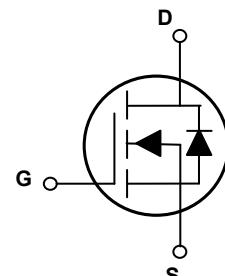


## Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	4mΩ(max.)
$I_D$	100A



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 GSFD3004 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 ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous, at Steady-State ( $T_A=25^\circ\text{C}$ ) <sup>1</sup>	$I_D$	100	A
Drain Current-Continuous, at Steady-State ( $T_A=100^\circ\text{C}$ )		70	
Drain Current-Pulsed <sup>2</sup>	$I_{DM}$	400	A
Power Dissipation ( $T_A=25^\circ\text{C}$ )	$P_D$	93	W
Power Dissipation ( $T_A=100^\circ\text{C}$ )		42	
Linear Derating Factor ( $T_A=25^\circ\text{C}$ )		0.74	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	225	mJ
Junction-to-Ambient (PCB Mounted, Steady-State) <sup>4</sup>	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction-to-Case	$R_{\theta JC}$	1.37	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	$T_J/T_{STG}$	-55 To +175	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_D=250\mu\text{A}$	30	-	-	V
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	$\mu\text{A}$
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-Source Forward Leakage	$I_{\text{GSS}}$	$V_{\text{GS}}=20\text{V}$	-	-	100	$\text{nA}$
		$V_{\text{GS}}=-20\text{V}$	-	-	-100	
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_D=15\text{A}$	-	3.3	4	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_D=15\text{A}$	-	4.2	5.2	
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_D=250\mu\text{A}$	1	1.5	2.4	V
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{\text{DS}}=15\text{V}, I_D=12\text{A}, V_{\text{GS}}=10\text{V}$	-	55.2	-	$\text{nC}$
Gate-Source Charge	$Q_{\text{gs}}$		-	12.8	-	
Gate-Drain ("Miller") Charge	$Q_{\text{gd}}$		-	11.2	-	
Turn-On Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DS}}=20\text{V}, R_{\text{GEN}}=3\Omega, V_{\text{GS}}=10\text{V}, I_D=4\text{A}, R_L=5\Omega$	-	10.3	-	$\text{nS}$
Rise Time	$t_r$		-	15.9	-	
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	28.7	-	
Fall Time	$t_f$		-	9.8	-	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=15\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	2140	-	$\text{pF}$
Output Capacitance	$C_{\text{oss}}$		-	430	-	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	249	-	
Gate Resistance	$R_g$	$F=1\text{MHz}$	-	1.9	3	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current (Body Diode)	$I_s$	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	90	A
Pulsed Source Current (Body Diode)	$I_{\text{SM}}$		-	-	340	A
Diode Forward Voltage	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_s=20\text{A}$	-	0.86	1.2	V
Reverse Recovery Time	$T_{\text{rr}}$	$T_J=25^\circ\text{C}, I_F=20\text{A}, \text{di}/\text{dt}=100\text{A}/\mu\text{s}$	-	10.5	-	ns
Reverse Recovery Charge	$Q_{\text{rr}}$		-	3.5	-	$\text{nC}$

Note:

1. Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
2. Repetitive rating: Pulsed width limited by maximum junction temperature.
3.  $L=0.5\text{mH}, V_{\text{DD}}=20\text{V}, R_g=25\Omega, T_J=25^\circ\text{C}$ .
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

