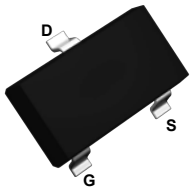
GOOD-ARK SEMICONDUCTOR

GSF0304

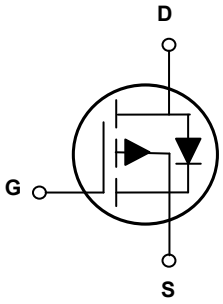
30V P-Channel MOSFET

Main Product Characteristics

V_{DS}	-30V
$R_{DS(ON)}$	65mΩ
I_D	-4.1A



SOT-23



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

RoHS Compliant

Description

The GSF0304 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°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-4.1	A
Drain Current-Pulsed[1]	I_{DM}	-20	A
Maximum Power Dissipation	P_D	1.4	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To +150	°C
Thermal Resistance, Junction-to-Ambient[2]	$R_{\theta JA}$	90	°C/W

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics[3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.1	-1.5	-2.1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.1A	-	48	65	mΩ
		V_{GS}=-4.5V, I_D=-4A	-	60	95	
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-1A	-	10	-	S
Dynamic Characteristics[4]						
Input Capacitance	C_{lss}	V_{DS}=-15V, V_{GS}=0V, F=1.0MHz	-	650	-	PF
Output Capacitance	C_{oss}		-	105	-	PF
Reverse Transfer Capacitance	C_{rss}		-	65	-	PF
Switching Characteristics[4]						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=-15V, R_L=3.6Ω, V_{GS}=-10V, R_{GEN}=3Ω	-	8.5	-	nS
Turn-On Rise Time	t_r		-	4.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	t_f		-	12.5	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V, I_D=-4A, V_{GS}=-10V	-	13	-	nC
Gate-Source Charge	Q_{gs}		-	2.8	-	nC
Gate-Drain Charge	Q_{gd}		-	2.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V, I_S=-4.1A	-	-	-1.2	V

