GOOD-ARK SEMICONDUCTOR

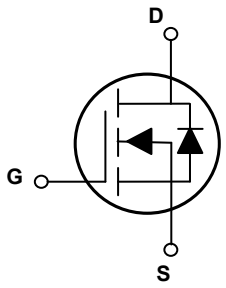
GSFU95R500

950V N-Channel Power MOSFET

Main Product Characteristics

BV_{DSS}	950V
$R_{DS(ON)}$	500mΩ (Max)
I_D	10A

TO-220F



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 GSFU95R500 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, EV Charger, motor driver and a wide variety of other applications.

Absolute Maximum Ratings (T_J=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	950	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current, T_C=25°C[1]	I_D	10	A
Continuous Drain Current, T_C=100°C[1]		6.3	
Pulsed Drain Current, T_C=25°C[2]	$I_{D,pulse}$	30	A
Continuous Diode Forward Current, T_C=25°C[1]	I_S	10	A
Diode Pulsed Current, T_C=25°C[2]	$I_{S,pulse}$	30	A
Power Dissipation, T_C=25°C[3]	P_D	34	W
Single Pulsed Avalanche Energy[5]	E_{AS}	165	mJ
MOSFET dv/dt Ruggedness, V_{DS}=0 to 480V	dv/dt	50	V/ns
Reverse Diode dv/dt, V_{DS}=0 to 480V, I_{SD}≤I_D		15	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	3.68	°C/W
Thermal Resistance, Junction to Ambient[4]	$R_{\theta JA}$	62.5	°C/W
Operation and Storage Temperature Range	T_{stg}, T_J	-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	950	-	-	V
		V_{GS}=0V, I_D=250uA T_J=150°C	1000	-	-	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2.9	-	3.9	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=950V, 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=5A	-	0.43	0.50	Ω
		V_{GS}=10V, I_D=5A T_J=150°C	-	1.6	-	
Gate Resistance	R_G	f=1MHz, Open drain	-	18	-	Ω
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=400V, I_D=6A V_{GS}=10V	-	24	-	nC
Gate-Source Charge	Q_{gs}		-	9.4	-	
Gate-Drain Charge	Q_{gd}		-	3.3	-	
Gate Plateau Voltage	$V_{plateau}$		-	5.6	-	V
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V, R_G=2Ω V_{GS}=10V, I_D=6A	-	33.6	-	nS
Rise Time	t_r		-	16.2	-	
Turn-Off Delay Time	$t_{d(off)}$		-	54.4	-	
Fall Time	t_f		-	6.2	-	
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V f=100KHz	-	1568	-	pF
Output Capacitance	C_{oss}		-	66	-	
Reverse Transfer Capacitance	C_{rss}		-	1.9	-	
Effective Output Capacitance, Energy Related	$C_{o(er)}$	V_{GS}=0V, V_{DS}=0V-400V	-	40	-	
Effective Output Capacitance, Time Related	$C_{o(tr)}$		-	185	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=10A	-	-	1.3	V
Reverse Recovery Time	t_{rr}	V_R=400V I_S=6A, di/dt=100A/μs	-	268	-	nS
Reverse Recovery Charge	Q_{rr}		-	3.2	-	uC
Peak Reverse Recovery Current	I_{rrm}		-	20.8	-	A

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=75mH, starting T_J=25°C.

