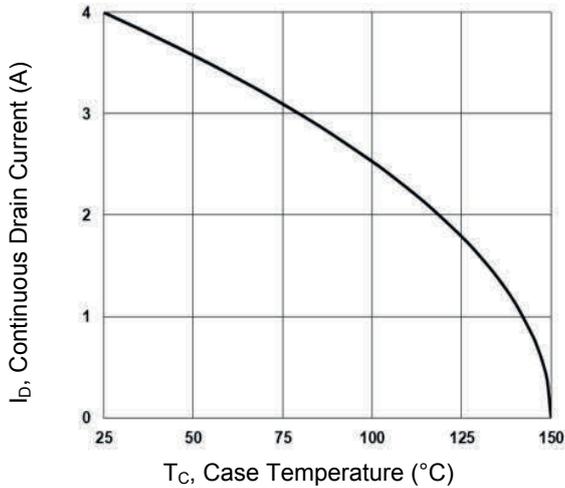


Figure 1. Continuous Drain Current vs. T_C

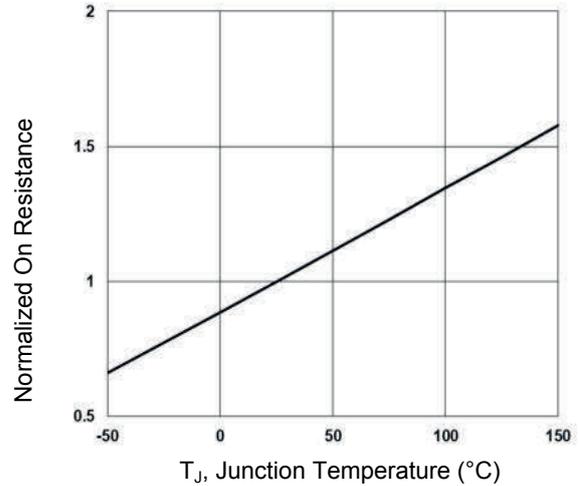


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

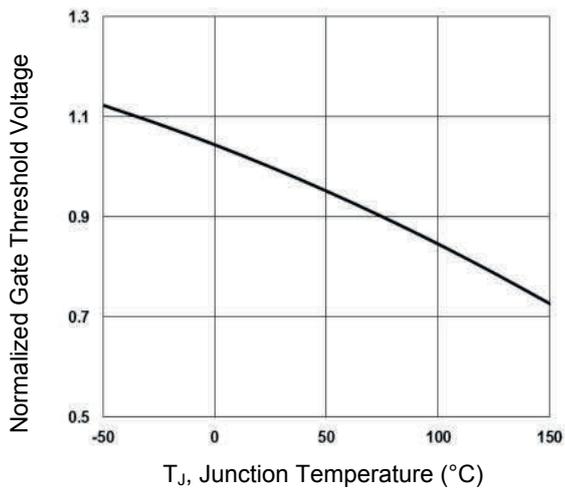


Figure 3. Normalized V_{th} vs. T_J

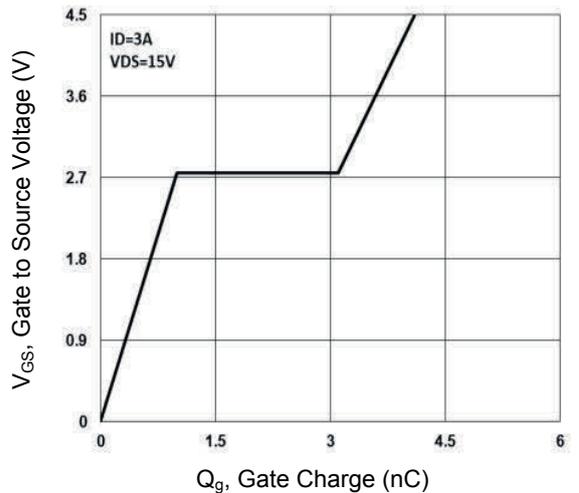


Figure 4. Gate Charge Waveform

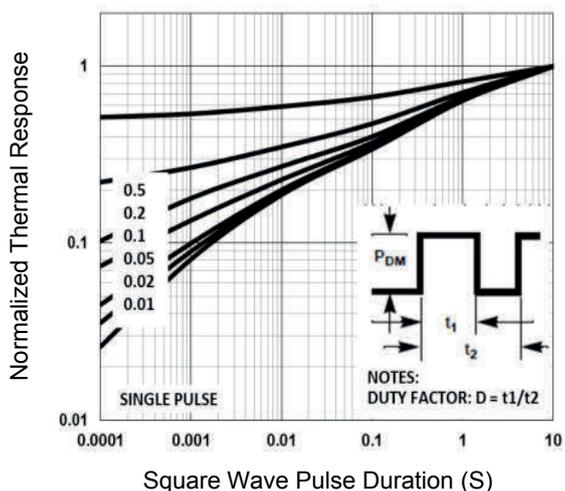


