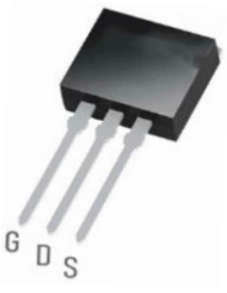
GOOD-ARK SEMICONDUCTOR

GSFDT90R120

900V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	900V
$R_{DS(ON)}$	1.2Ω (Max.)
I_D	5A



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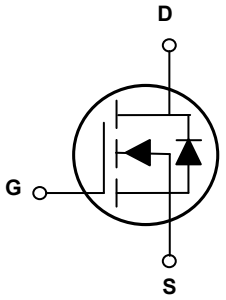


Schematic Diagram

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

RoHS Compliant

Description

The GSFDT90R120 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_J=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	900	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous[1] (T_C=25°C)	I_D	5	A
Drain Current-Continuous[1] (T_C=100°C)		3.2	
Drain Current-Pulsed[2] (T_C=25°C)	$I_{D.pulse}$	15	A
Continuous Diode Forward Current[1] (T_C=25°C)	I_S	5	A
Diode Pulsed Current[2] (T_C=25°C)	$I_{S.pulse}$	15	A
Power Dissipation[3] (T_C=25°C)	P_D	83	W
Single Pulsed Avalanche Energy[5]	E_{AS}	193	mJ
MOSFET dv/dt Ruggedness, V_{DS}=0-480V	dv/dt	50	V/ns
Reverse Diode dv/dt, V_{DS}=0-480V, I_{SD}≤I_D	dv/dt	15	V/ns
Thermal Resistance, Junction-to-Ambient[4]	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	°C/W
Junction Temperature Range	T_J	-55 To +150	°C
Storage Temperature Range	T_{STG}	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	900	-	-	V
		V_{GS}=0V, I_D=250uA T_J=150°C	960	1070	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=900V, V_{GS}=0V	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V	-	-	±100	nA
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	1.0	1.2	Ω
		V_{GS}=10V, I_D=2A, T_J=150°C	-	2.88	-	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	2.0	-	4.0	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=400V, I_D=5A, V_{GS}=10V	-	12.5	-	nC
Gate-Source Charge	Q_{gs}		-	3.8	-	
Gate-to-Drain Charge	Q_{gd}		-	4.3	-	
Gate Plateau Voltage	$V_{plateau}$		-	5.8	-	V
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V, R_G=33Ω, V_{GS}=10V, I_D=5A	-	33.2	-	nS
Rise Time	t_r		-	26.5	-	
Turn-Off Delay Time	$t_{d(off)}$		-	44	-	
Fall Time	t_f		-	17.6	-	
Input Capacitance	C_{lss}	V_{DS}=50V, V_{GS}=0V, F=100kHz	-	874	-	pF
Output Capacitance	C_{oss}		-	37.5	-	
Reverse Transfer Capacitance	C_{rss}		-	1.7	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Peak Reverse Recovery Current	I_{rrm}	V_R=400V, I_S=5A, di/dt=100A/μs	-	19.5	-	A
Reverse Recovery Time	T_{rr}		-	265.9	-	ns
Reverse Recovery Charge	Q_{rr}		-	2.9	-	uC
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=5A	-	-	1.3	V

Note:

1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating; pulse width limited by max. junction temperature.
3. Pd is based on max. junction temperature, using junction-case thermal resistance.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25 °C.
5. V_{DD}=100V, V_{GS}=10V, L=79.9mH, starting T_J=25°C.