Typical Electrical and Thermal Characteristic Curves

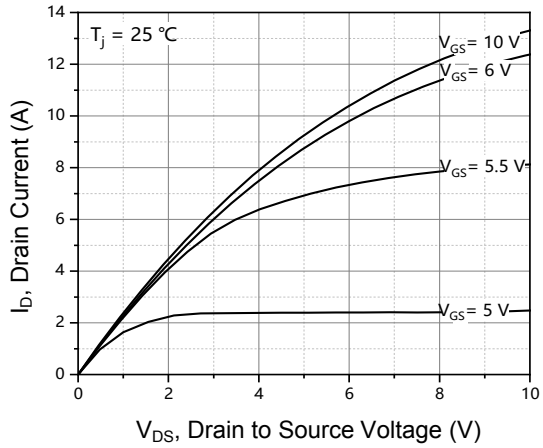


Figure 1. Typical Output Characteristics

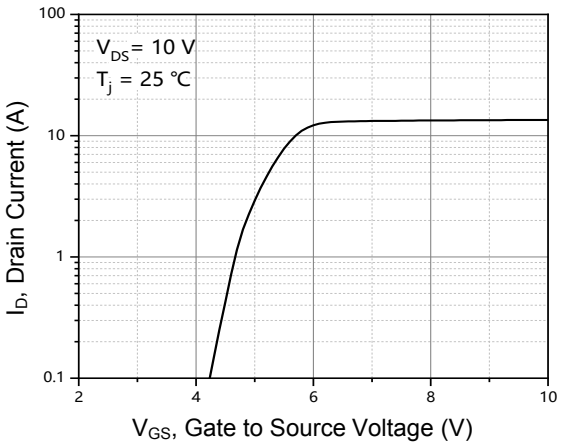


Figure 2. Typical Transfer Characteristics

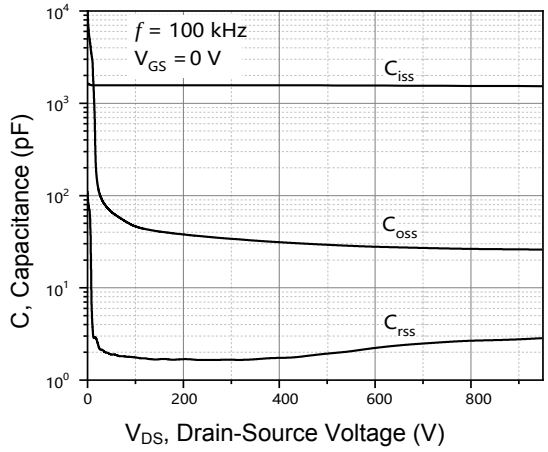


Figure 3. Typical Capacitances

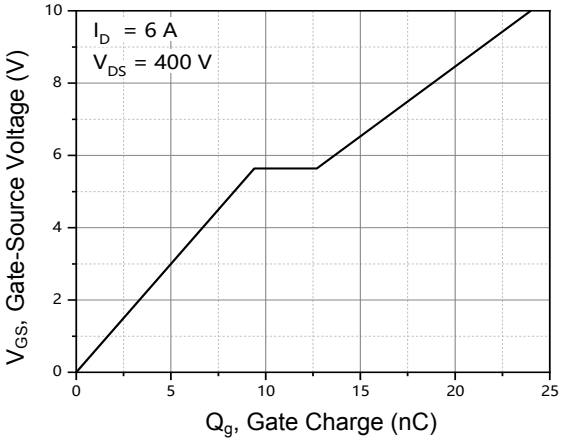


Figure 4. Typical Gate Charge

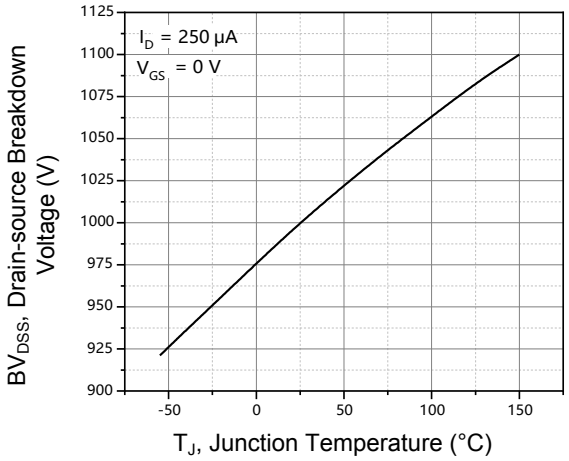


Figure 5. Drain-Source Breakdown Voltage

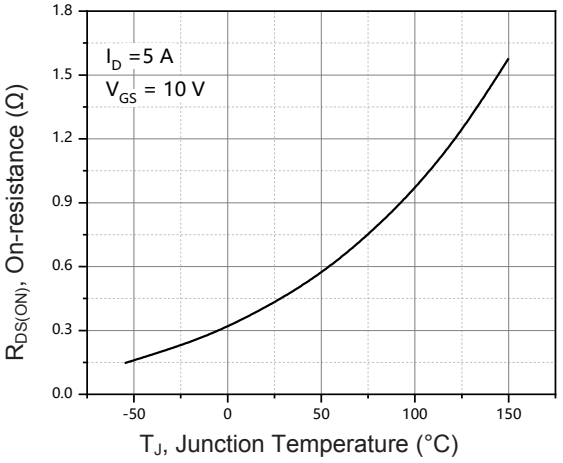


Figure 6. Drain-Source On-State Resistance

Typical Electrical and Thermal Characteristic Curves

