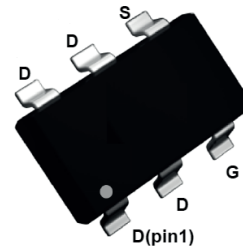
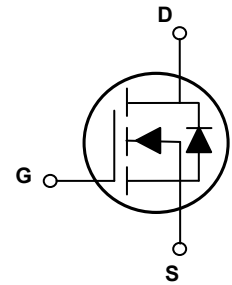


Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	24mΩ (Max.)
I_D	5.6A



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 GSFR3504 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 ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, @ Steady-State ($T_A=25^{\circ}\text{C}$) ¹	I_D	5.6	A
Continuous Drain Current, @ Steady-State ($T_A=70^{\circ}\text{C}$)		4.5	A
Pulsed Drain Current ²	I_{DM}	23	A
Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	1.4	W
Linear Derating Factor ($T_A=25^{\circ}\text{C}$)		0.011	W/ $^{\circ}\text{C}$
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State) ³	$R_{\theta JA}$	80	$^{\circ}\text{C/W}$
Operating Junction and Storage Temperature Range	T_J/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
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
		$T_J=125^{\circ}\text{C}$	-	-	50	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=12V$	-	-	100	nA
		$V_{GS}=-12V$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5.6A$	-	18	24	m Ω
		$V_{GS}=4.5V, I_D=3.0A$	-	25	34	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.5	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$	-	545	-	pF
Output Capacitance	C_{oss}		-	78	-	
Reverse Transfer Capacitance	C_{rss}		-	69	-	
Total Gate Charge	Q_g	$I_D=5.6A, V_{DS}=15V, V_{GS}=4.5V$	-	13	-	nC
Gate-to-Source Charge	Q_{gs}		-	2.4	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	2.35	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=4.5V, V_{DS}=15V, R_L=15\Omega, R_{GEN}=3\Omega, I_D=5.6A$	-	12	-	nS
Rise Time	t_r		-	52	-	
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	
Fall Time	t_f		-	10	-	
Gate Resistance	R_g	$f=1\text{MHz}$	-	3.1	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	5.6	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	23	A
Diode Forward Voltage	V_{SD}	$I_S=3.0A, V_{GS}=0V$	-	0.82	1.2	V
Reverse Recovery Time	T_{rr}	$T_J=25^{\circ}\text{C}, I_F=5.6A, di/dt=100A/\mu s$	-	1.28	-	nS
Reverse Recovery Charge	Q_{rr}		-	16.5	-	nC

Notes:

1. Pulse test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

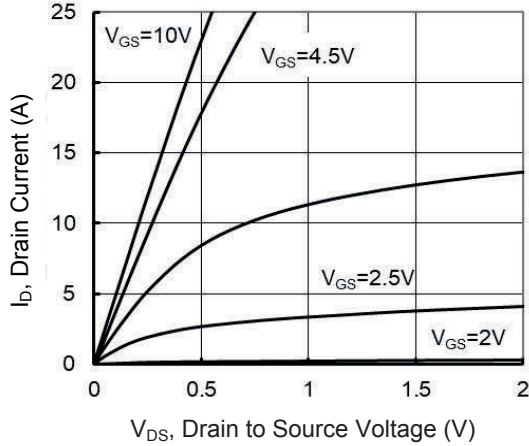


Figure 1. Typical Output Characteristics

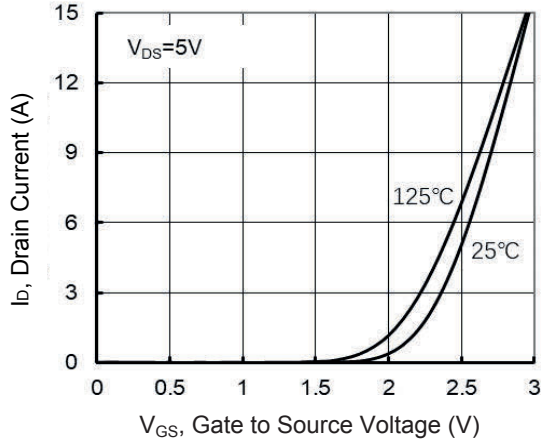


Figure 2. Typical Transfer Characteristics

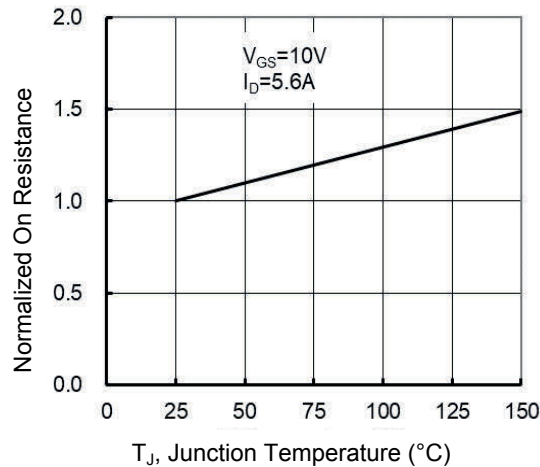


Figure 3. Normalized $R_{DS(ON)}$ vs. T_J

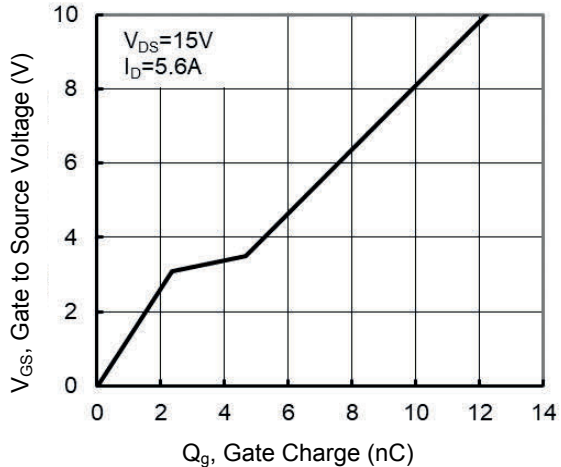


Figure 4. Gate Charge

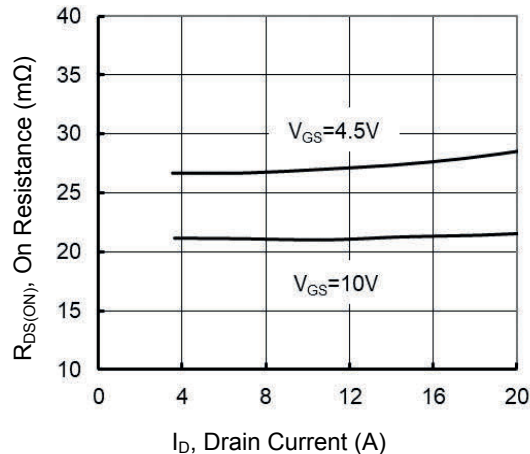


