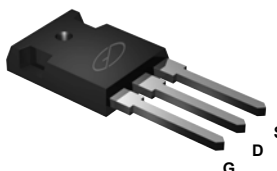
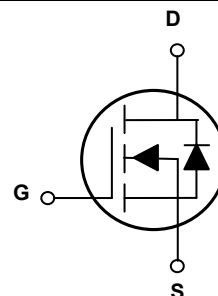


Main Product Characteristics

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



TO-247



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 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 ($T_J=25^{\circ}\text{C}$ 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 ($T_C=25^{\circ}\text{C}$)	I_D	12	A
Drain Current-Continuous ¹ ($T_C=100^{\circ}\text{C}$)		7.6	
Drain Current-Pulsed ² ($T_C=25^{\circ}\text{C}$)	$I_{D,pulse}$	36	A
Continuous Diode Forward Current ¹ ($T_C=25^{\circ}\text{C}$)	I_S	12	A
Diode Pulsed Current ² ($T_C=25^{\circ}\text{C}$)	$I_{S,pulse}$	36	A
Power Dissipation ³ ($T_C=25^{\circ}\text{C}$)	P_D	219	W
Single Pulsed Avalanche Energy ⁵	E_{AS}	360	mJ
MOSFET dv/dt Ruggedness, $V_{DS}=0-480\text{V}$	dv/dt	50	V/ns
Reverse Diode dv/dt, $V_{DS}=0-480\text{V}$, $I_{SD} \leq I_D$	dv/dt	15	V/ns
Thermal Resistance, Junction-to-Ambient ⁴	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.57	$^{\circ}\text{C/W}$
Junction Temperature Range	T_J	-55 To +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^{\circ}\text{C}$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ 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 _{iss}	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. P_d is based on max. junction temperature, using junction-case thermal resistance.
4. $V_{DD}=100V, V_{GS}=10V, L=80\text{mH}$, starting $T_J=25^{\circ}\text{C}$.

