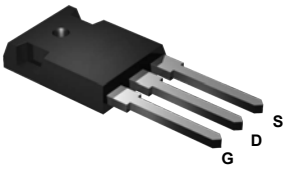
GOOD-ARK
SEMICONDUCTOR

GSFA90R350

900V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	900V
$R_{DS(ON)}$	0.35Ω (Max.)
I_D	12A



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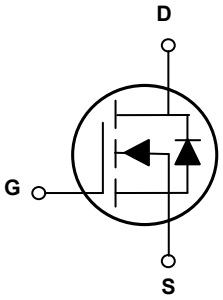


Schematic Diagram

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 GSFA90R350 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	12	A
Drain Current-Continuous[1] (T_C=100°C)		7.6	
Drain Current-Pulsed[2] (T_C=25°C)	$I_{D.pulse}$	36	A
Continuous Diode Forward Current[1] (T_C=25°C)	I_S	12	A
Diode Pulsed Current[2] (T_C=25°C)	$I_{S.pulse}$	36	A
Power Dissipation[3] (T_C=25°C)	P_D	219	W
Single Pulsed Avalanche Energy[5]	E_{AS}	360	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	$R_{\theta JC}$	0.57	°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=250μA	900	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=900V, V_{GS}=0V	-	-	1	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=6A	-	0.28	0.35	Ω
		V_{GS}=10V, I_D=6A, T_J=150°C	-	0.98	-	
Gate Resistance	R_G	F=1MHz, Open Drain	-	16.6	-	Ω
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	2.9	-	3.9	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=400V, I_D=10A, V_{GS}=10V	-	53.8	-	nC
Gate-Source Charge	Q_{gs}		-	15.6	-	
Gate-to-Drain Charge	Q_{gd}		-	14.5	-	
Gate Plateau Voltage	$V_{plateau}$		-	5.3	-	V
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V, R_G=2Ω, V_{GS}=10V, I_D=10A	-	50	-	nS
Rise Time	t_r		-	32	-	
Turn-Off Delay Time	$t_{d(off)}$		-	121	-	
Fall Time	t_f		-	27.6	-	
Input Capacitance	C_{lss}	V_{DS}=50V, V_{GS}=0V, F=100kHz	-	2786	-	pF
Output Capacitance	C_{oss}		-	94	-	
Reverse Transfer Capacitance	C_{rss}		-	3.9	-	
Effective Output Capacitance, Energy Related	$C_{o(er)}$	V_{GS}=0V, V_{DS}=0V-400V	-	58	-	
Effective Output Capacitance, Time Related	$C_{o(tr)}$		-	276	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Peak Reverse Recovery Current	I_{rrm}	I_S=10A, V_R=400V, di/dt=100A/μs	-	25.3	-	A
Reverse Recovery Time	T_{rr}		-	300	-	ns
Reverse Recovery Charge	Q_{rr}		-	4.1	-	uC
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=12A	-	-	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. V_{DD}=100V, V_{GS}=10V, L=80mH, starting T_J=25°C.