## Typical Electrical and Thermal Characteristic Curves

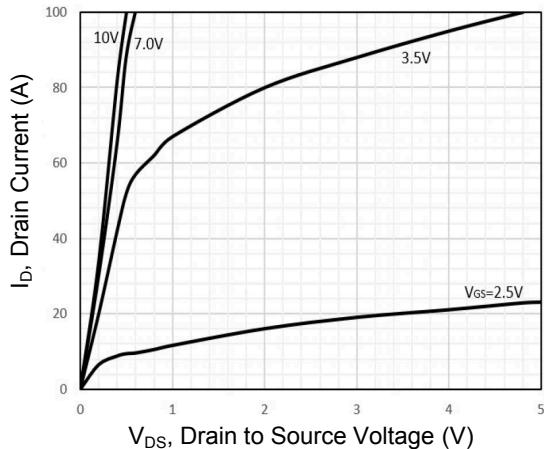


Figure 1. Output Characteristics

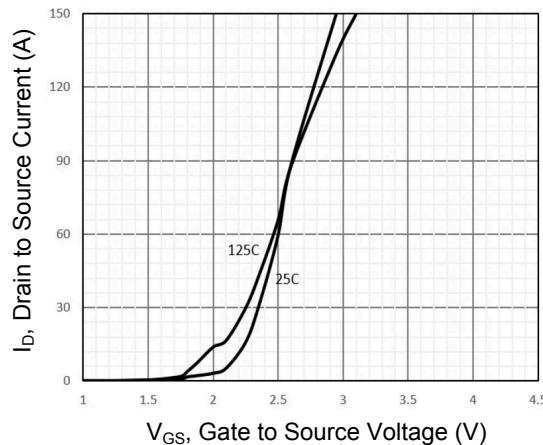


Figure 2. Transfer Characteristics

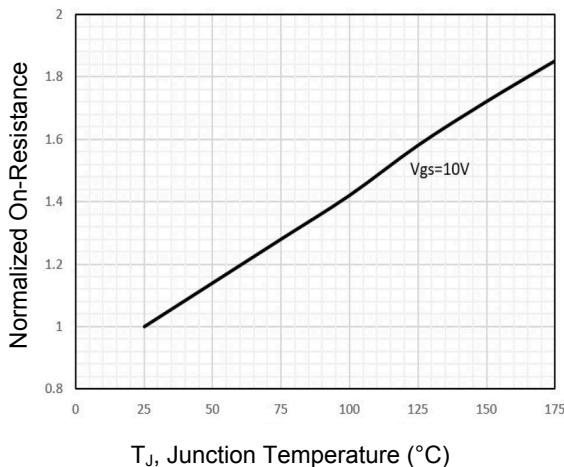


Figure 3. Normalized  $R_{DS(ON)}$  vs. Junction Temperature

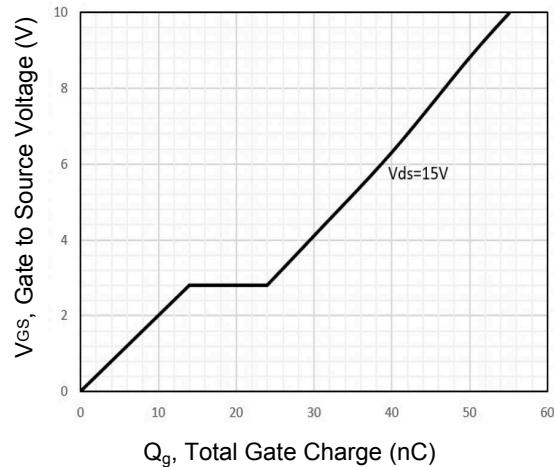


Figure 4. Gate Charge Characteristics

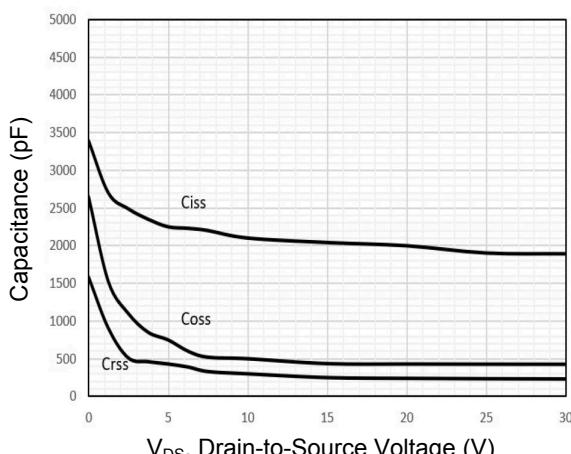


Figure 5. Capacitance Characteristics

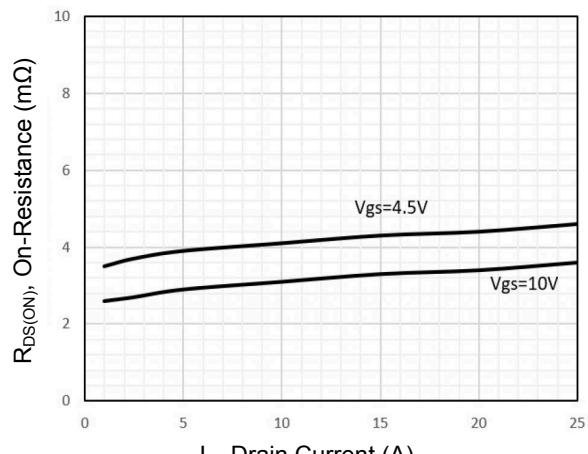
