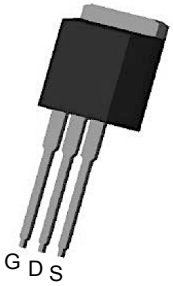
GOOD-ARK SEMICONDUCTOR

GSFDT4022

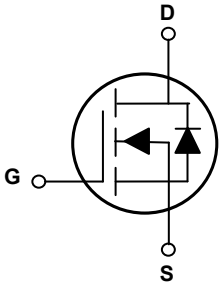
40V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	22mΩ (Max.)
I_D	30A



TO-262-3L



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 GSFDT4022 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°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)[1]	I_D	30	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		21	A
Pulsed Drain Current[2]	I_{DM}	120	A
Power Dissipation (T_C=25°C)	P_D	50	W
Linear Derating Factor (T_C=25°C)		0.40	W/°C
Single Pulse Avalanche Energy[3]	E_{AS}	49	mJ
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.5	°C/W
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)[4]	$R_{\theta JA}$	62.0	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	40	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V	-	-	1	μA
		T_J=125°C	-	-	20	
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=20A	-	16	22	mΩ
		V_{GS}=4.5V, I_D=15A	-	20	28	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.1	1.6	2.9	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=30V, f=1MHz	-	2200	-	pF
Output Capacitance	C_{oss}		-	140	-	
Reverse Transfer Capacitance	C_{rss}		-	70	-	
Total Gate Charge	Q_g	I_D=20A, V_{DS}=30V, V_{GS}=10V	-	48	-	nC
Gate-to-Source Charge	Q_{gs}		-	9.2	-	
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	10	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DS}=30V, I_D=20A, R_{GEN}=3Ω	-	11	-	nS
Rise Time	t_r		-	26	-	
Turn-Off Delay Time	$t_{d(off)}$		-	87	-	
Fall Time	t_f		-	75	-	
Gate Resistance	R_g	f=1MHz	-	2.2	-	Ω
Drain-Source Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	30	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	120	A
Diode Forward Voltage	V_{SD}	I_S=20A, V_{GS}=0V	-	1.0	1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=20A, di/dt=100A/μs	-	14	-	nS
Reverse Recovery Charge	Q_{rr}		-	16.5	-	nC

Notes:

1. Pulse test: Pulse width ≤300us, duty cycle ≤2%.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. L=0.5mH, V_{DD}=30V, R_G=25Ω, T_J=25°C.
4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

