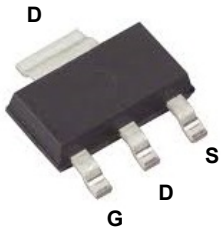
GOOD-ARK
SEMICONDUCTOR

GSFL2004

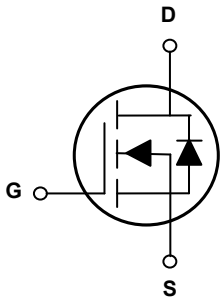
200V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	200V
$R_{DS(ON)}$	700mΩ (Max.)
I_D	4A



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 GSFL2004 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°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_A=25°C)	I_D	4	A
Drain Current-Continuous (T_A=100°C)		2.8	
Drain Current-Pulsed[1]	I_{DM}	16	A
Single Pulse Avalanche Energy[2]	E_{AS}	10.6	mJ
Power Dissipation (T_A=25°C)	P_D	30	W
Power Dissipation-Derate above 25°C		0.24	W/°C
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.17	°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°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	200	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	-	0.055	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=200V, V_{GS}=0V, T_J=25°C	-	-	1	uA
		V_{DS}=160V, 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=3A	-	510	700	mΩ
		V_{GS}=4.5V, I_D=2A	-	550	750	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	1.0	1.8	2.9	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-5	-	mV/°C
Forward Transconductance	gfs	V_{DS}=10V, I_D=3A	-	8	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=100V, V_{GS}=10V, I_D=4A	-	12.6	-	nC
Gate-Source Charge[2,3]	Q_{gs}		-	2.1	-	
Gate-Drain Charge[2,3]	Q_{gd}		-	2.2	-	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=100V, V_{GS}=10V, R_G=5Ω, I_D=4A	-	13	-	nS
Rise Time[2,3]	t_r		-	10	-	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	40	-	
Fall Time[2,3]	t_f		-	10	-	
Input Capacitance	C_{iss}	V_{DS}=30V, V_{GS}=0V, F=1MHz	-	775	-	pF
Output Capacitance	C_{oss}		-	12.5	-	
Reverse Transfer Capacitance	C_{rss}		-	4.4	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	1.4	3	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}		-	-	16	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=2A, T_J=25°C	-	-	1.2	V
Reverse Recovery Time[2]	T_{rr}	V_R=50V, I_S=4A, dI/dt=100A/μS, T_J=25°C	-	86	-	nS
Reverse Recovery Charge[2]	Q_{rr}		-	280	-	nC

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=40V, V_{GS}=10V, L=0.5mH, R_G=25Ω, starting T_J=25°C.
3. Pulse test: pulse width ≦ 300uS, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