Figure 5. Normalized Transient Response

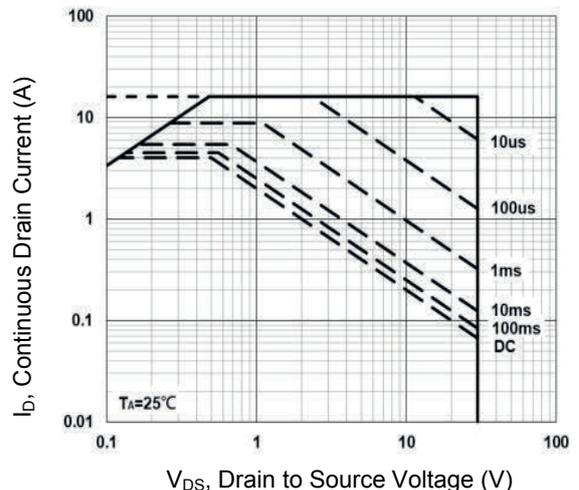


Figure 6. Maximum Safe Operation Area

P-Channel Typical Characteristic Curves

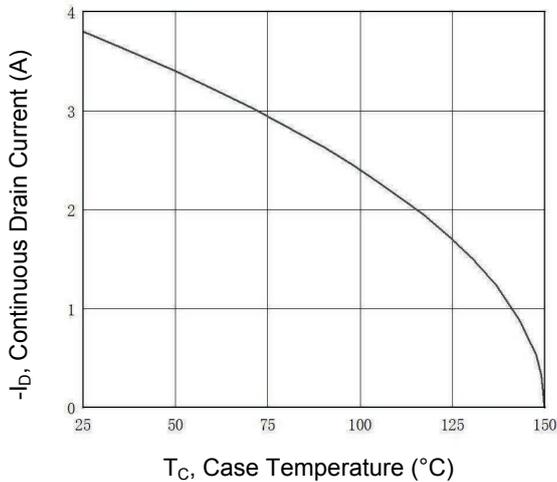


Figure 7. Continuous Drain Current vs. T_C

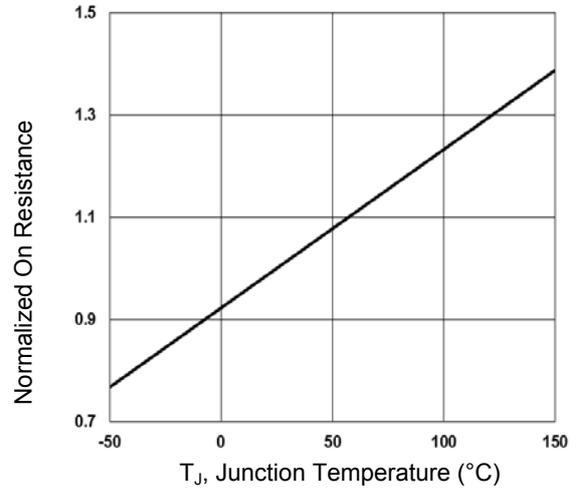


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

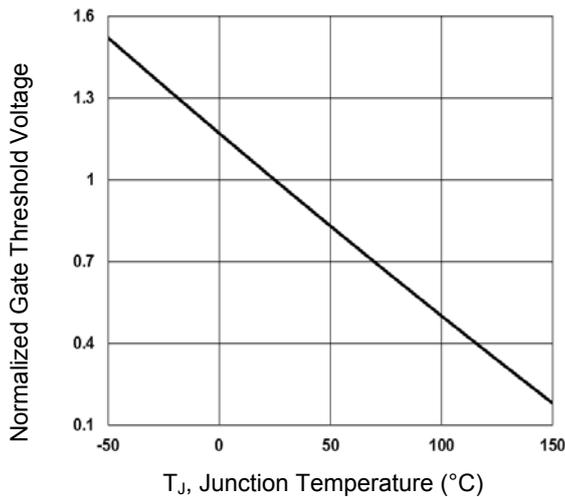


Figure 9. Normalized V_{th} vs. T_J

