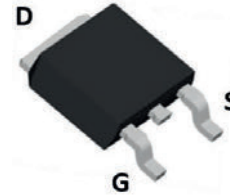
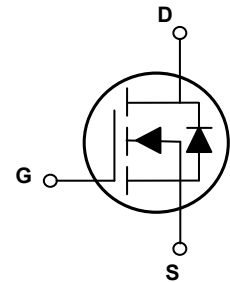


## Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	3.0m $\Omega$ (Max.)
$I_D$	240A



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 GSFD4003 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 ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-to-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current, @ Steady-State ( $T_C=25^\circ\text{C}$ ) <sup>1</sup>	$I_D$	240	A
Continuous Drain Current, @ Steady-State ( $T_C=100^\circ\text{C}$ )		150	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	960	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	190	W
Linear Derating Factor ( $T_C=25^\circ\text{C}$ )		2.1	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	610	mJ
Junction-to-Case	$R_{\theta JC}$	0.66	$^\circ\text{C}/\text{W}$
Junction-to-Ambient (PCB Mounted, Steady-State) <sup>4</sup>	$R_{\theta JA}$	62.0	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	$T_J/T_{STG}$	-55 to +150	$^\circ\text{C}$

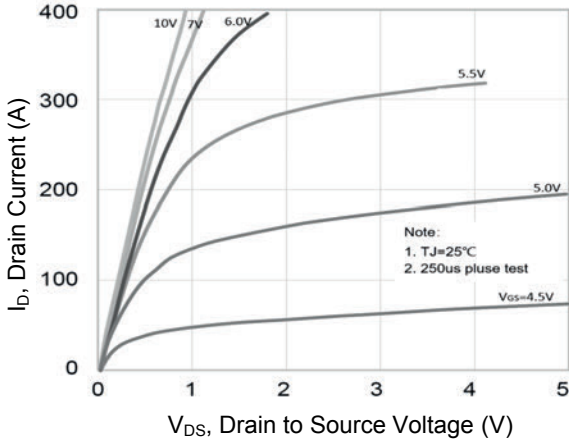
**Electrical Characteristics** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Drain-to-Source Leakage Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$	-	-	1	$\mu A$
		$T_J=125^\circ\text{C}$	-	-	50	
Gate-to-Source Forward Leakage	$I_{GSS}$	$V_{GS}=20V$	-	-	100	nA
		$V_{GS}=-20V$	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=80A$	-	2.3	3.0	m $\Omega$
		$V_{GS}=6.0V, I_D=40A$	-	2.6	3.8	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.1	3.0	3.9	V
Gate Resistance	$R_g$	$F=1\text{MHz}$	-	4.0	-	$\Omega$
<b>Dynamic and Switching Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=25V$ $F=1\text{MHz}$	-	5700	-	pF
Output Capacitance	$C_{oss}$		-	770	-	
Reverse Transfer Capacitance	$C_{rss}$		-	530	-	
Total Gate Charge	$Q_g$	$I_D=50A, V_{DD}=32V,$ $V_{GS}=10V$	-	108	-	nC
Gate-to-Source Charge	$Q_{gs}$		-	34	-	
Gate-to-Drain ("Miller") Charge	$Q_{gd}$		-	30	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=20V,$ $I_D=30A, R_{GEN}=2.7\Omega$	-	28	-	nS
Rise Time	$t_r$		-	89	-	
Turn-Off Delay Time	$t_{d(off)}$		-	134	-	
Fall Time	$t_f$		-	116	-	
<b>Source-Drain Ratings and Characteristics</b>						
Continuous Source Current (Body Diode)	$I_S$	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	240	A
Pulsed Source Current (Body Diode)	$I_{SM}$		-	-	960	A
Diode Forward Voltage	$V_{SD}$	$I_S=50A, V_{GS}=0V$	-	0.95	1.2	V
Reverse Recovery Time	$t_{rr}$	$T_J=25^\circ\text{C}, I_F=50A,$ $di/dt=100A/\mu s$	-	29	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	0.03	-	$\mu C$

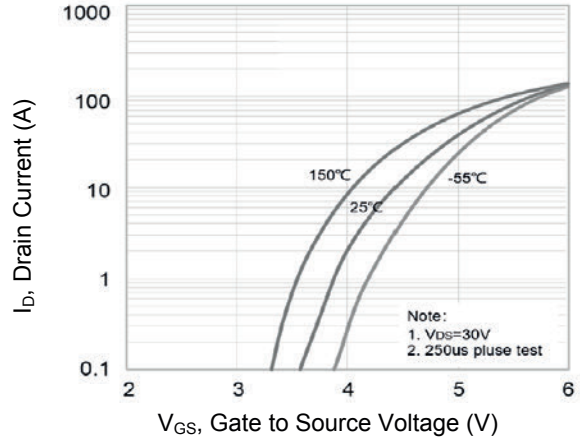
Note:

1. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
2. Repetitive rating; pulse width limited by max. junction temperature.
3.  $L=1\text{mH}, V_{DD}=38V, R_g=25\Omega, T_J=25^\circ\text{C}$ .
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

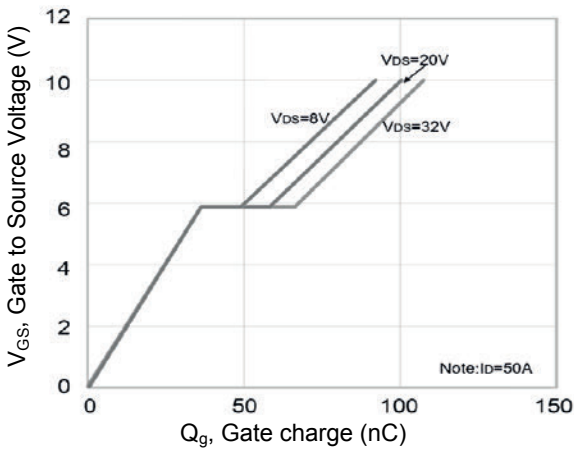
**Typical Electrical and Thermal Characteristic Curves**



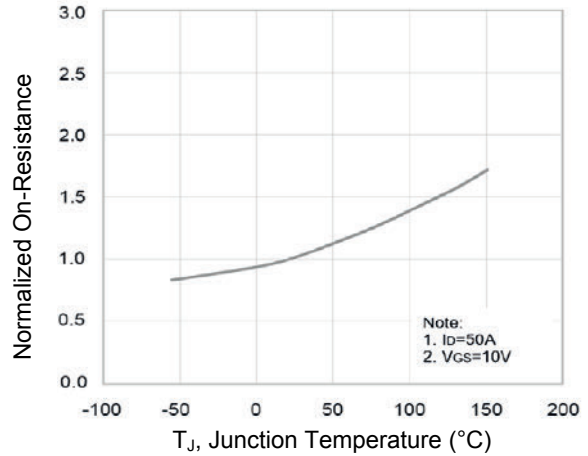
**Figure 1. Output Characteristics**



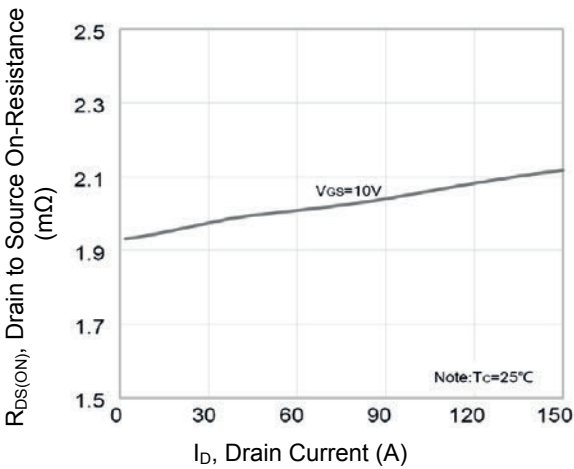
**Figure 2. Transfer Characteristics**



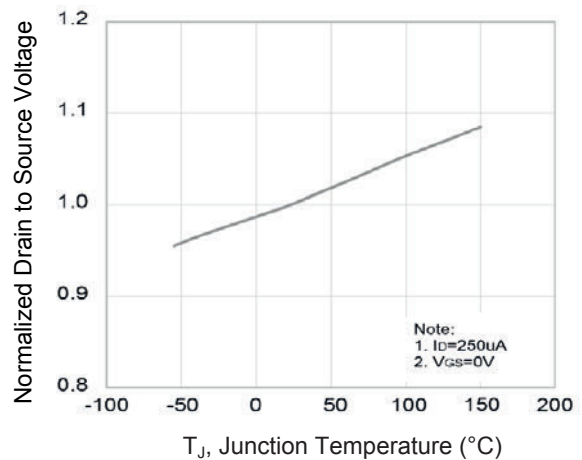
**Figure 3. Gate Charge**



**Figure 4. Normalized  $R_{DS(on)}$  vs.  $T_J$**

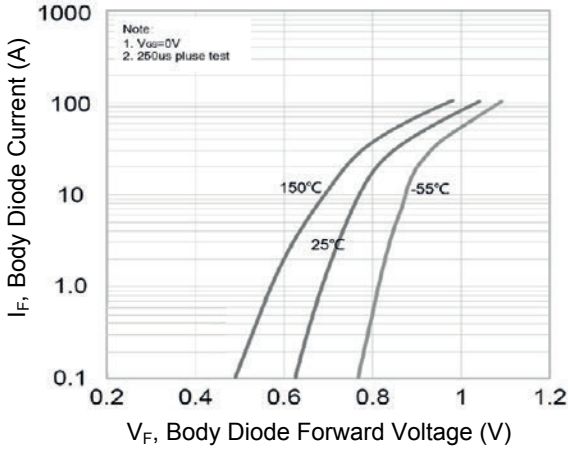


**Figure 5. On-Resistance vs. Drain Current**

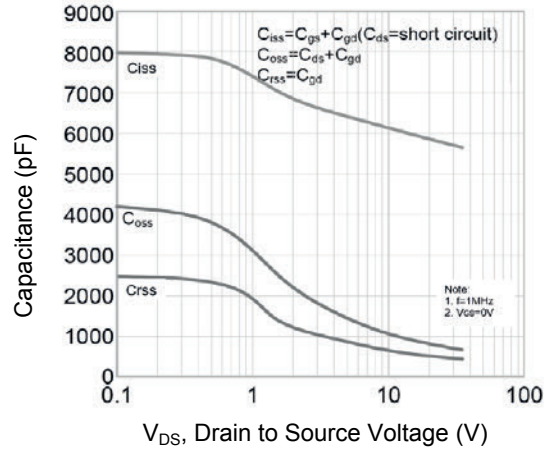


**Figure 6. Normalized  $B_{V_{DS}}$  vs.  $T_J$**

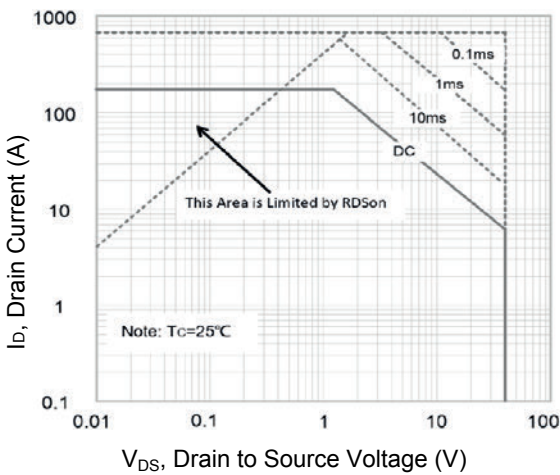