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristic Curves

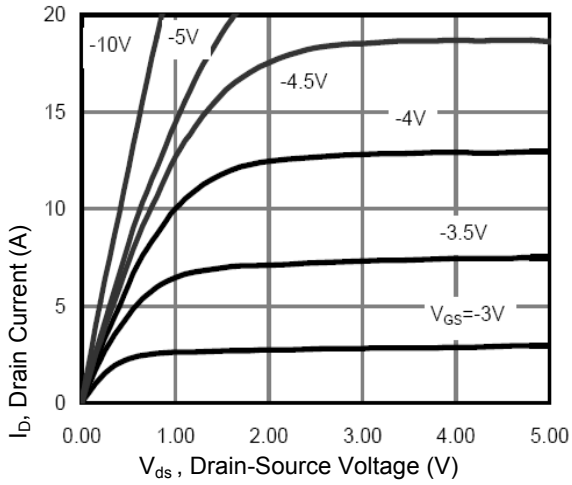


Figure 1. Output Characteristics

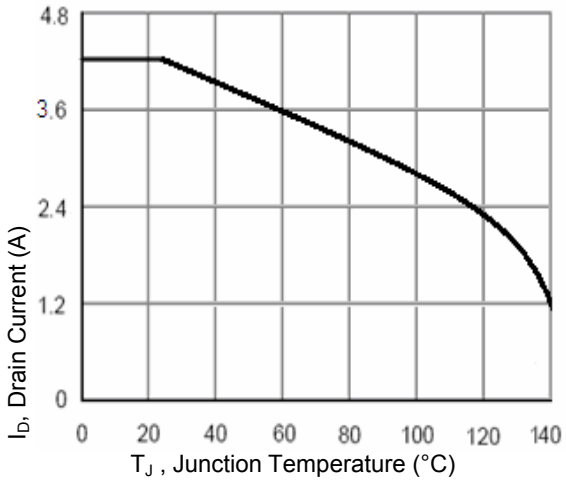


Figure 2. Drain Current

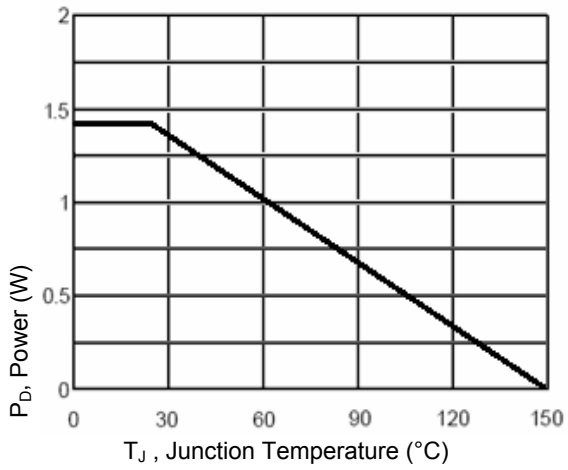


Figure 3. Power Dissipation

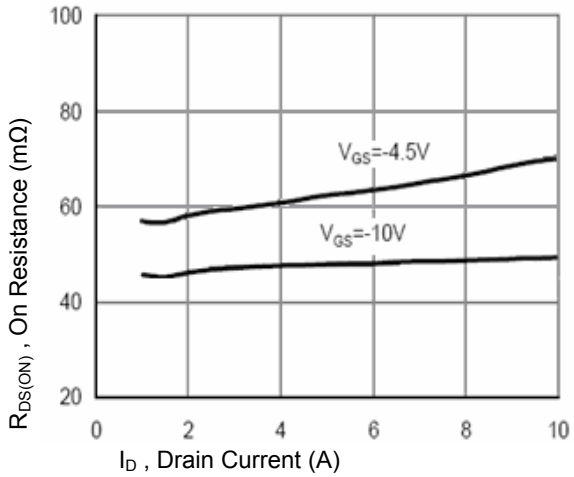


Figure 4. Drain-Source On-Resistance

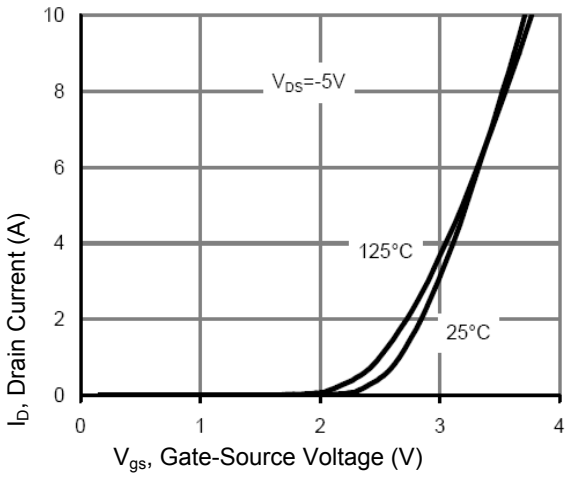


Figure 5. Transfer Characteristics

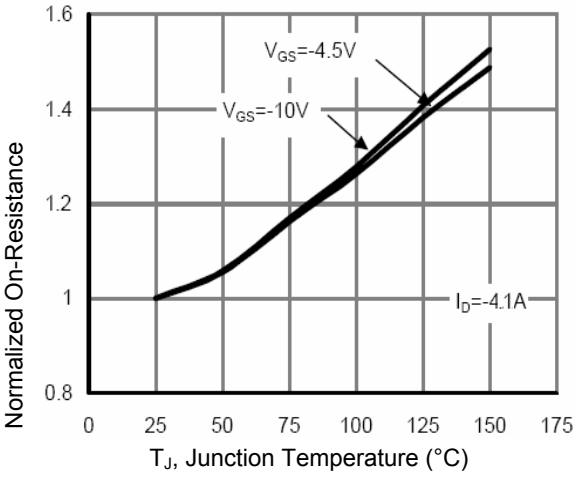