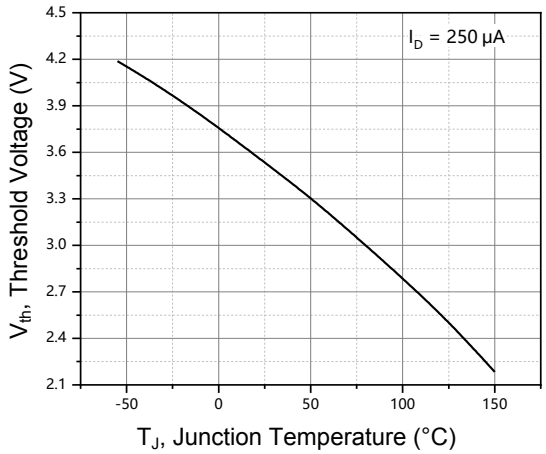


Figure 7. Threshold Voltage

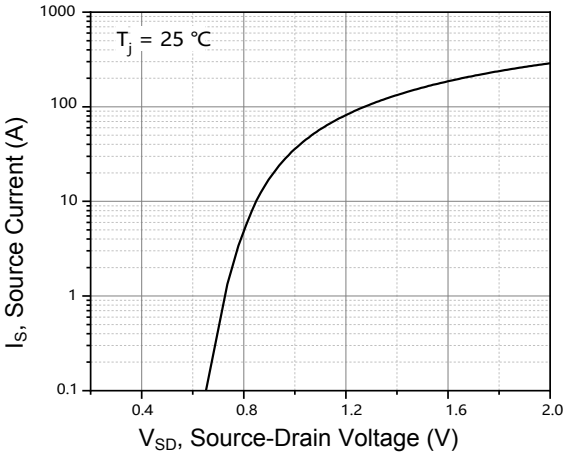


Figure 8. Forward Characteristic Of Body Diode

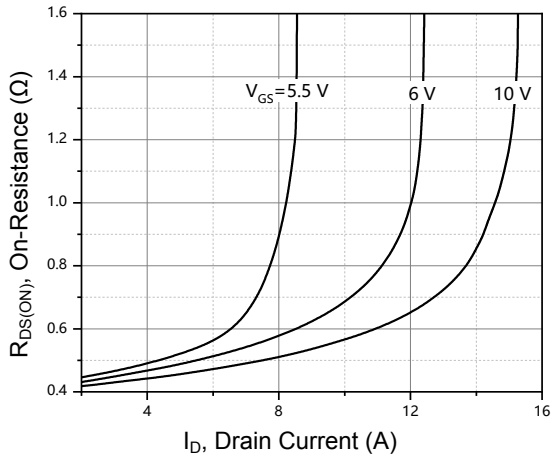


Figure 9. Drain-Source On-State Resistance

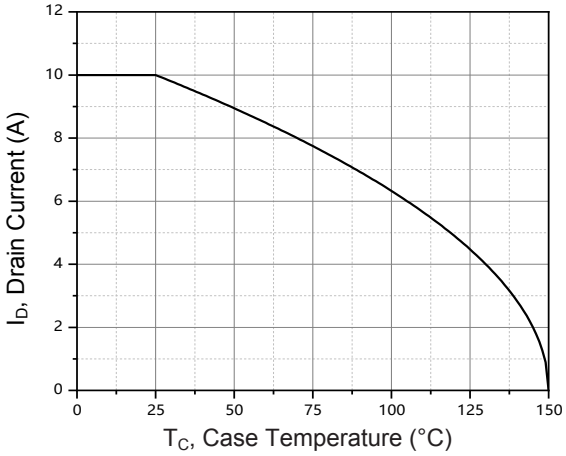


Figure 10. Drain Current

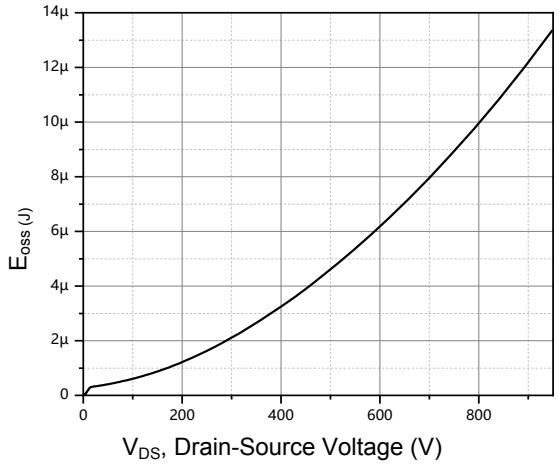


Figure 11. Typical Coss Stored Energy

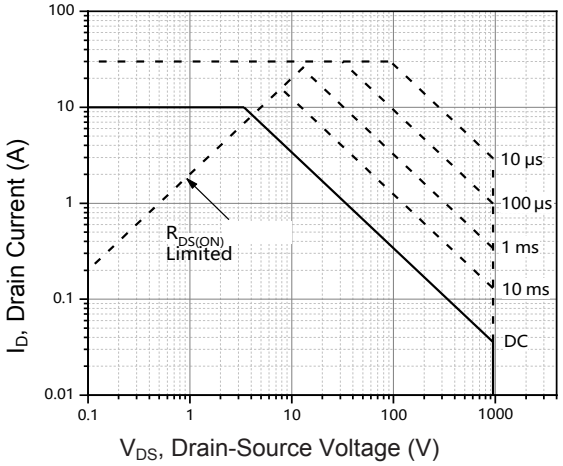


Figure 12. Safe Operation Area T_C=25°C

Typical Electrical and Thermal Characteristic Curves

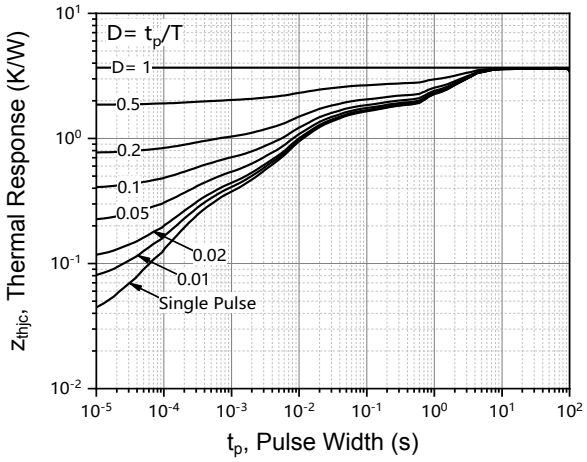
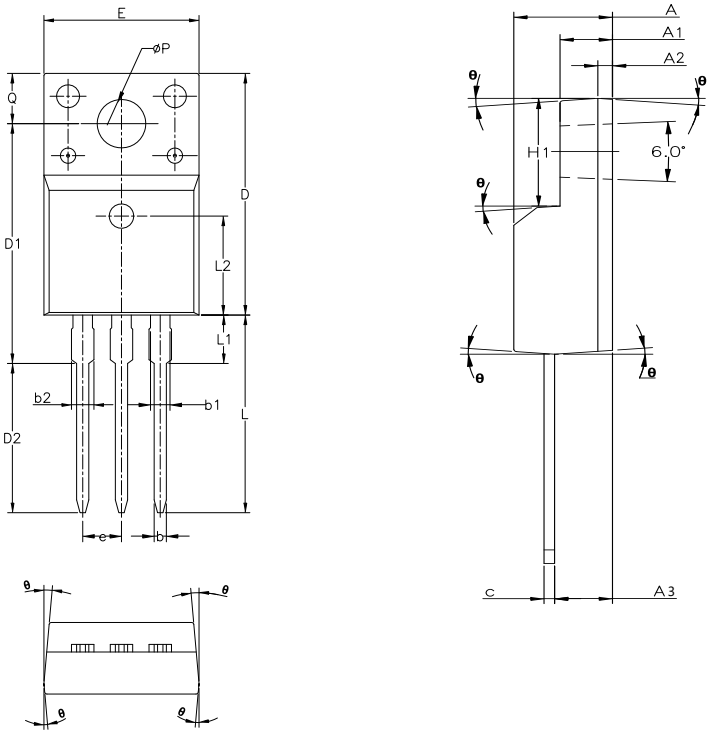


Figure 13. Max. Transient Thermal Impedance

Package Outline Dimensions (TO-220F)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.50	4.83	0.177	0.190
A1	2.34	2.74	0.092	0.108
A2	0.70 REF		0.028 REF	
A3	2.56	2.93	0.101	0.115
b	0.70	0.90	0.028	0.035
b1	1.18	1.38	0.046	0.054
b2	-	1.47	-	0.058
c	0.45	0.60	0.018	0.024
D	15.67	16.07	0.617	0.633
D1	15.55	15.95	0.612	0.628
D2	9.60	10.00	0.378	0.394
E	9.96	10.36	0.392	0.408
e	2.54 BSC		0.100 REF	
H1	6.48	6.88	0.255	0.271
L	12.68	13.28	0.499	0.523
L1	-	3.50	-	0.138
L2	6.50 REF		0.256 REF	
ΦP	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134
θ	1°	5°	1°	5°