Figure 5. $R_{DS(ON)}$ vs. Drain Current

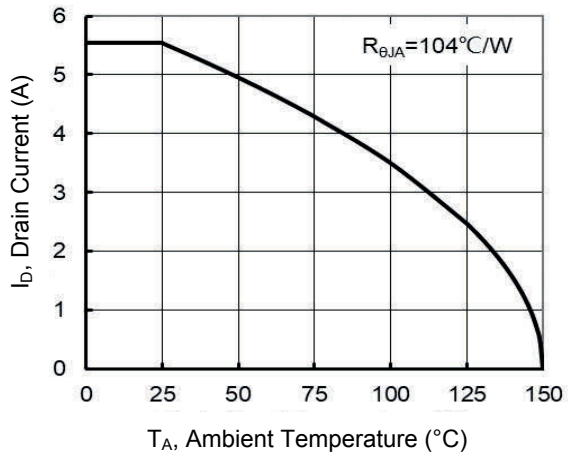


Figure 6. Drain Current vs. T_A

Typical Electrical and Thermal Characteristic Curves

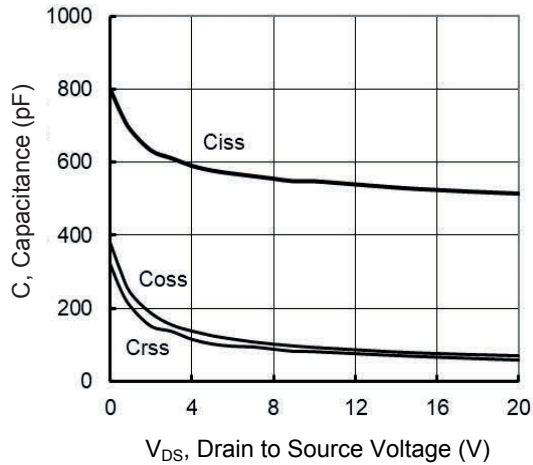


Figure 7. Capacitance Characteristics

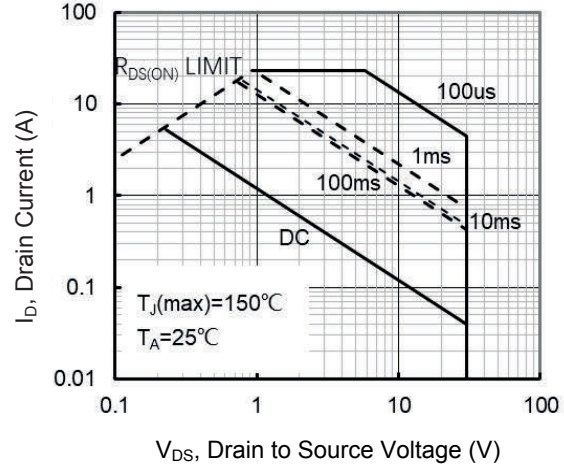
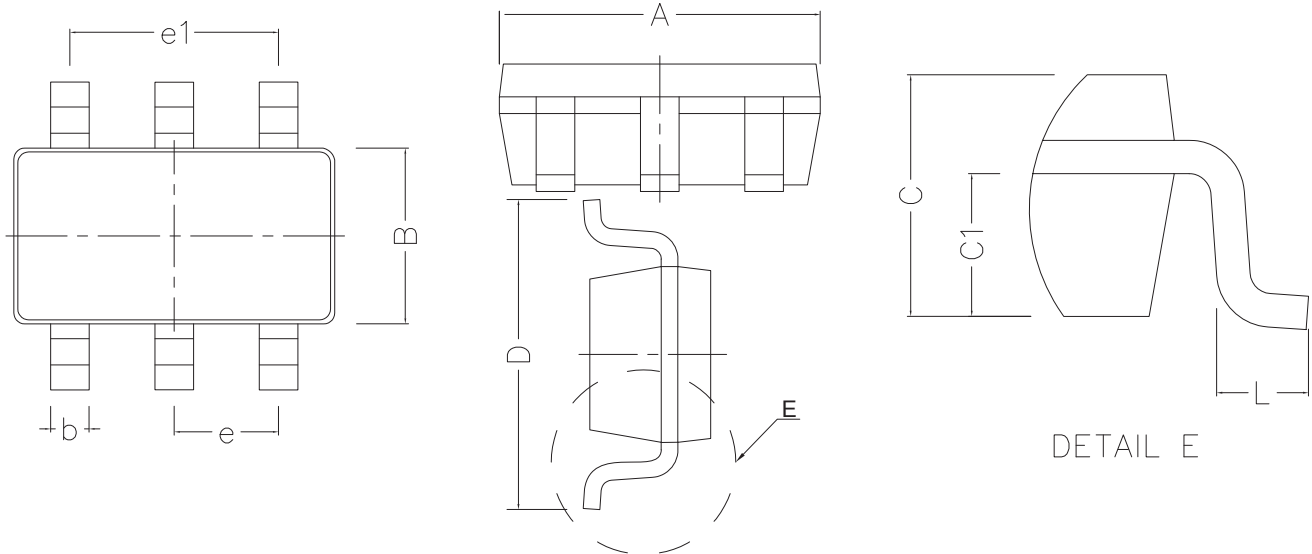


Figure 8. Safe Operation Area

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
GSFR3504	SOT-23-6L	R3504	Tape & Reel	3,000 pcs / Reel