Typical Electrical and Thermal Characteristic Curves

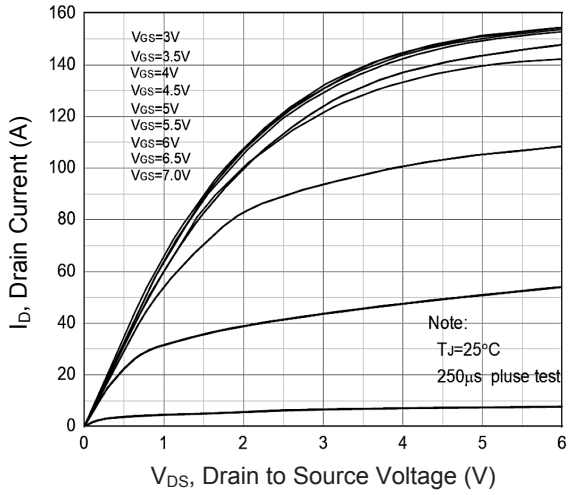


Figure 1. Output Characteristics

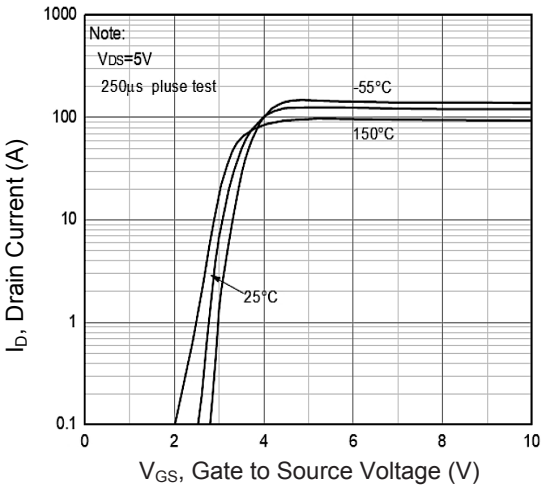


Figure 2. Transfer Characteristics

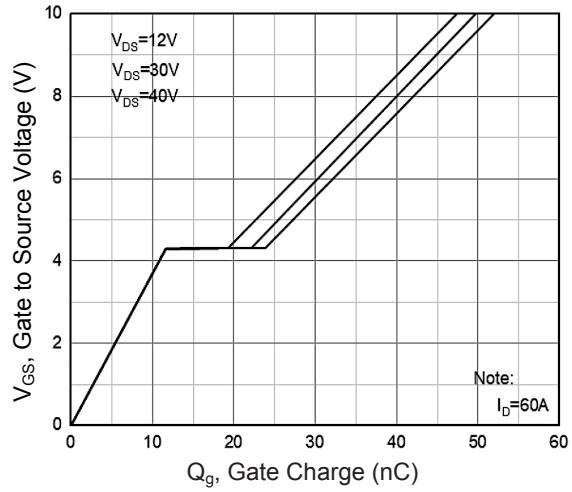


Figure 3. Gate Charge Characteristics

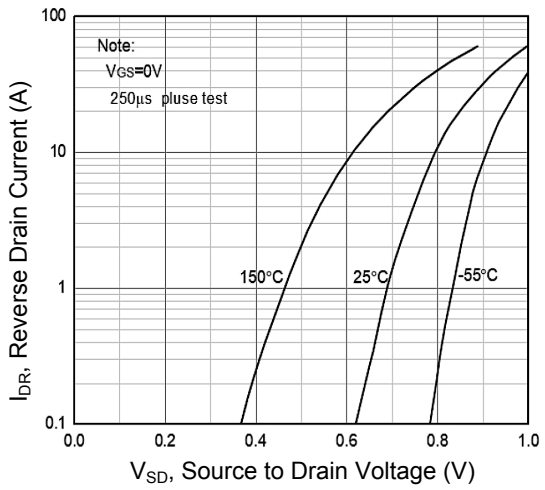


Figure 4. Body Diode Characteristics

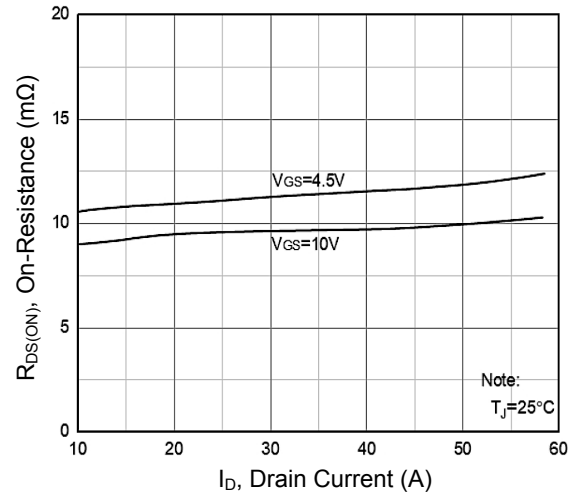


Figure 5. On-Resistance vs. Drain Current

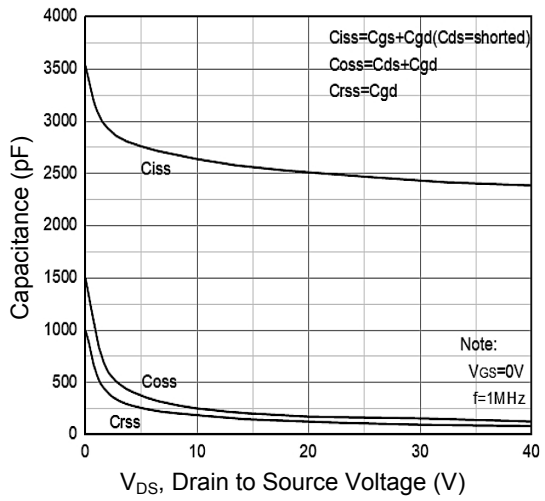


Figure 6. Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

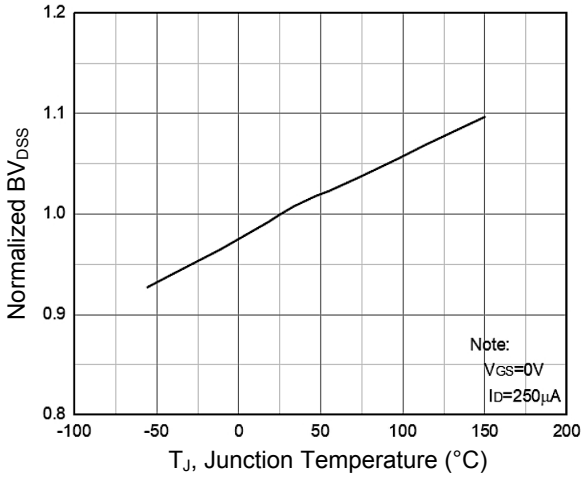


Figure 7. Normalized BV_{DSS} vs. T_J

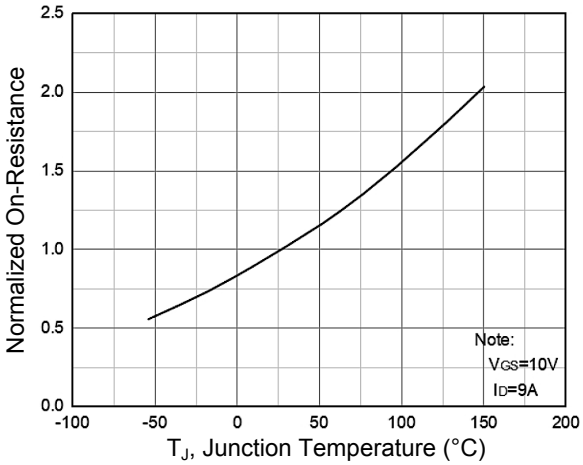


