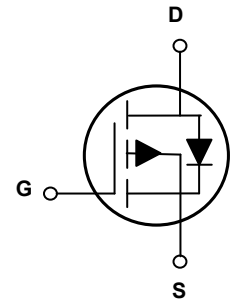


### Main Product Characteristics

$V_{DS}$	-30V
$R_{DS(ON)}$	65m $\Omega$
$I_D$	-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



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

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

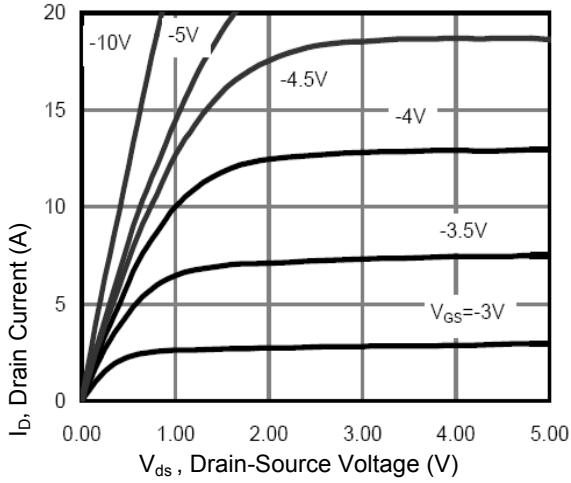
### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-33	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics<sup>3</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.1	-1.5	-2.1	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-4.1A$	-	48	65	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$	-	60	95	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-1A$	-	10	-	S
<b>Dynamic Characteristics<sup>4</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$	-	650	-	PF
Output Capacitance	$C_{oss}$		-	105	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	65	-	PF
<b>Switching Characteristics<sup>4</sup></b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=3.6\Omega, V_{GS}=-10V, R_{GEN}=3\Omega$	-	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
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-4.1A$	-	-	-1.2	V

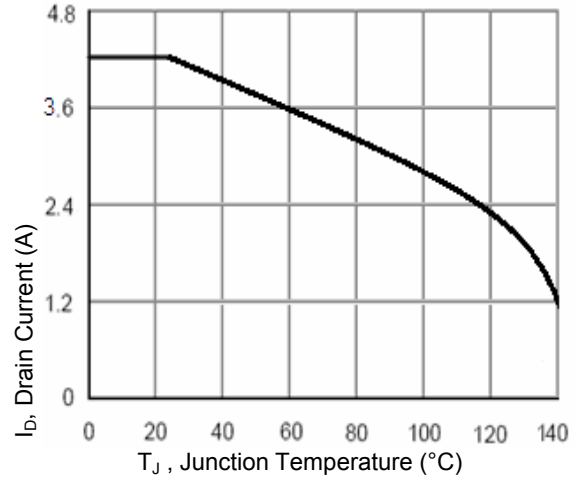
Notes:

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

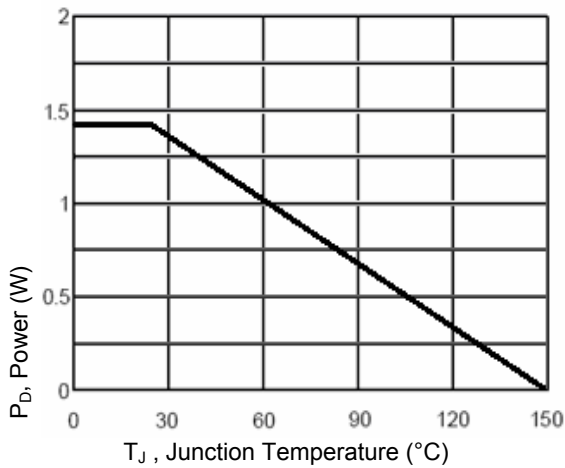
**Typical Electrical and Thermal Characteristic Curves**