Figure 6. Drain-Source On-Resistance

Typical Electrical and Thermal Characteristic Curves

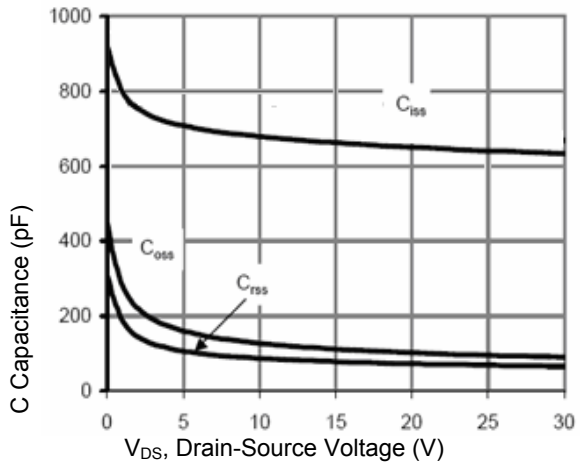


Figure 7. Capacitance vs. V_{DS}

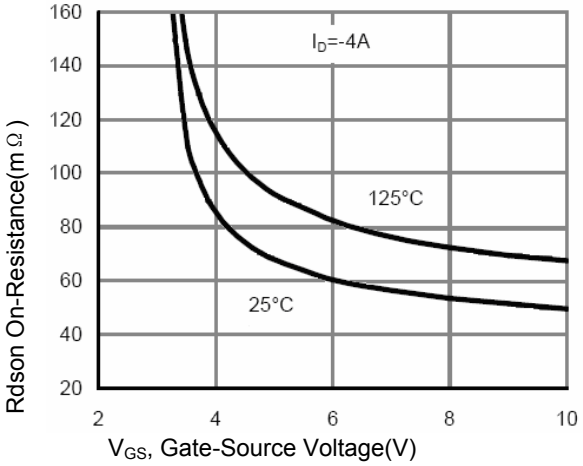


Figure 8. R_{dson} vs. V_{GS}

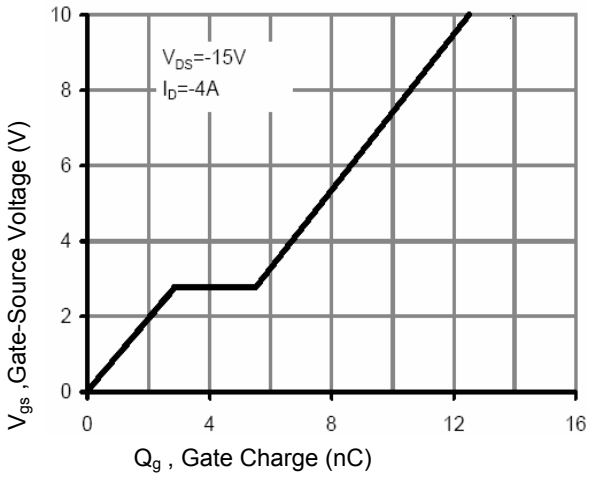


Figure 9. Gate Charge

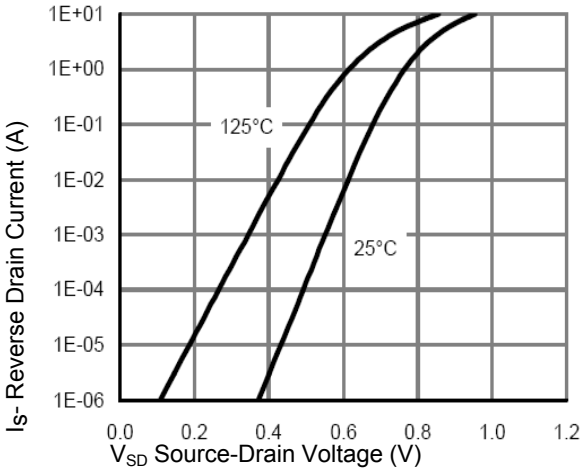


Figure 10. Source-Drain Diode Forward

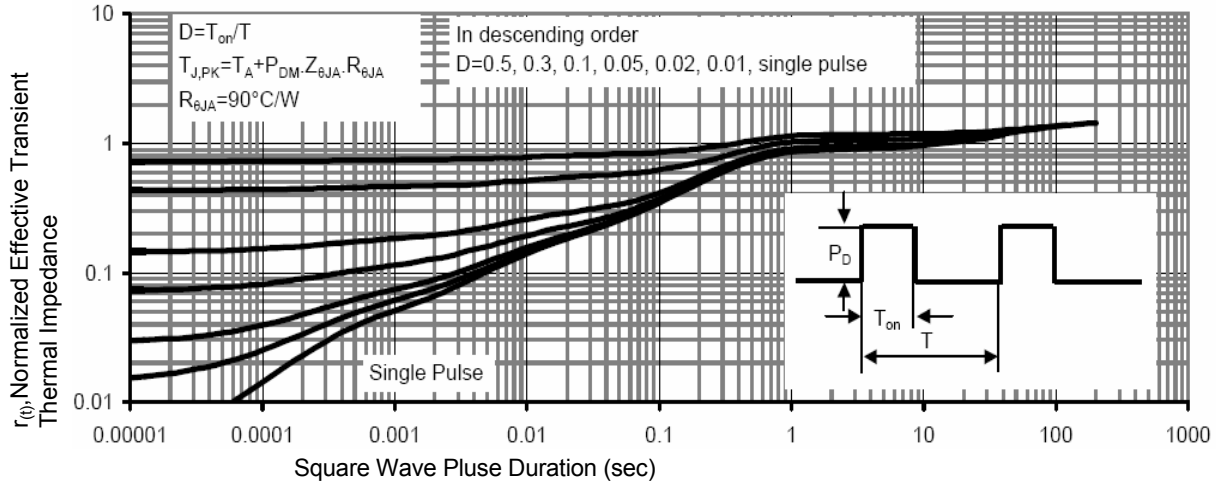


Figure 11. Normalized Maximum Transient Thermal Impedance

