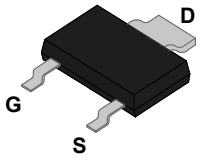
GOOD-ARK SEMICONDUCTOR

GSFL7004

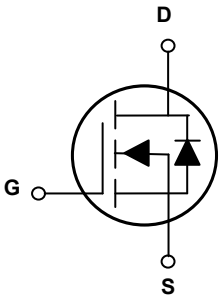
700V N-Channel MOSFET

Main Product Characteristics

BV_{DSS}	700V
$R_{DS(ON)}$	1300mΩ
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 GSFL7004 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_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage(V_{GS}=0V)	V_{DS}	700	V
Gate-Source Voltage (V_{DS}=0V), AC (f>1 Hz)	V_{GS}	±30	V
Drain Current-Continuous(T_C=25°C)	$I_{D(DC)}$	4	A
Drain Current-Continuous(T_C=100°C)		2.5	A
Drain Current-Pulsed[1]	I_{DM}	16	A
Power Dissipation (T_C=25°C)	P_D	5.2	W
Single Pulse Avalanche Energy[2]	E_{AS}	27	mJ
Avalanche Current[1]	I_{AR}	0.7	A
Repetitive Avalanche energy, t_{AR} Limited by T_{jmax}[1]	E_{AR}	0.1	mJ
Drain Source Voltage Slope, V_{DS}≤480V	dv/dt	50	V/nS
Reverse Diode dv/dt, V_{DS}≤48 V, I_{SD}<I_D		15	
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	24	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Storage Temperature Range	T_{STG}	-55 To +150	°C
Operating Junction Temperature Range	T_J	-55 To +150	°C

Electrical Characteristics (T_A=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=250μA	700	-	-	V
Zero Gate Voltage Drain Current (T_C=25°C)	I_{DSS}	V_{DS}=700V , V_{GS}=0V	-	-	1	μA
Zero Gate Voltage Drain Current (T_C=125°C)			-	-	50	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	3	-	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	1100	1300	mΩ
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=50V, V_{GS}=0V, F=1MHz	-	304	-	pF
Output Capacitance	C_{oss}		-	17	-	
Reverse Transfer Capacitance	C_{rss}		-	0.5	-	
Total Gate Charge	Q_g	V_{DS}=480V, I_D=4A, V_{GS}=10V	-	8.8	12	nC
Gate-Source Charge	Q_{gs}		-	2.3	-	
Gate-Drain Charge	Q_{gd}		-	4	-	
Switching Times						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=380V, R_G=5Ω V_{GS}=10V, I_D=2.5A	-	8	-	nS
Turn-On Rise Time	t_r		-	4	-	
Turn-Off Delay Time	$t_{d(off)}$		-	52	70	
Turn-Off Fall Time	t_f		-	9	18	
Source-Drain Diode Characteristics						
Source-Drain Current (Body Diode)	I_{SD}	T_C=25°C	-	-	4	A
Pulsed Source-Drain Current (Body Diode)	I_{SM}		-	-	16	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=4A, T_J=25°C	-	0.9	1.2	V
Reverse Recovery Time	T_{rr}	I_F=2A, di/dt=100A/μs, T_J=25°C	-	200	-	nS
Reverse Recovery Charge	Q_{rr}		-	0.6	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	6	-	A

Notes: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. T_J=25°C,V_{DD}=50V,V_G=10V, R_G=25Ω