Typical Electrical and Thermal Characteristic Curves

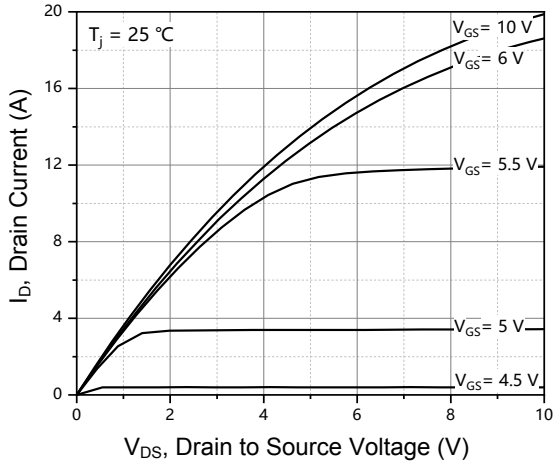


Figure 1. Output Characteristics

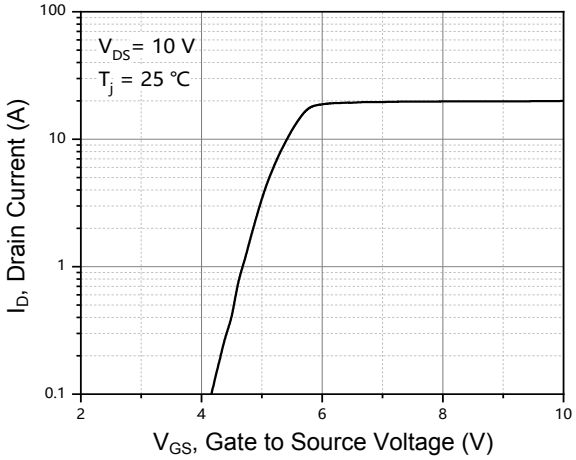


Figure 2. Transfer Characteristics

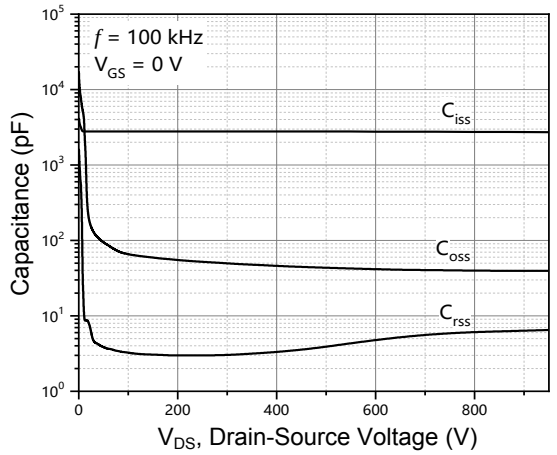


Figure 3. Capacitance Characteristics

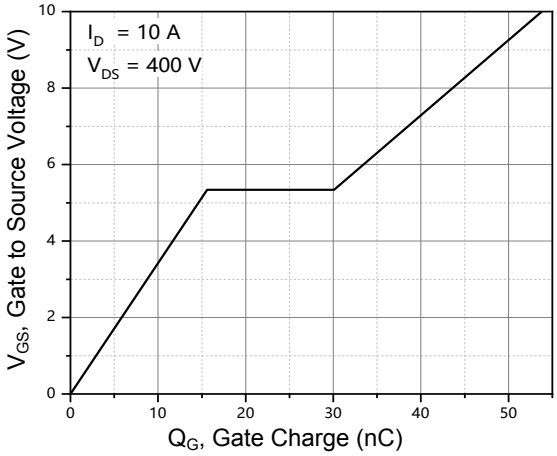


Figure 4. Gate Charge

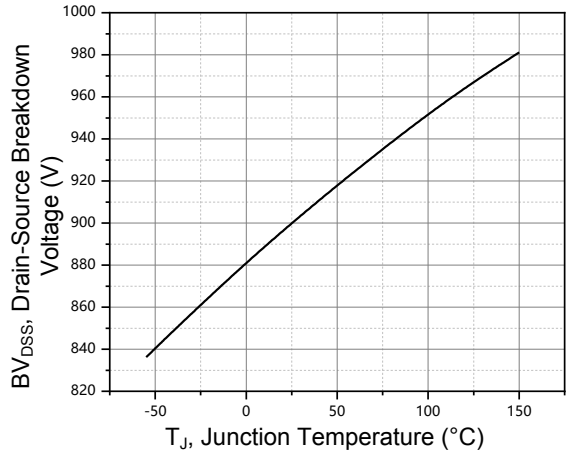


Figure 5. Drain-Source Breakdown Voltage

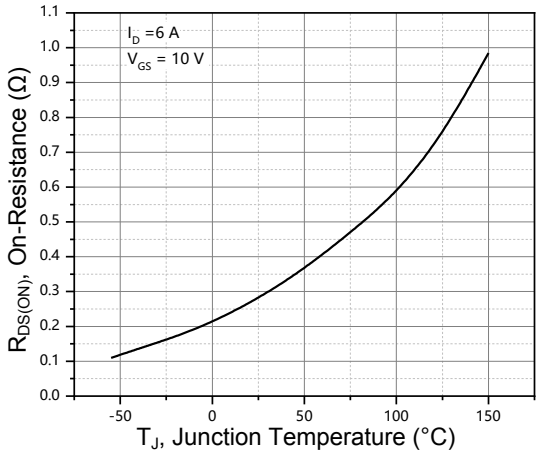


Figure 6. Drain-Source On-State Resistance

Typical Electrical and Thermal Characteristic Curves

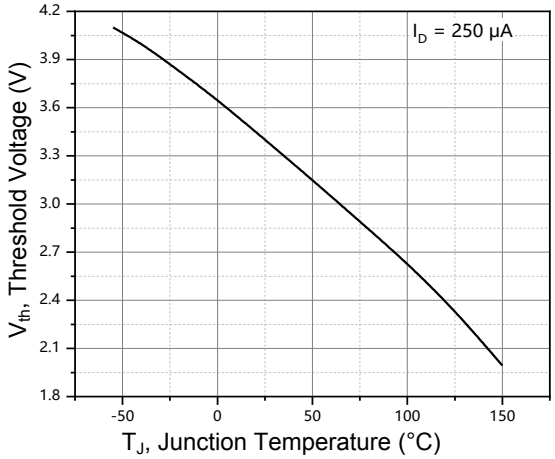