Typical Electrical and Thermal Characteristic Curves

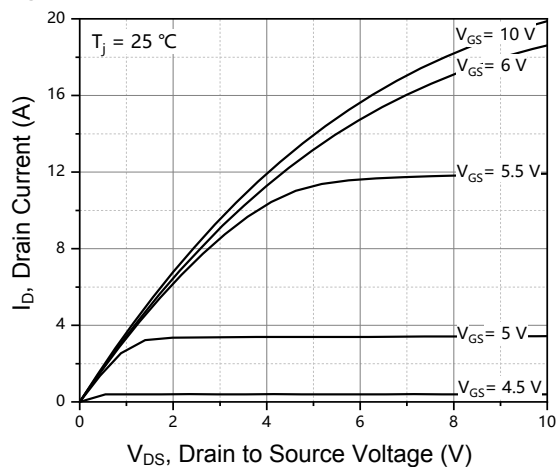


Figure 1. Output Characteristics

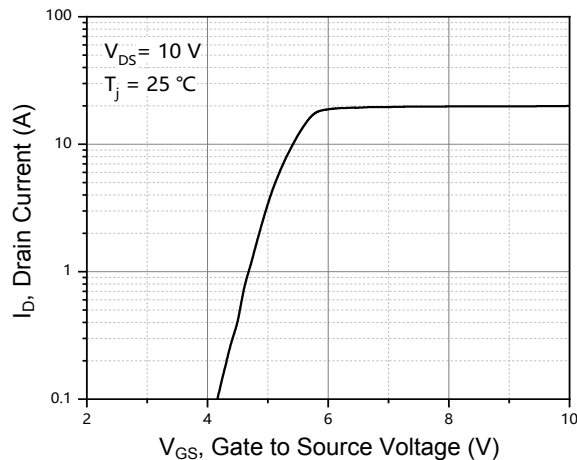


Figure 2. Transfer Characteristics

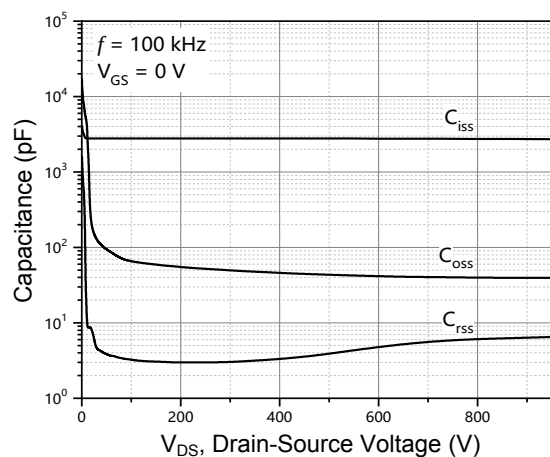


Figure 3. Capacitance Characteristics

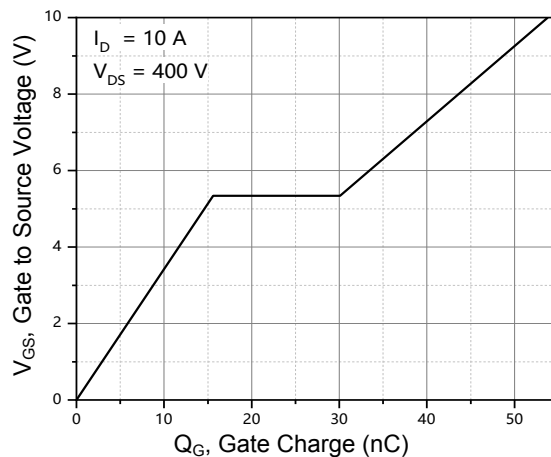


Figure 4. Gate Charge

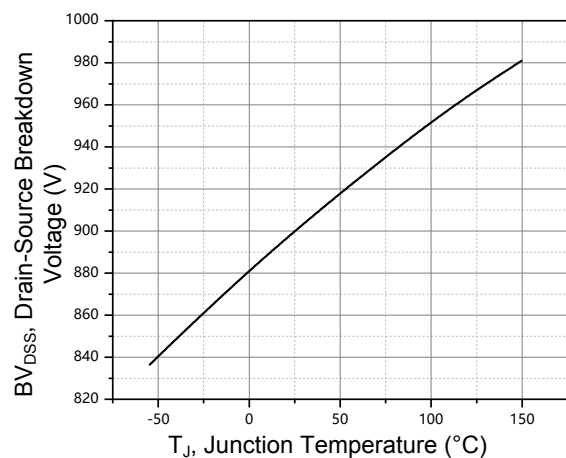


Figure 5. Drain-Source Breakdown Voltage