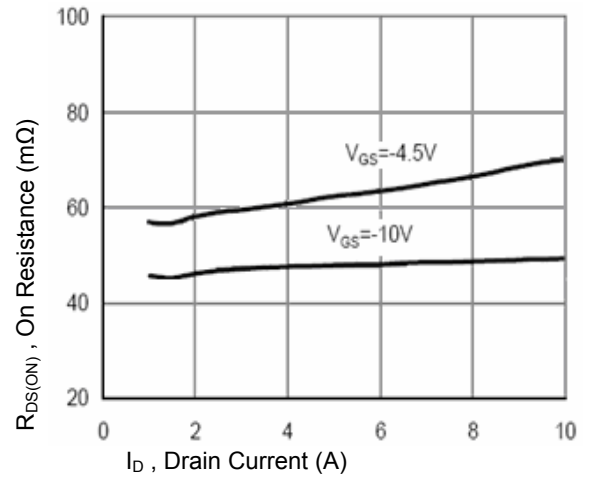
**Figure 1. Output Characteristics**



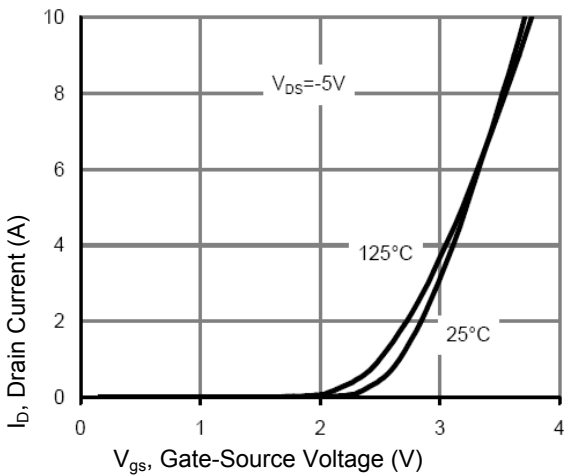
**Figure 2. Drain Current**



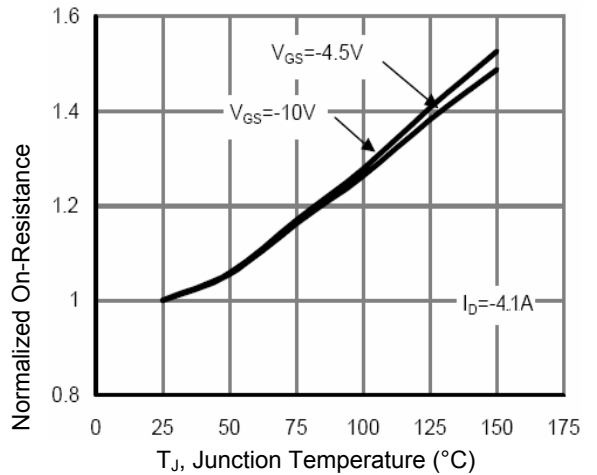
**Figure 3. Power Dissipation**



**Figure 4. Drain-Source On-Resistance**

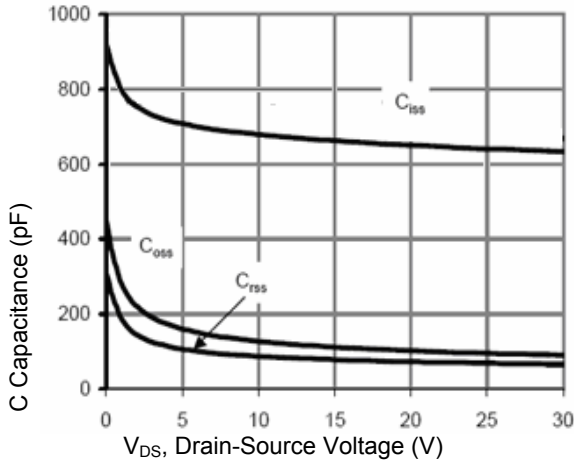