Typical Electrical and Thermal Characteristic Curves

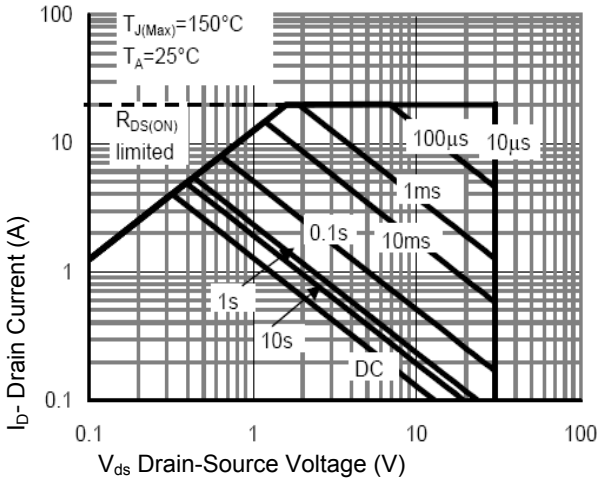
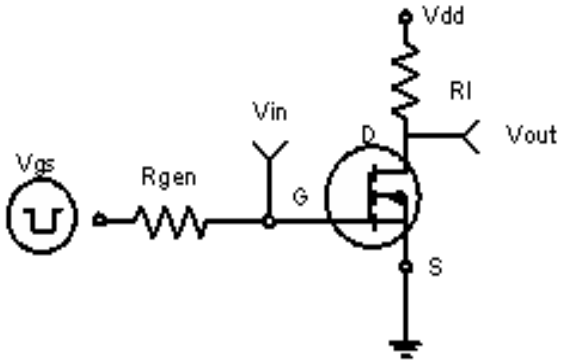
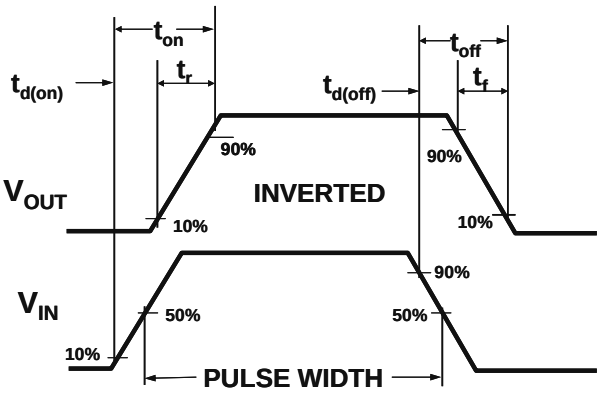


Figure 12. Safe Operation Area

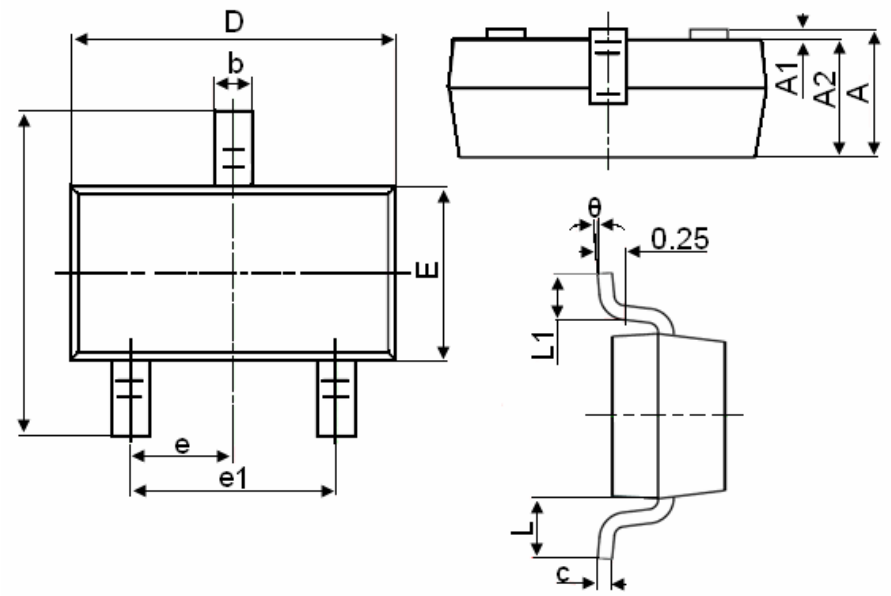


Firgure 13. Switch Time Test Circuit



Firgure 14. Switching Waveforms

Package Outline Dimensions (SOT-23)



Symbol	Dimensions in Millimeters	
	Min.	Max.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Notes:

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.