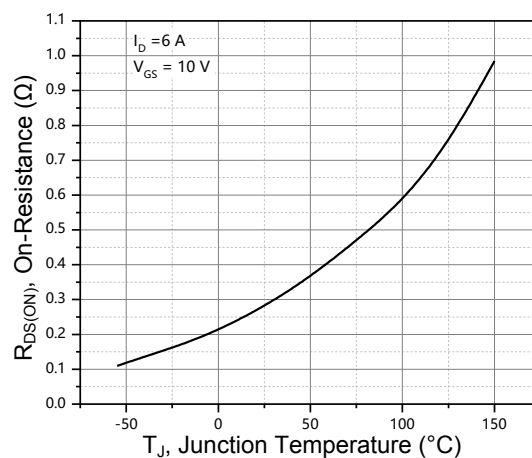


Figure 6. Drain-Source On-State Resistance

Typical Electrical and Thermal Characteristic Curves

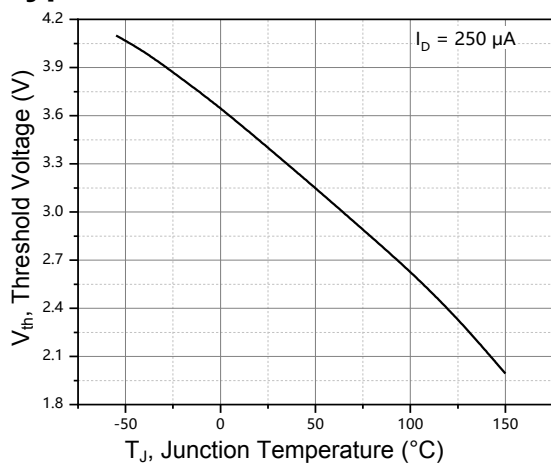


Figure 7. Threshold Voltage

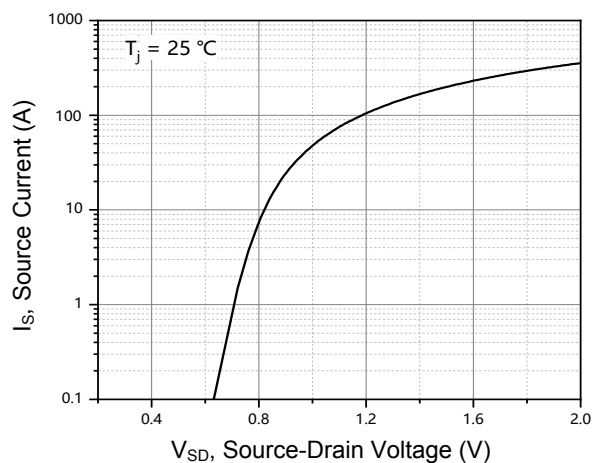


Figure 8. Forward Characteristics of Body Diode

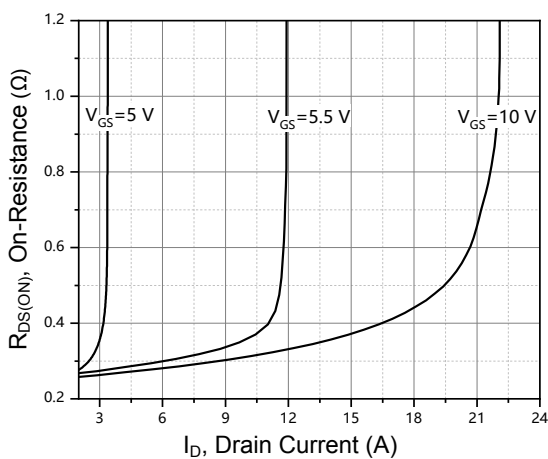


Figure 9. $R_{DS(ON)}$ vs. Drain Current

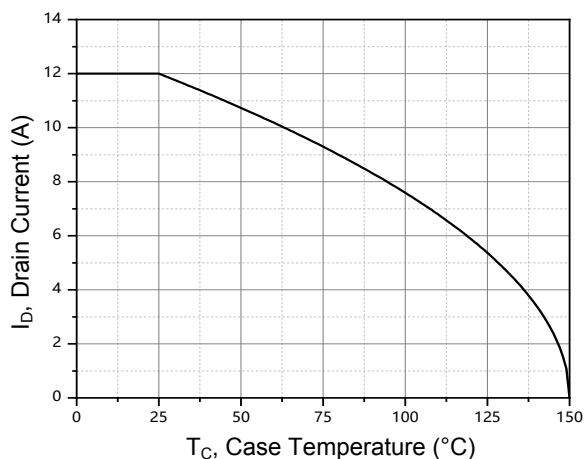