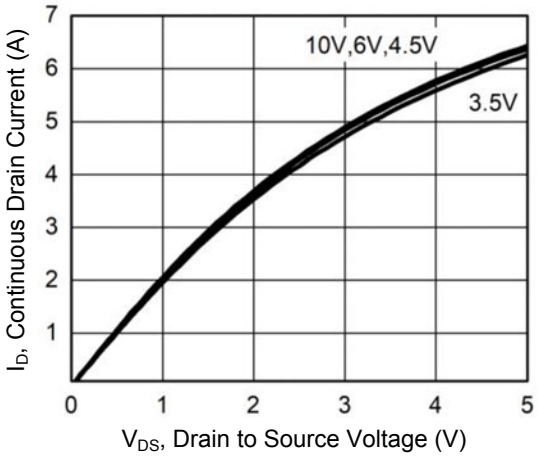


Figure 1. Typical Output Characteristics

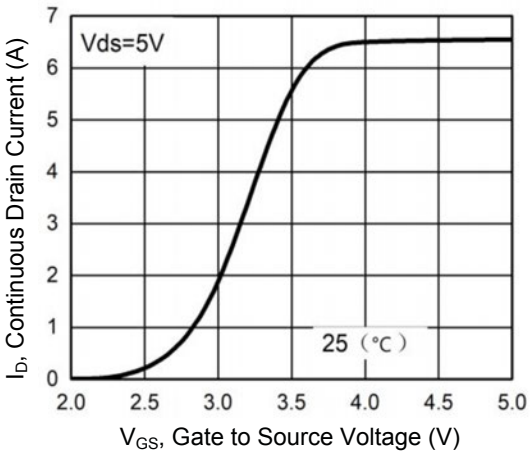


Figure 2. Transfer Characteristics

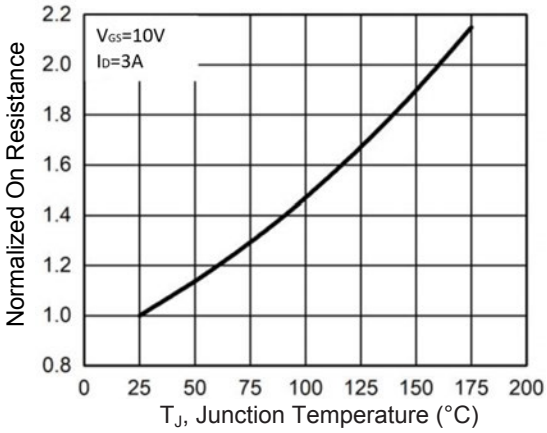


Figure 3. Normalized $R_{DS(ON)}$ vs. T_J

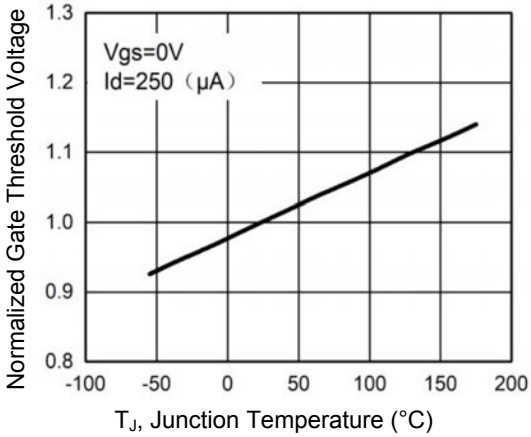


Figure 4. Normalized BV_{DSS} vs. T_J

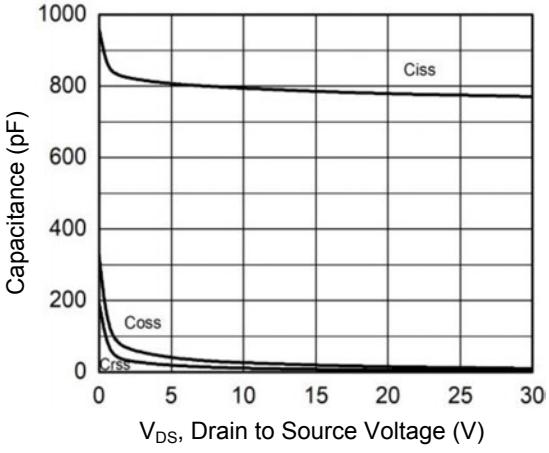


Figure 5. Capacitance Characteristics

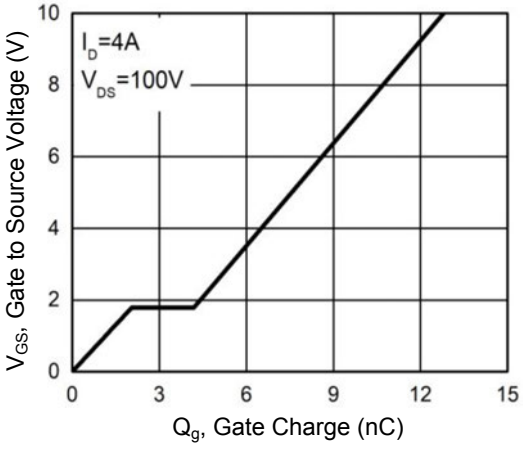


Figure 6. Gate Charge Waveform

Typical Electrical and Thermal Characteristic Curves

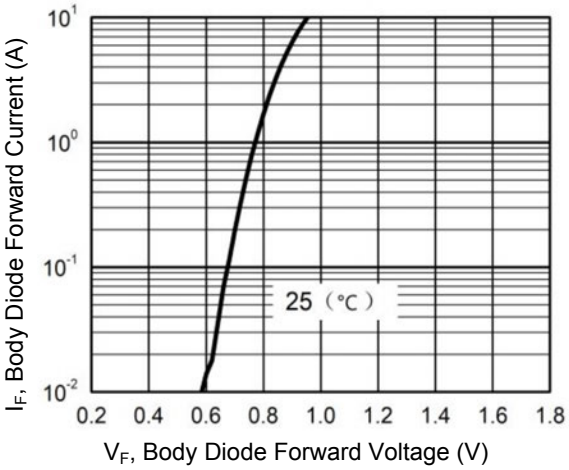