**Figure 5. Transfer Characteristics**

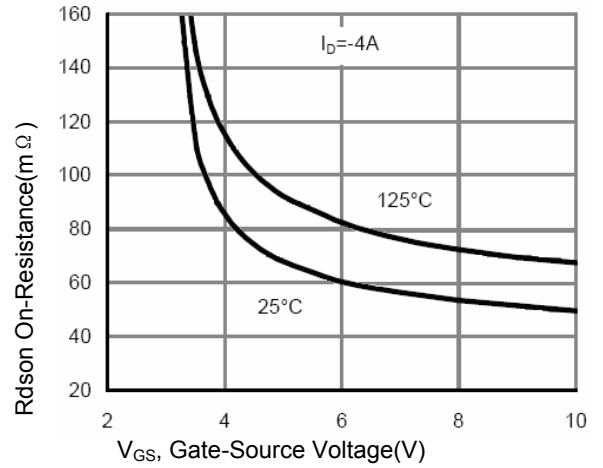


**Figure 6. Drain-Source On-Resistance**

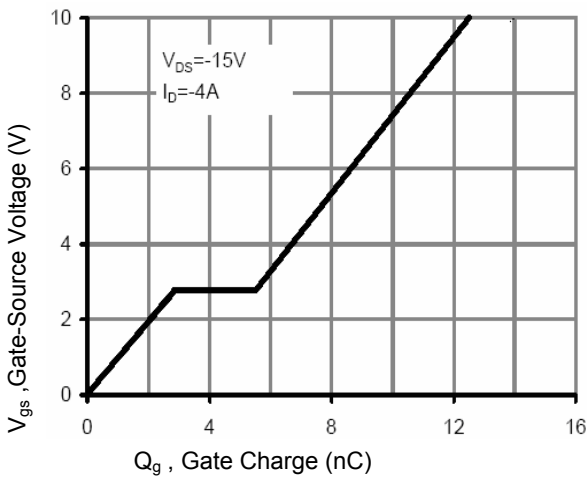
**Typical Electrical and Thermal Characteristic Curves**



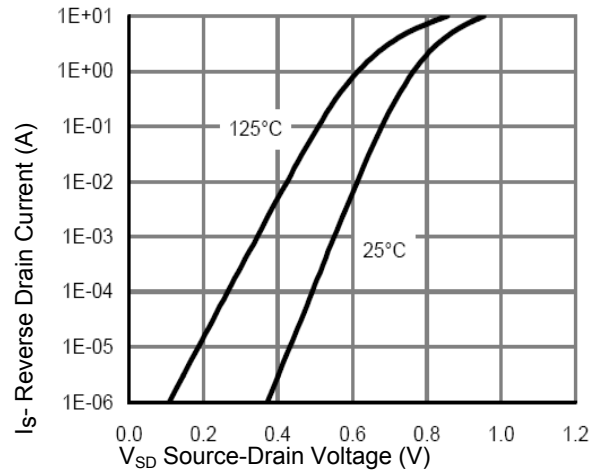
**Figure 7. Capacitance vs.  $V_{DS}$**



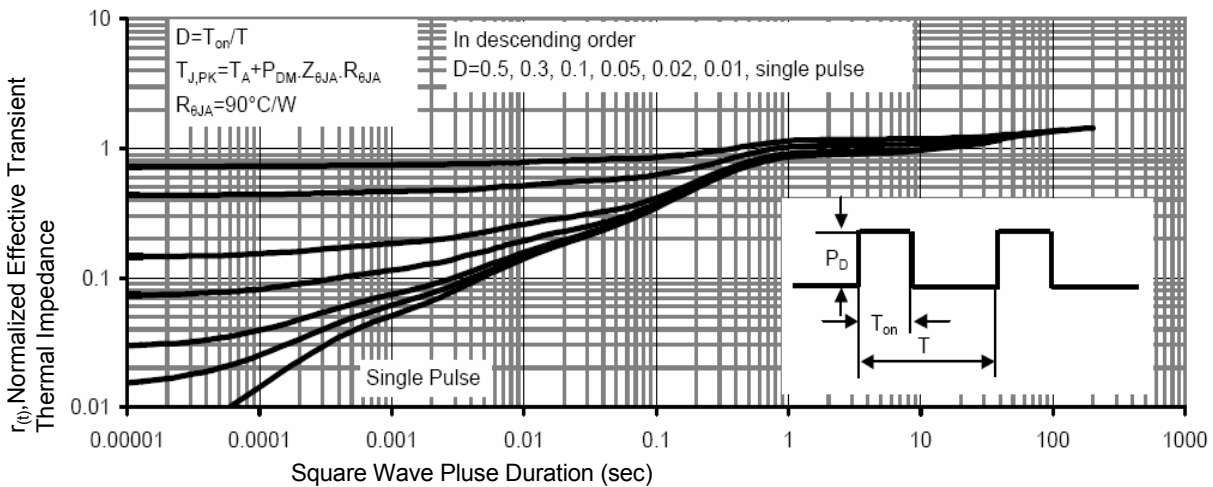
**Figure 8.  $R_{dson}$  vs.  $V_{GS}$**