Figure 10. Drain Current

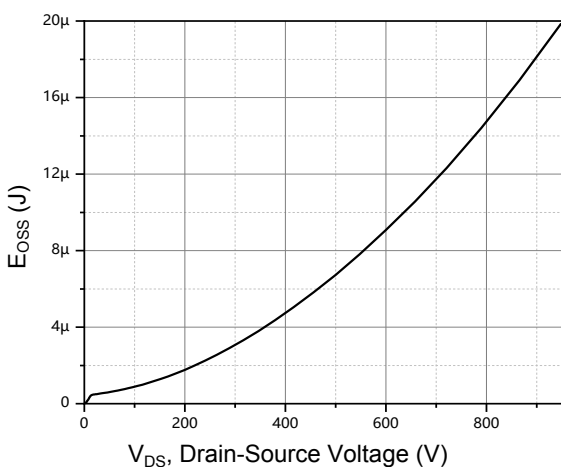


Figure 11. Typ. C_{oss} Stored Energy

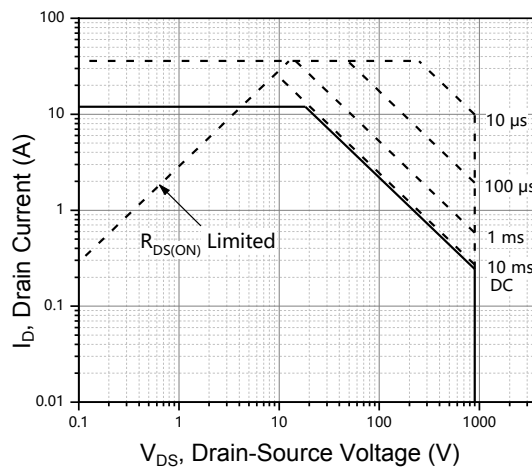


Figure 12. Safe Operation Area, $T_C=25^{\circ}\text{C}$

Typical Electrical and Thermal Characteristic Curves

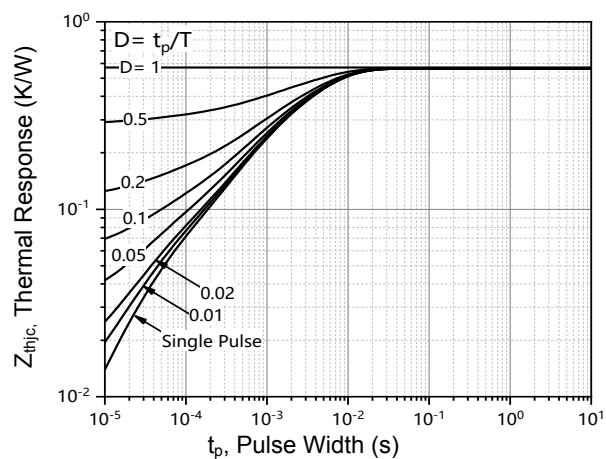
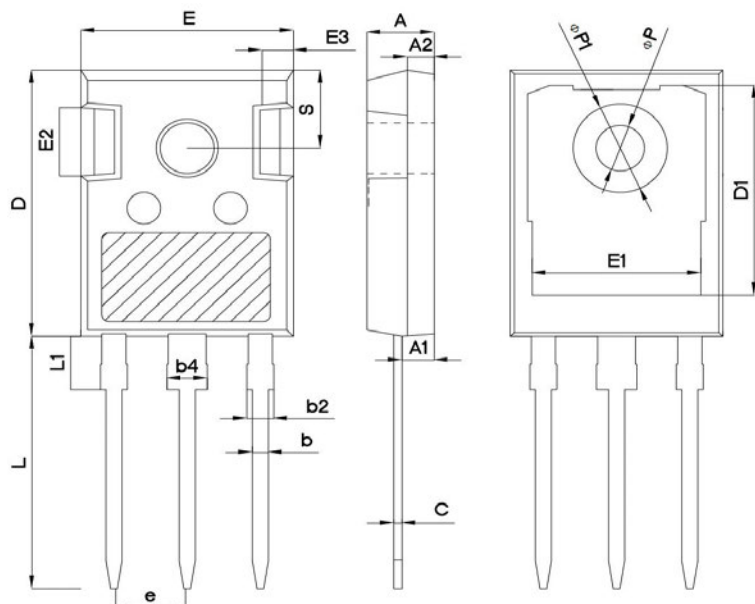


Figure 13. Max. Transient Thermal Impedance

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	