Typical Electrical and Thermal Characteristic Curves

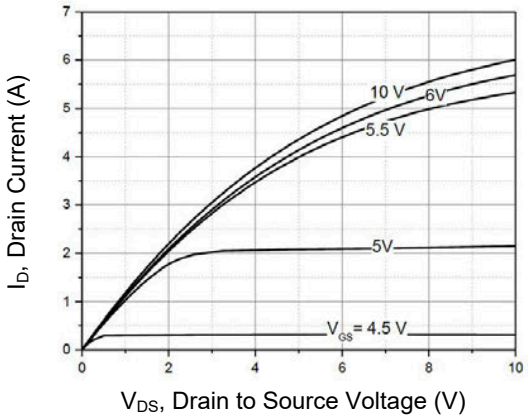


Figure 1. Output Characteristics

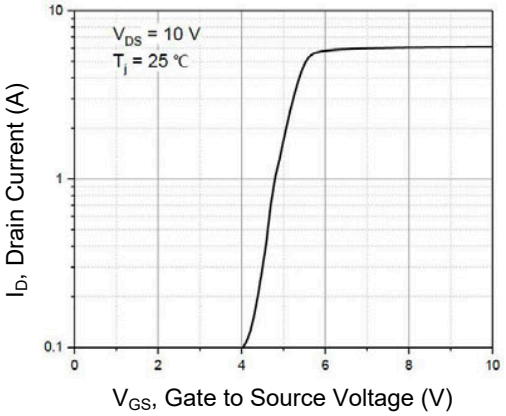


Figure 2. Transfer Characteristics

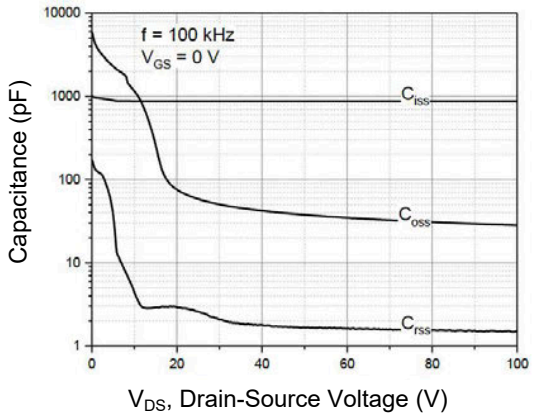


Figure 3. Capacitance Characteristics

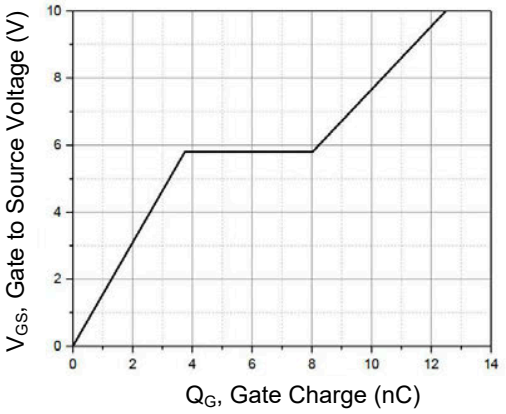


Figure 4. Gate Charge

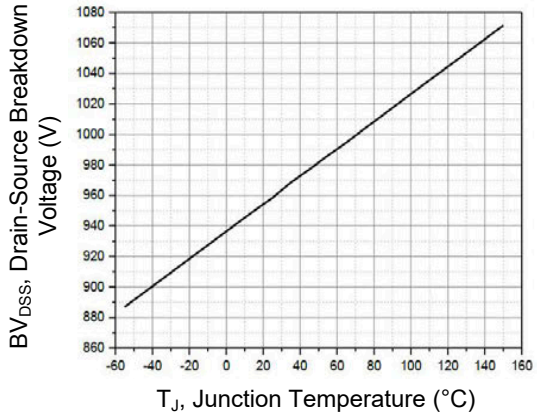


Figure 5. Drain-Source Breakdown Voltage

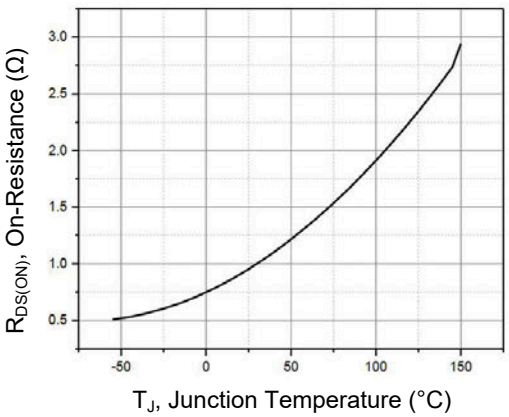


Figure 6. Drain-Source On-State Resistance

Typical Electrical and Thermal Characteristic Curves

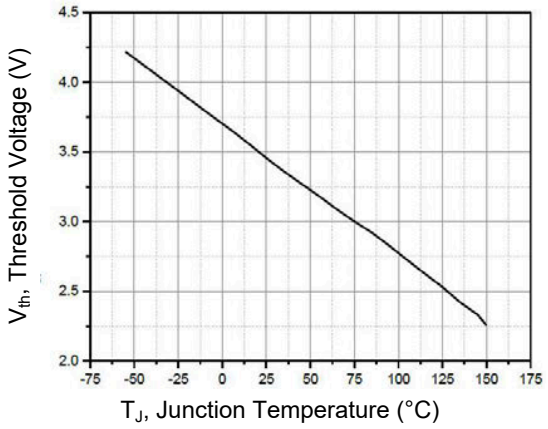


Figure 7. Threshold Voltage

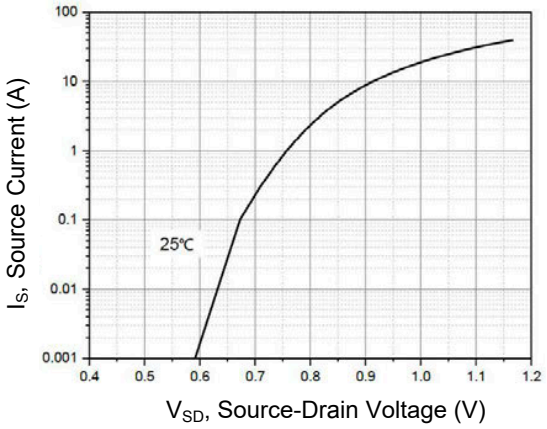


Figure 8. Forward Characteristics of Body Diode

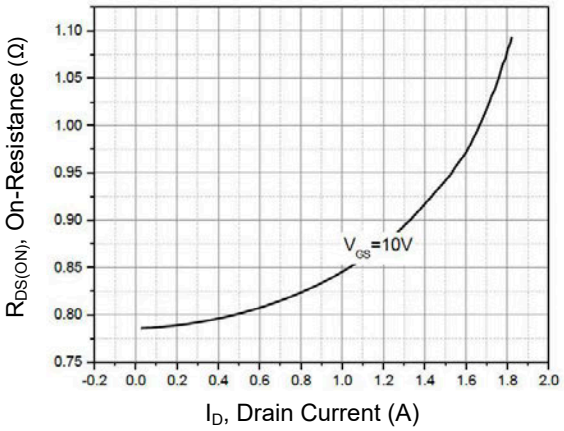