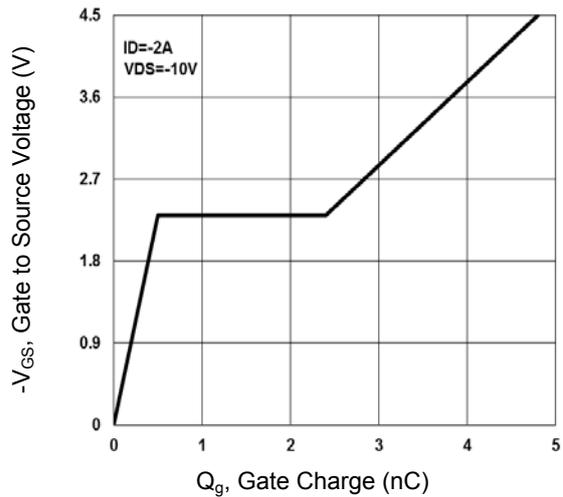


Figure 10. Gate Charge Waveform

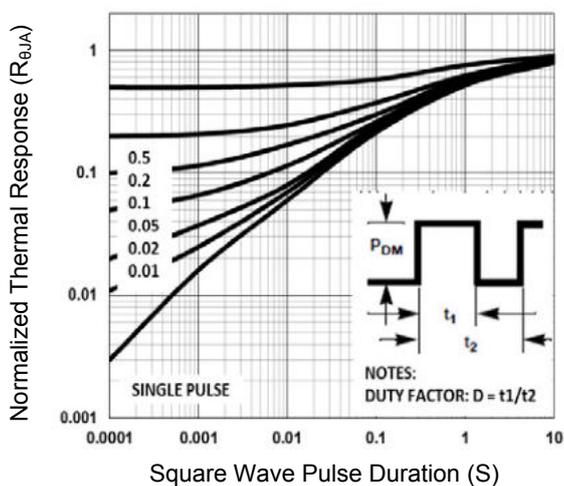


Figure 11. Normalized Transient Impedance

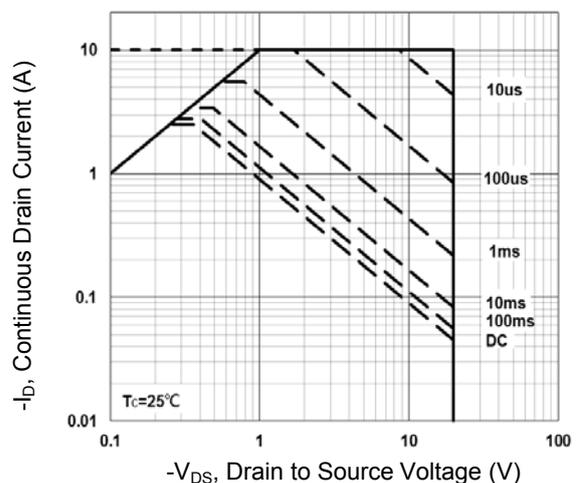
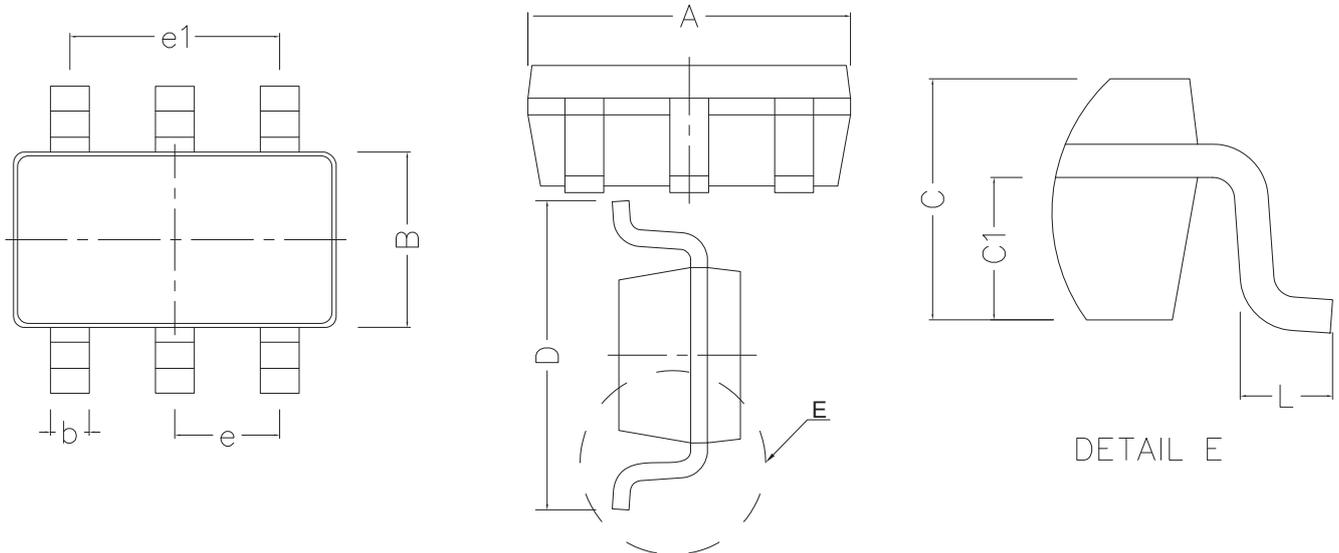


Figure 12. Maximum Safe Operation Area

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
GSFR3954	SOT-23-6L	R3954	Tape & Reel	3,000pcs / Reel