**Typical Electrical and Thermal Characteristic Curves**



**Figure 7. Body Diode Characteristics**

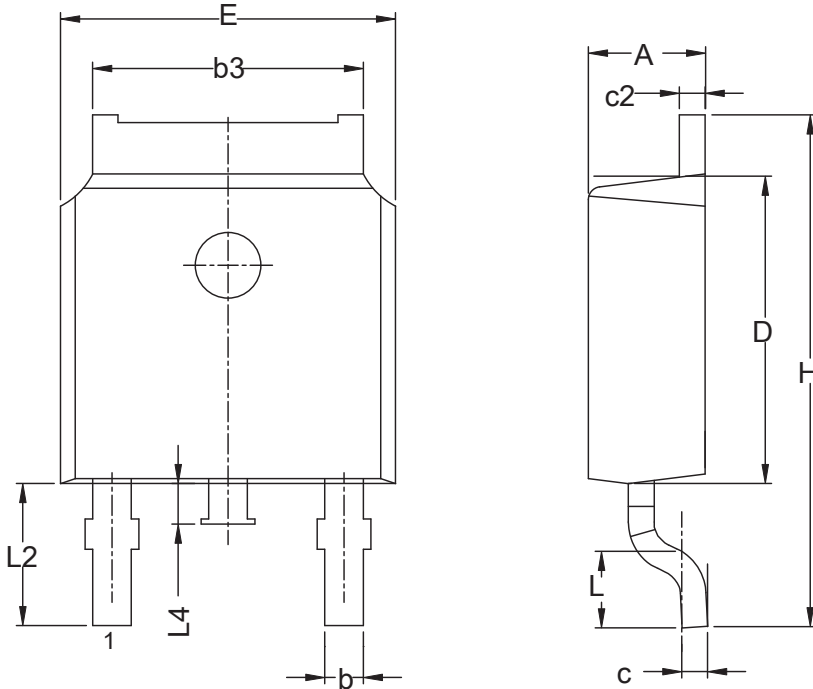


**Figure 8. Capacitance Characteristics**



**Figure 9. Safe Operation Area**

**Package Outline Dimensions (TO-252)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	2.500	0.055	0.098
b	0.500	0.900	0.020	0.035
b3	5.100	5.500	0.201	0.217
c	0.400	0.650	0.016	0.026
c2	0.460	0.580	0.018	0.023
D	5.400	6.400	0.213	0.252
E	6.300	6.900	0.248	0.272
e	2.186	2.386	0.086	0.094
H	9.400	10.300	0.370	0.406
L	1.390	1.770	0.055	0.070
L4	0.600	1.100	0.024	0.043
L2	2.850 REF		0.112 REF	

**Order Information**

Device	Package	Marking	Carrier	Quantity
GSFD4003	TO-252 (DPAK)	D4003	Tape & Reel	2,500pcs / Reel

For more information, please contact us at: [inquiry@goodarksemi.com](mailto:inquiry@goodarksemi.com)