**Figure 9. Gate Charge**

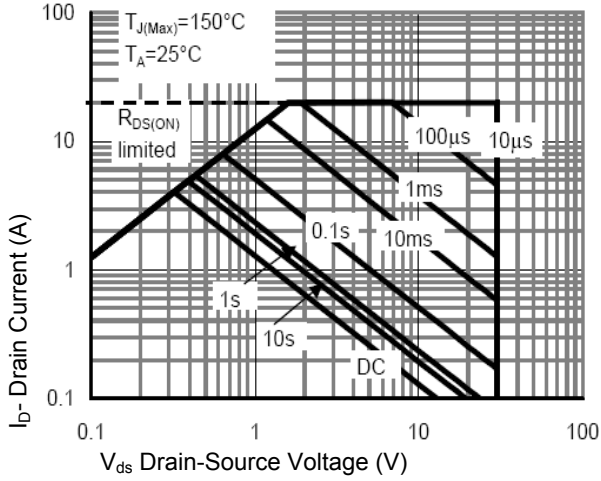


**Figure 10. Source-Drain Diode Forward**

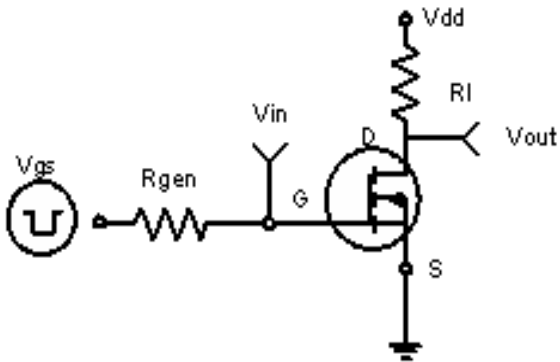


**Figure 11. Normalized Maximum Transient Thermal Impedance**

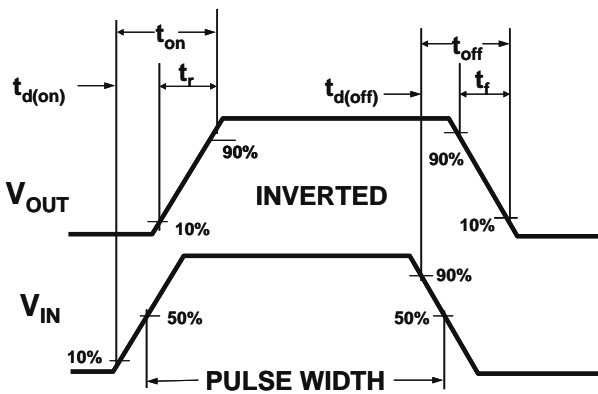
**Typical Electrical and Thermal Characteristic Curves**



**Figure 12. Safe Operation Area**

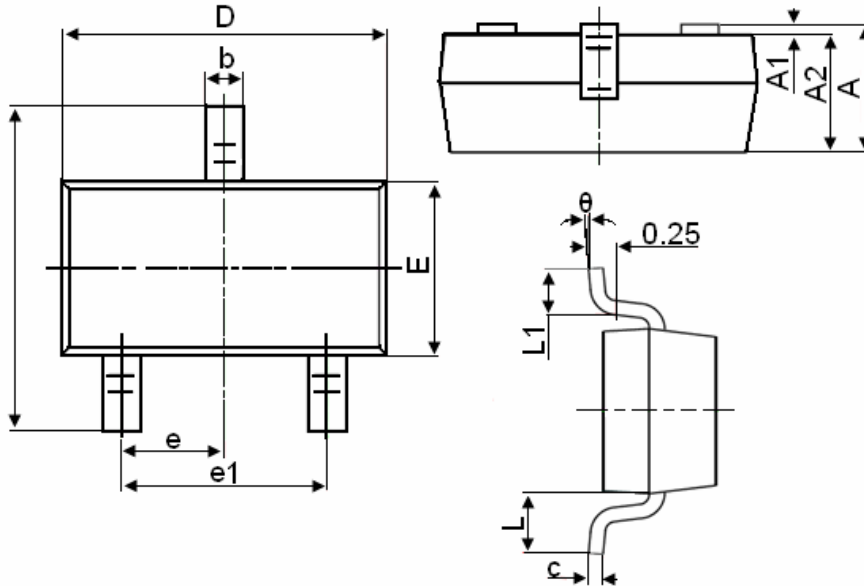


**Figure 13. Switch Time Test Circuit**



**Figure 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  $\pm 0.10\text{mm}$  (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.