Typical Electrical and Thermal Characteristic Curves

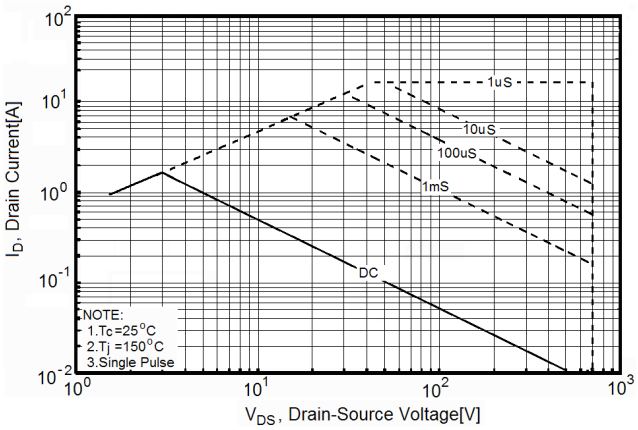


Figure 1. Safe Operating Area

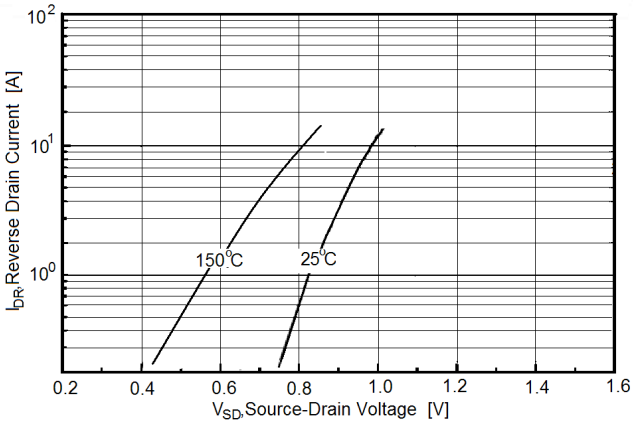


Figure 2. Source-Drain Diode Forward Voltage

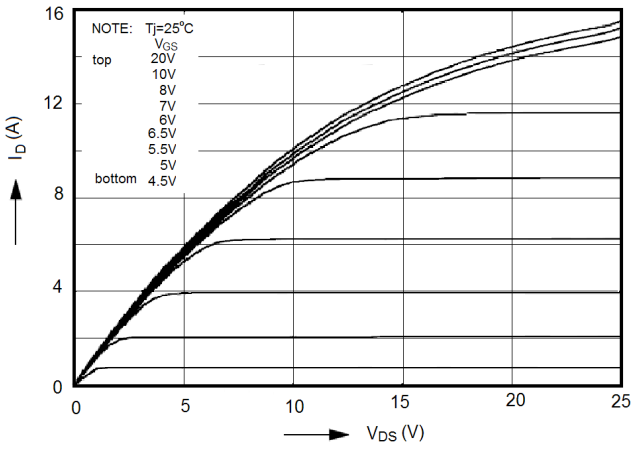


Figure 3. Output Characteristics

