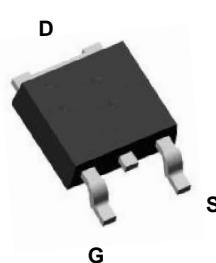
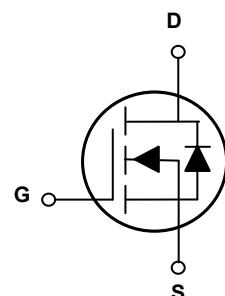


### Main Product Characteristics

BV <sub>DSS</sub>	40V
R <sub>DS(ON)</sub>	28mΩ
I <sub>D</sub>	23A



TO-252 (DPAK)



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 GSFD0424 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<sub>C</sub>=25°C unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	40	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current – Continuous (T <sub>C</sub> =25°C)	I <sub>D</sub>	23	A
Drain Current – Continuous (T <sub>C</sub> =100°C)		14.5	A
Drain Current – Pulsed <sup>1</sup>	I <sub>DM</sub>	92	A
Power Dissipation (T <sub>C</sub> =25°C)	P <sub>D</sub>	25	W
Power Dissipation – Derate above 25°C		0.2	W/°C
Thermal Resistance Junction to Ambient	R <sub>θJA</sub>	62	°C/W
Thermal Resistance Junction to Case	R <sub>θJC</sub>	5	°C/W
Storage Temperature Range	T <sub>STG</sub>	-50 to +150	°C
Operating Junction Temperature Range	T <sub>J</sub>	-50 to +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	40	-	-	V
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=40\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{\text{DS}}=32\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{\text{DS(ON)}}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=12\text{A}$	-	23	28	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=10\text{A}$	-	32	38	$\text{m}\Omega$
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	1.2	1.6	2.5	V
Forward Transconductance	$g_{\text{fs}}$	$V_{\text{DS}}=10\text{V}, I_{\text{D}}=3\text{A}$	-	9	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{\text{DS}}=20\text{V}, V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=5\text{A}$	-	4.5	10	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{\text{gs}}$		-	1.5	2.4	
Gate-Drain Charge <sup>2,3</sup>	$Q_{\text{gd}}$		-	1.9	5	
Turn-On Delay Time <sup>2,3</sup>	$T_{\text{d(on)}}$	$V_{\text{DD}}=20\text{V}, V_{\text{GS}}=4.5\text{V}, R_{\text{G}}=25\Omega, I_{\text{D}}=1\text{A}$	-	3.2	6	nS
Rise Time <sup>2,3</sup>	$T_r$		-	8.6	16	
Turn-Off Delay Time <sup>2,3</sup>	$T_{\text{d(off)}}$		-	18	36	
Fall Time <sup>2,3</sup>	$T_f$		-	6	12	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	420	800	pF
Output Capacitance	$C_{\text{oss}}$		-	65	120	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	40	80	
Gate Resistance	$R_g$	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=0\text{V}, F=1\text{MHz}$	-	1.2	2.4	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_s$	$V_G=V_D=0\text{V}, \text{Force Current}$	-	-	23	A
Pulsed Source Current	$I_{\text{SM}}$		-	-	46	A
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_s=1\text{A}, T_J=25^\circ\text{C}$	-	-	1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. Pulsed test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