Figure 9. Drain-Source On-State Resistance

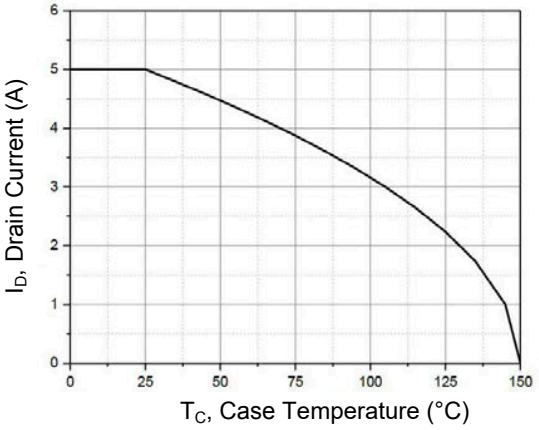


Figure 10. Drain Current

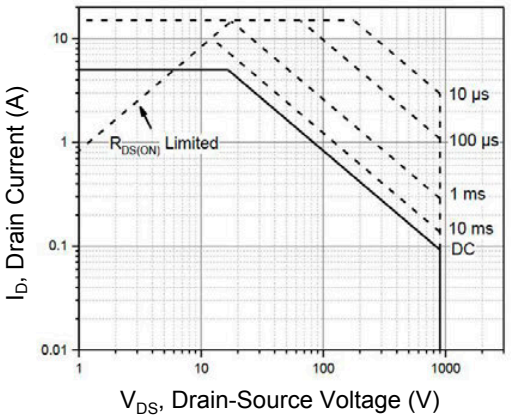
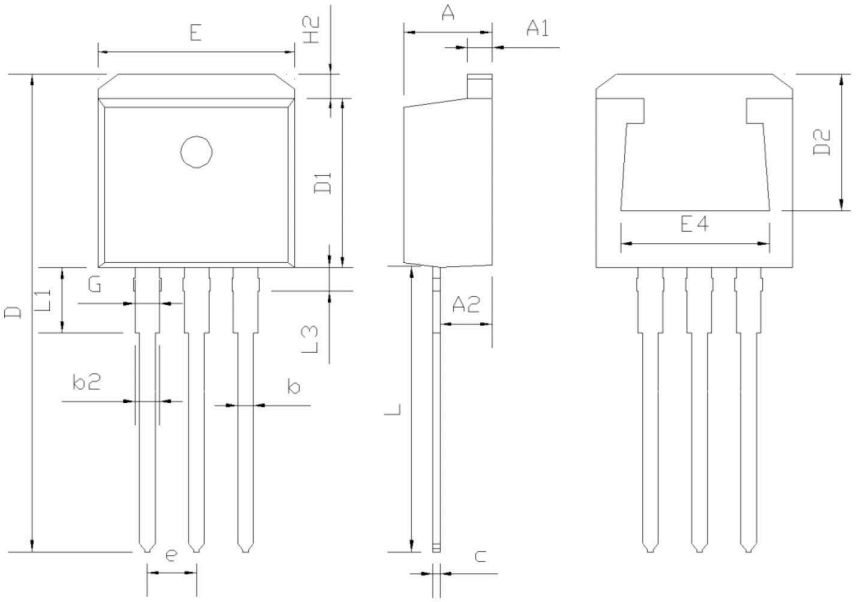


Figure 11. Safe Operation Area, T_C=25°C

Package Outline Dimensions (TO-262)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.370	4.770	0.172	0.188
A1	1.220	1.420	0.048	0.056
A2	2.490	2.890	0.098	0.114
b	0.710	0.960	0.028	0.038
b2	1.170	1.420	0.046	0.056
c	0.280	0.530	0.011	0.021
D	23.200	24.020	0.913	0.946
D1	8.500	8.900	0.335	0.350
D2	6.000	-	0.236	-
E	9.860	10.360	0.388	0.408
E4	7.060	-	0.278	-
e	2.540 BSC		0.100 BSC	
H2	-	1.500	-	0.059
L	13.330	14.130	0.525	0.556
L1	3.500	4.000	0.138	0.157
L3	1.280	1.580	0.050	0.062
G	1.250	1.500	0.049	0.059