Figure 7. Threshold Voltage

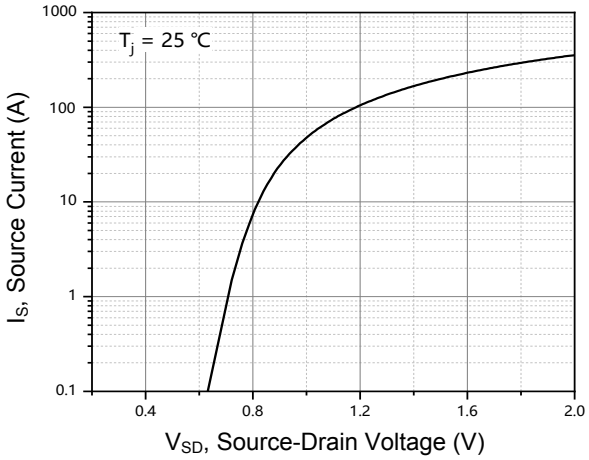


Figure 8. Forward Characteristics of Body Diode

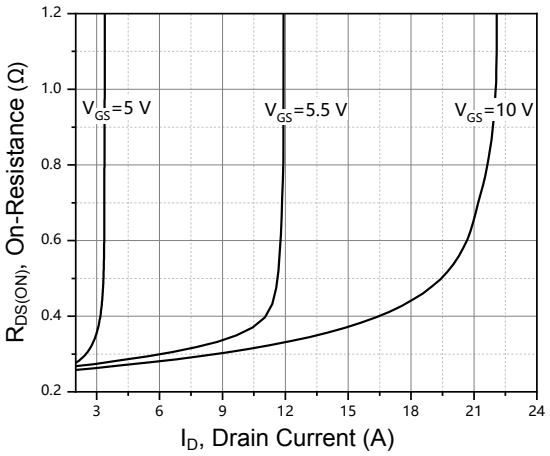


Figure 9. $R_{DS(ON)}$ vs. Drain Current

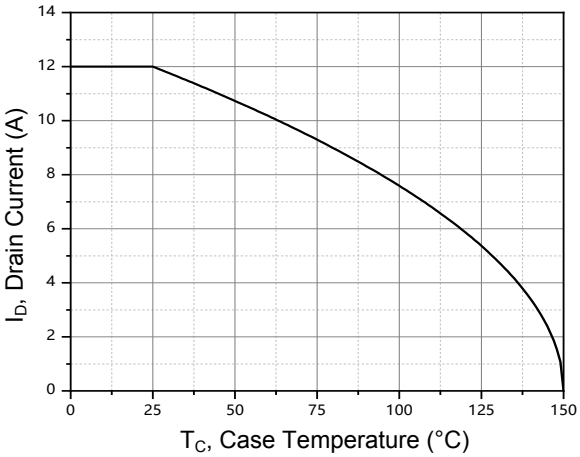


Figure 10. Drain Current

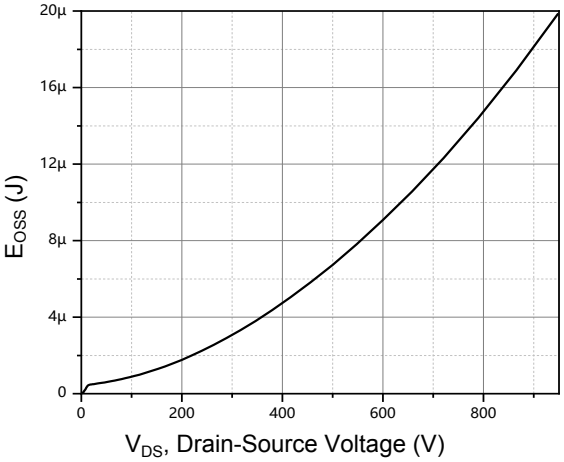


Figure 11. Typ. Coss Stored Energy

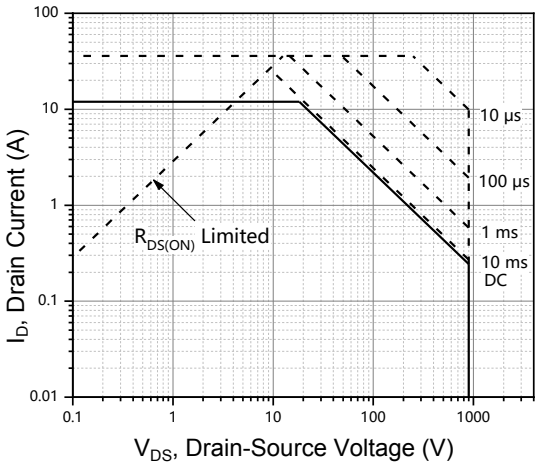


Figure 12. Safe Operation Area, T_C=25°C

Typical Electrical and Thermal Characteristic Curves

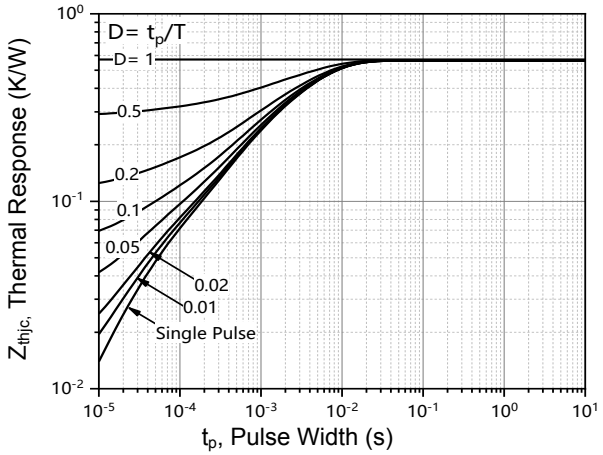
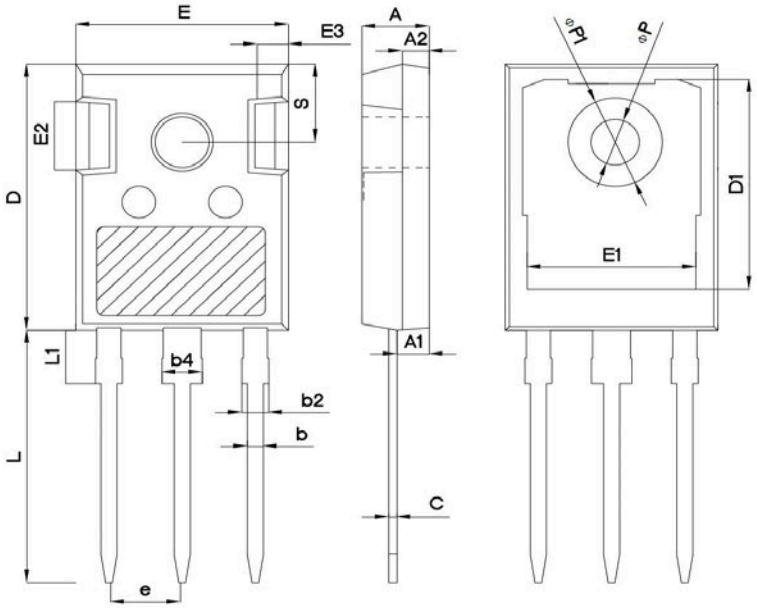


Figure 13. Max. Transient Thermal Impedance

Package Outline Dimensions (TO-247)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.800	5.200	0.189	0.205
A1	2.210	2.590	0.087	0.102
A2	1.850	2.150	0.073	0.085
b	1.110	1.360	0.044	0.054
b2	1.910	2.210	0.075	0.087
b4	2.910	3.210	0.115	0.126
c	0.510	0.750	0.020	0.030
D	20.800	21.300	0.819	0.839
D1	16.250	16.850	0.640	0.663
E	15.500	16.100	0.610	0.634
E1	13.000	13.600	0.512	0.535
E2	4.800	5.200	0.189	0.205
E3	2.300	2.700	0.091	0.106
e	5.440 BSC		0.214 BSC	
L	19.820	20.220	0.780	0.796
L1	-	4.300	-	0.169
ΦP	3.400	3.800	0.134	0.150
ΦP1	-	7.300	-	0.287
S	6.150 BSC		0.242 BSC	