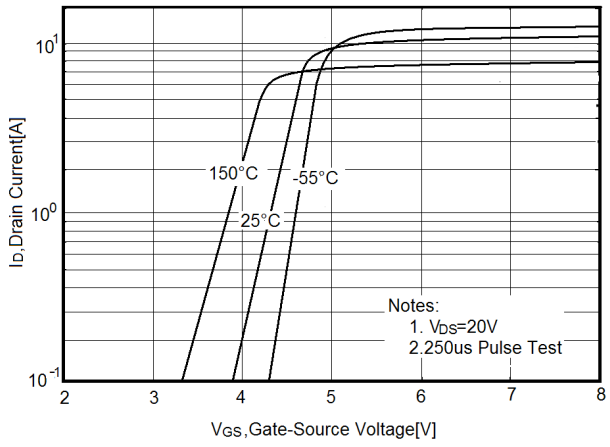


Figure 4. Transfer Characteristics

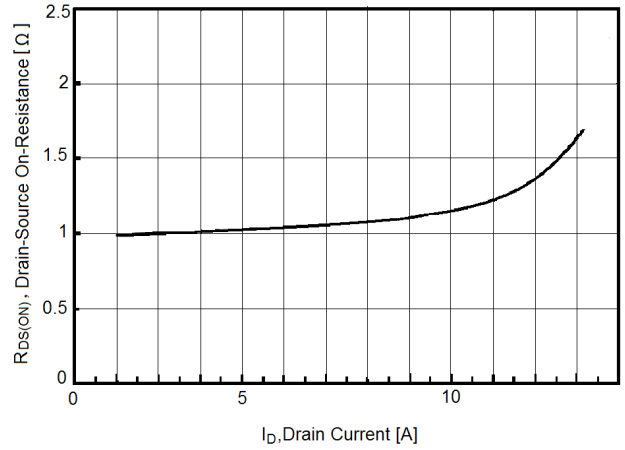


Figure 5. Static Drain-Source on Resistance

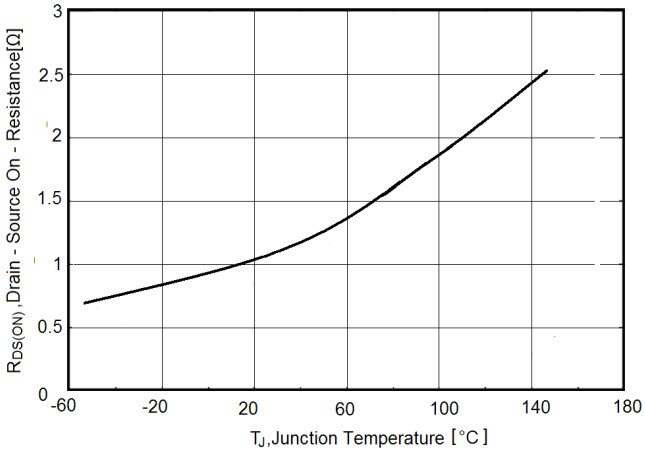
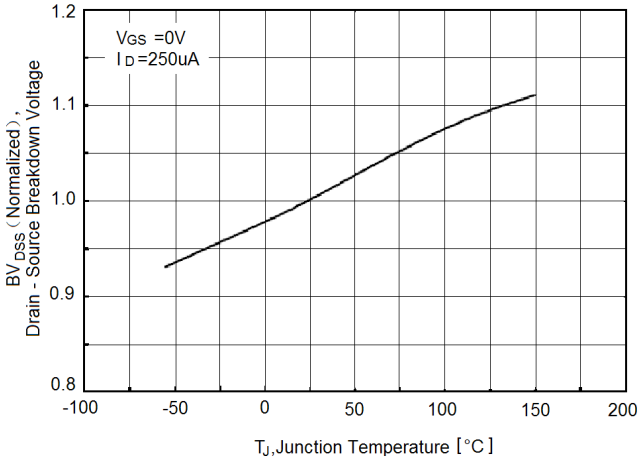
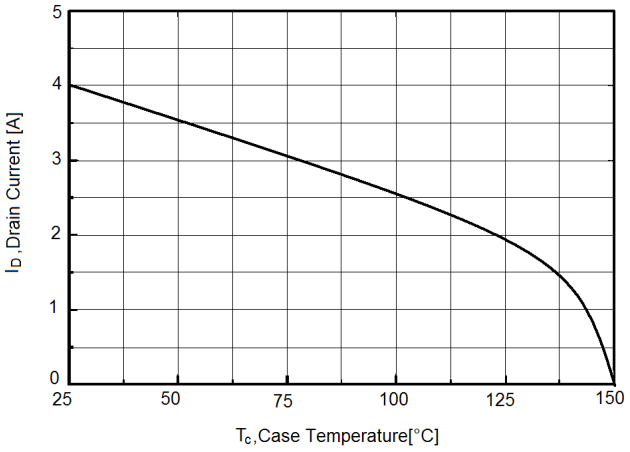