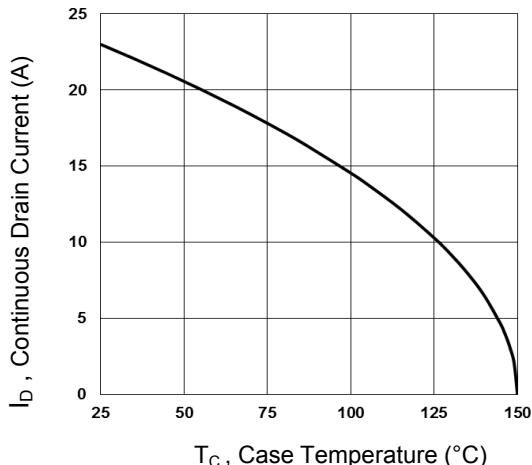


Figure 1. Continuous Drain Current vs. T<sub>c</sub>

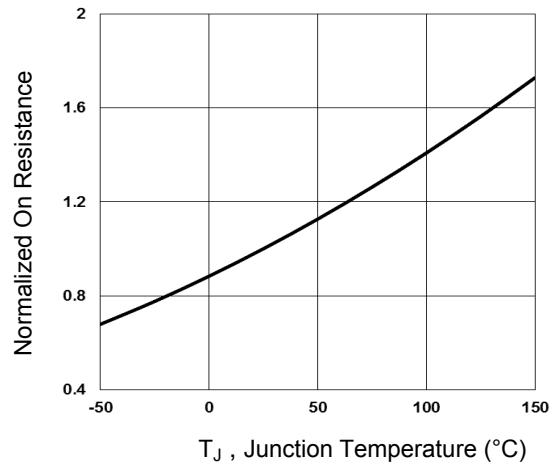


Figure 2. Normalized R<sub>DS(ON)</sub> vs. T<sub>j</sub>

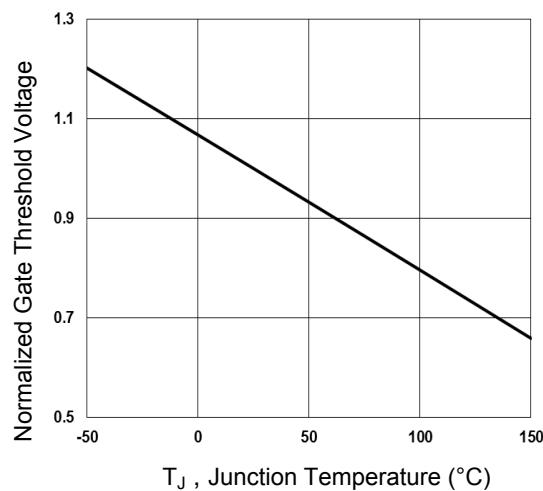


Figure 3. Normalized V<sub>th</sub> vs. T<sub>j</sub>

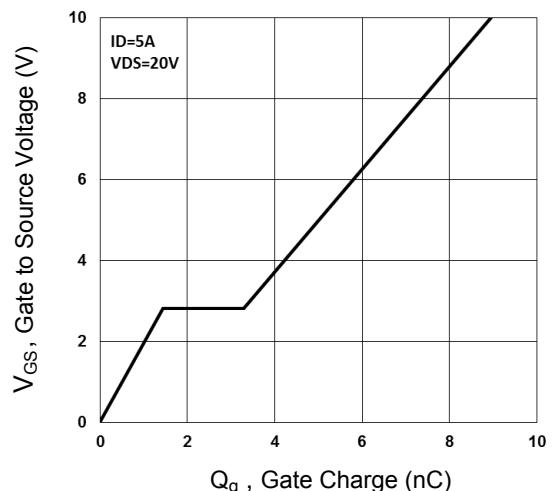


Figure 4. Gate Charge Characteristics

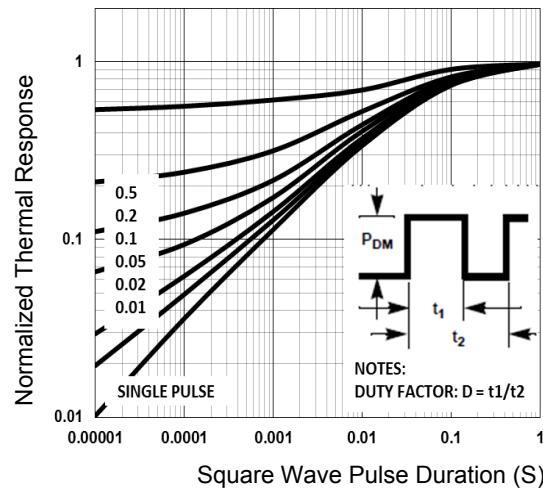


Figure 5. Normalized Transient Impedance