Figure 7. Body Diode Characteristics

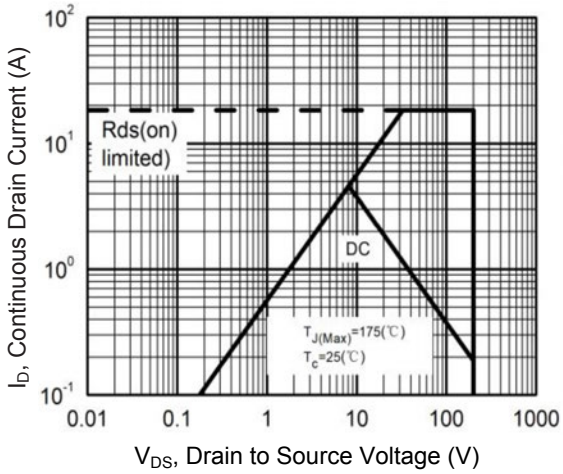
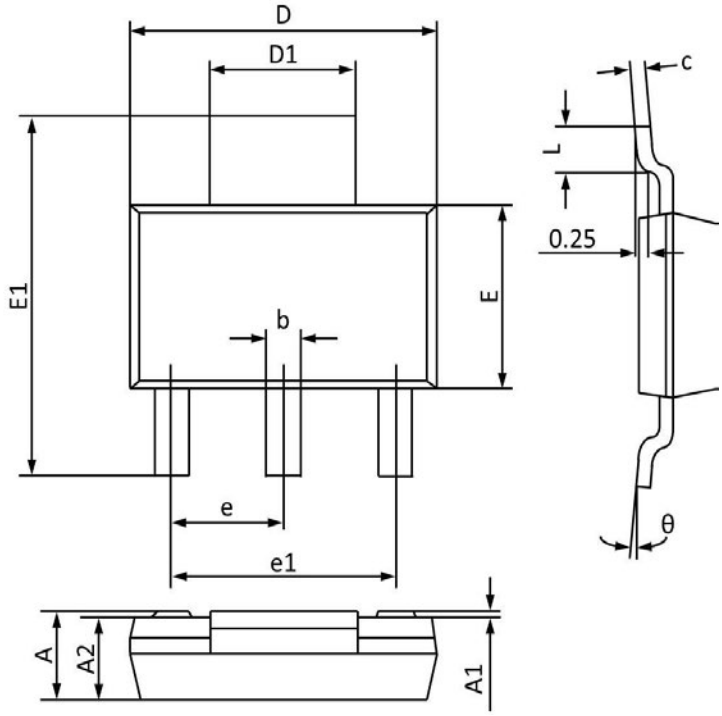


Figure 8. Maximum Safe Operation Area

Package Outline Dimensions (SOT-223)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.50	1.80	0.060	0.071
A1	0.00	0.12	0.000	0.005
A2	1.45	1.75	0.057	0.069
b	0.60	0.82	0.024	0.032
c	0.20	0.35	0.008	0.014
D	6.20	6.70	0.244	0.264
D1	2.90	3.10	0.114	0.122
E	3.30	3.70	0.130	0.146
E1	6.70	7.30	0.264	0.287
e	2.30 BSC		0.091 BSC	
e1	4.40	4.70	0.173	0.185
L	0.90	1.15	0.035	0.045
θ	0°	10°	0°	10°