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

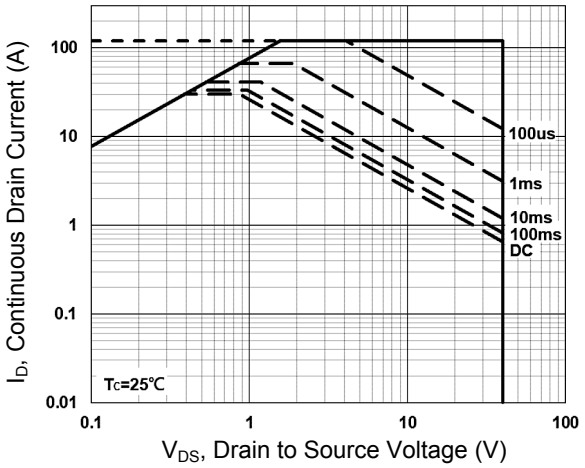
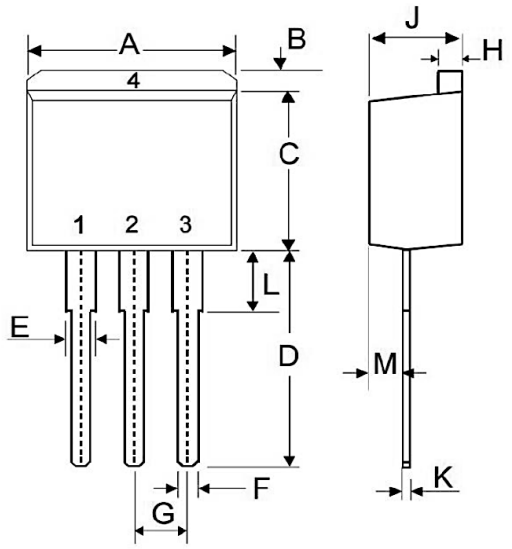


Figure 9. Maximum Safe Operation Area

Package Outline Dimensions (TO-262-3L)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	9.900	10.400	0.390	0.409
B	1.270 TYP		0.050 TYP	
C	8.500	8.900	0.335	0.350
D	13.300	13.800	0.524	0.543
E	1.120	1.420	0.044	0.056
F	0.660	0.960	0.026	0.038
G	2.540 TYP		0.100 TYP	
H	1.120	1.420	0.044	0.056
J	4.320	4.820	0.170	0.190
K	0.280	0.520	0.011	0.200
L	4.460	4.860	0.176	0.191
M	1.430	1.630	0.056	0.064

Order Information

Device	Package	Marking	Packaging	SPQ
GSFDT4022	TO-262-3L	DT4022	Tube	50 Pcs / Tube