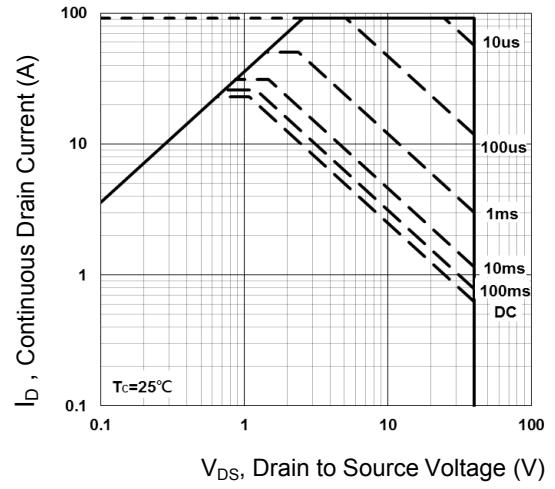


Figure 6. Maximum Safe Operation Area

### Typical Electrical and Thermal Characteristic Curves

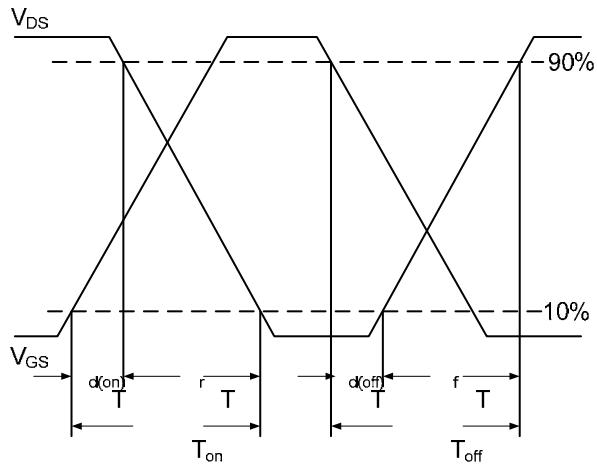


Figure 7. Switching Time Waveform

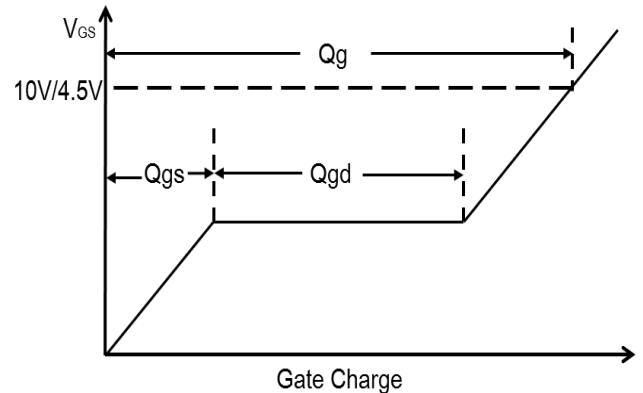
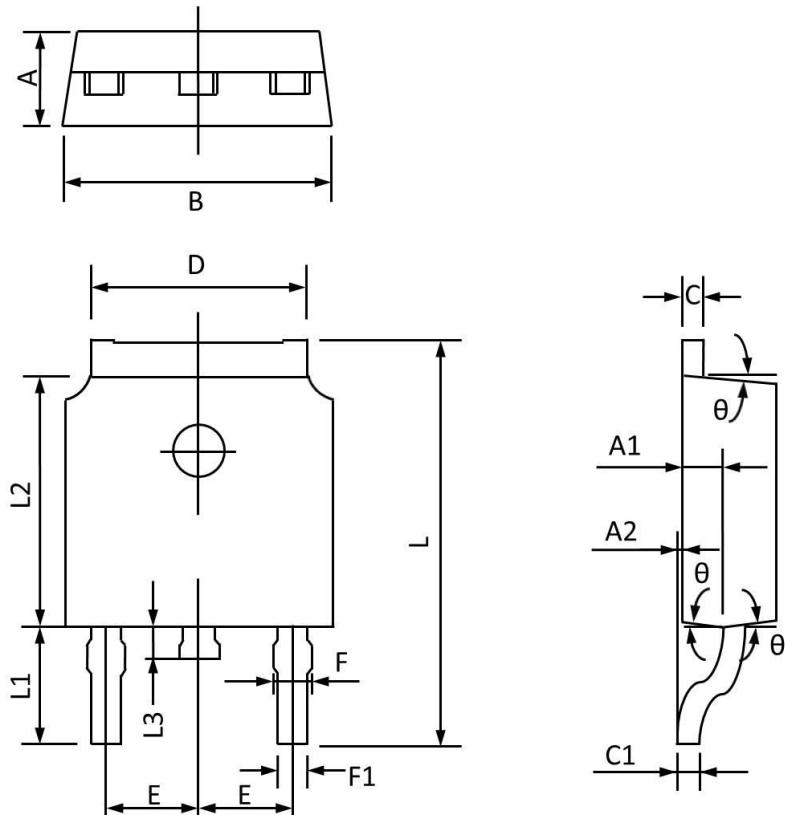


Figure 8. Gate Charge Waveform

**Package Outline Dimensions**

**TO-252 (DPAK)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°