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

Typical Electrical and Thermal Characteristic Curves



Firgure 7. BV_{DSS} vs Junction Temperature



Firgure 8. Maximum I_D vs Junction Temperature

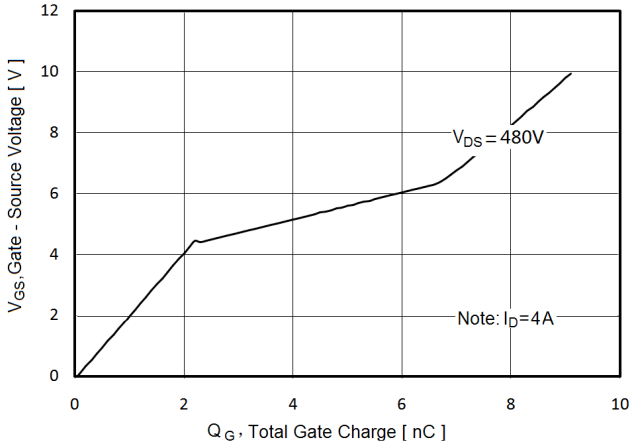


Figure 9. Gate Charge Waveforms

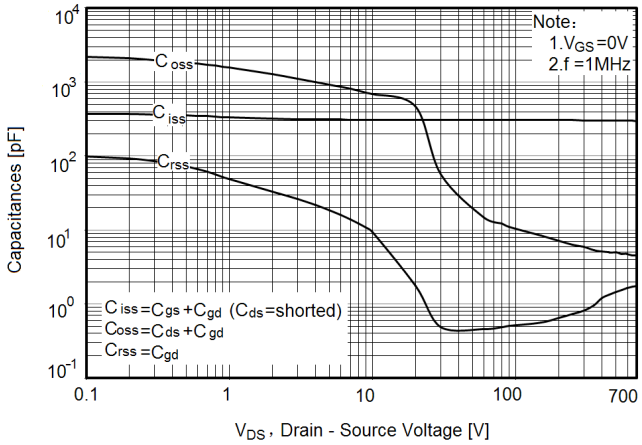


Figure10. Capacitance

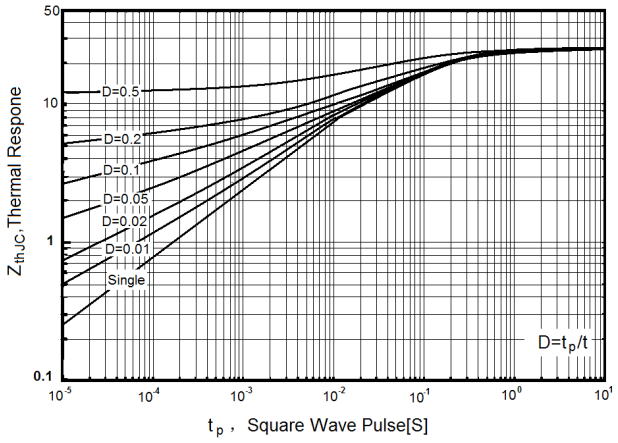


Figure 11. Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

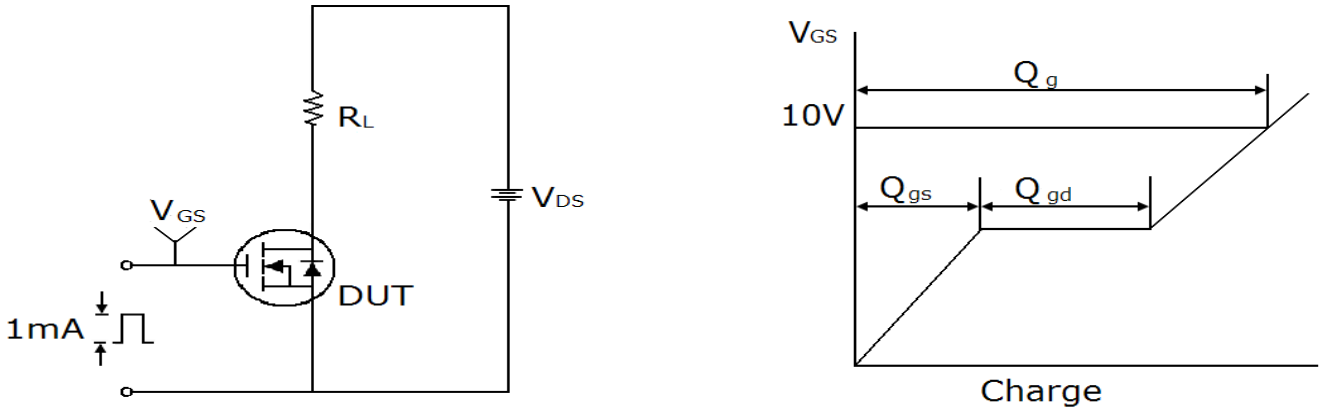


Figure 12. Gate Charge Test Circuit & Waveform

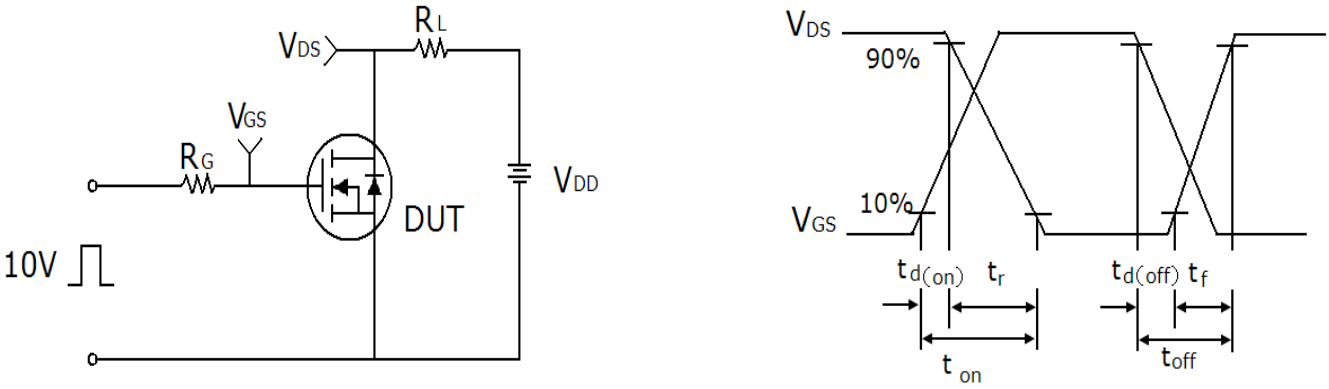