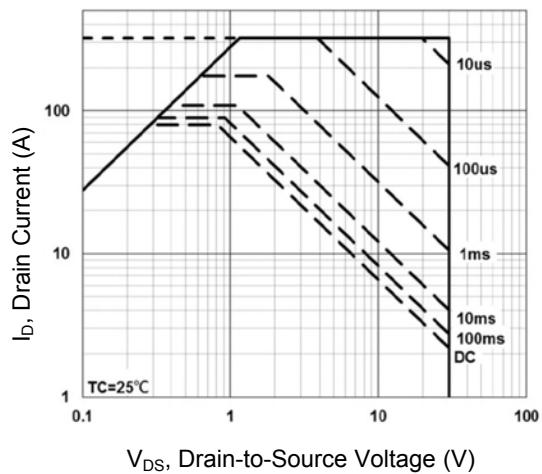


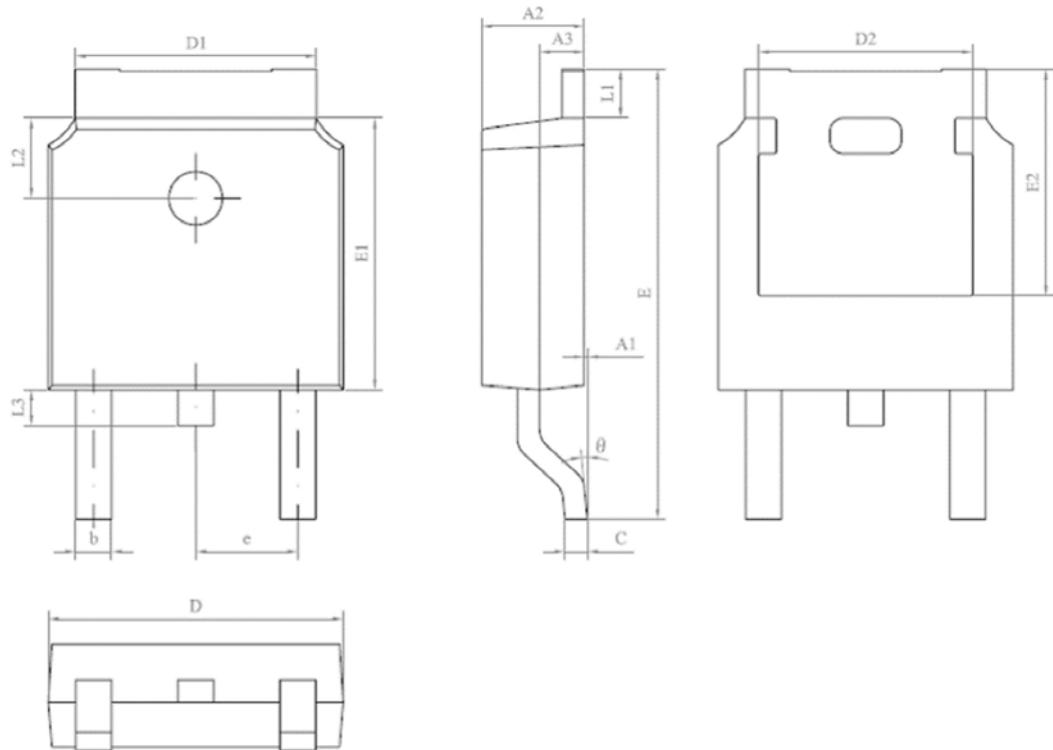
Figure 6. Drain to Source On-Resistance

## Typical Electrical and Thermal Characteristic Curves



**Figure 7. Safe Operation Area**

### Package Outline Dimensions (TO-252 (DPAK))



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A1	0.00	0.10	E	9.90	10.30
A2	2.20	2.40	E1	6.00	6.20
A3	0.09	1.10	E2	5.00	5.20
b	0.75	0.85	e	2.40	2.20
C	0.50	0.60	L1	0.90	1.25
D	6.50	6.70	L2	1.70	1.90
D1	5.30	5.50	L3	0.60	1.00
D2	4.70	4.90	θ	0°	8°