Figure 13. Switch Time Test Circuit

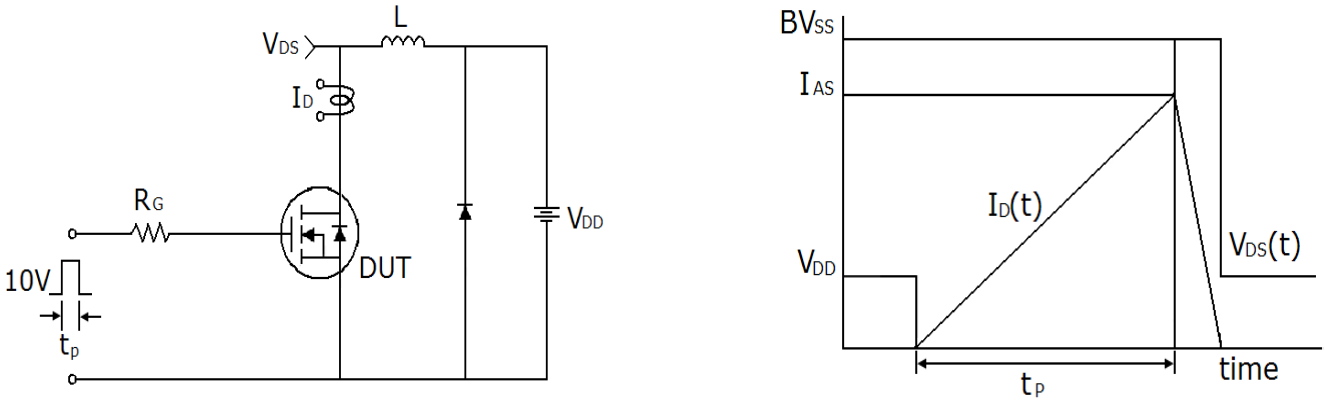
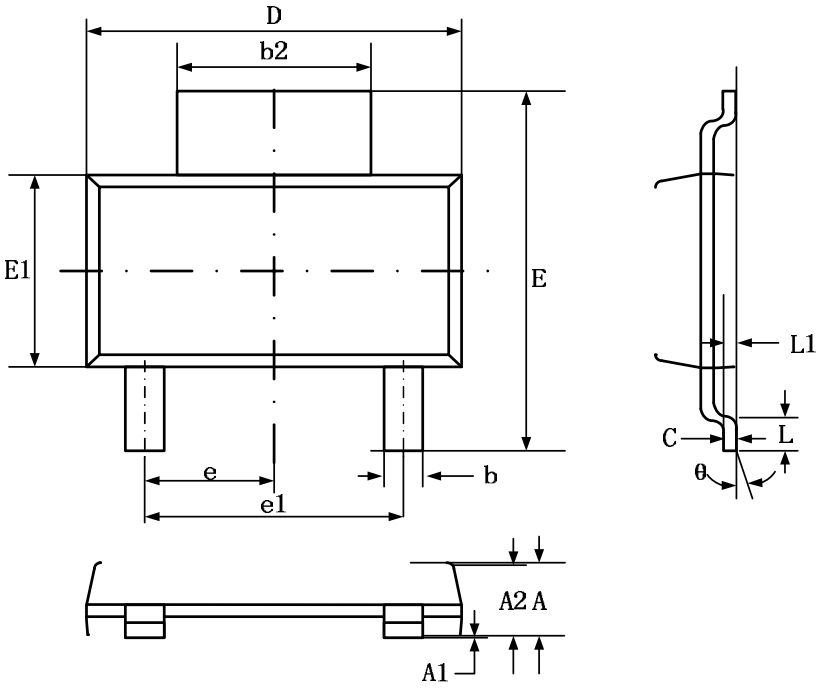


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

Package Outline Dimensions (SOT-223)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	——	1.80	——	0.071
A1	0.02	0.10	0.001	0.004
A2	1.50	1.70	0.059	0.067
b	0.66	0.84	0.026	0.033
b2	2.90	3.10	0.114	0.122
c	0.23	0.35	0.009	0.014
D	6.30	6.70	0.248	0.264
E	6.70	7.30	0.264	0.287
E1	3.30	3.70	0.130	0.146
e	2.30 BSC.		0.091 BSC.	
e1	4.60 BSC.		0.182 BSC.	
L	0.81	——	0.032	——
L1	0.25 BSC.		0.032 BSC.	
θ	0°	10°	0°	10°