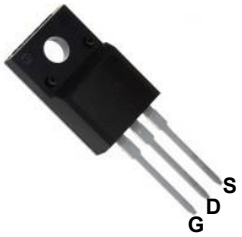
GOOD-ARK SEMICONDUCTOR

GSFU9506

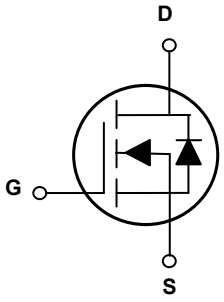
950V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	950V
$R_{DS(ON)}$	0.75Ω (Max.)
I_D	6A



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 GSFU9506 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_{DSS}	950	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current-Continuous[1] (T_C=25°C)	I_D	6	A
Drain Current-Continuous[1] (T_C=100°C)		3.8	
Drain Current-Pulsed[2] (T_C=25°C)	$I_{D.pulse}$	18	A
Continuous Diode Forward Current[1] (T_C=25°C)	I_S	6	A
Diode Pulsed Current[2] (T_C=25°C)	$I_{S.pulse}$	18	A
Power Dissipation[3] (T_C=25°C)	P_D	32	W
Single Pulsed Avalanche Energy[5]	E_{AS}	122	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	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.91	°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	950	-	-	V
		V_{GS}=0V, I_D=250uA, T_J=150°C	1000	-	-	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
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3A	-	0.67	0.75	Ω
		V_{GS}=10V, I_D=3A, T_J=150°C	-	1.98	-	
Gate Resistance	R_G	F=1MHz, Open Drain	-	21	-	Ω
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	2.9	-	3.9	V
Dynamic and Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=400V, I_D=6A, V_{GS}=10V	-	18.4	-	nC
Gate-Source Charge	Q_{gs}		-	6.2	-	
Gate-to-Drain Charge	Q_{gd}		-	4.5	-	
Gate Plateau Voltage	$V_{plateau}$		-	5.5	-	V
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V, R_G=2Ω, V_{GS}=10V, I_D=6A	-	32.4	-	nS
Rise Time	t_r		-	19.8	-	
Turn-Off Delay Time	$t_{d(off)}$		-	51.8	-	
Fall Time	t_f		-	14.2	-	
Input Capacitance	C_{lss}	V_{DS}=50V, V_{GS}=0V, F=100kHz	-	1250	-	pF
Output Capacitance	C_{oss}		-	49	-	
Reverse Transfer Capacitance	C_{rss}		-	1.9	-	
Effective Output Capacitance, Energy Related	$C_{o(er)}$	V_{GS}=0V, V_{DS}=0V-400V	-	29	-	
Effective Output Capacitance, Time Related	$C_{o(tr)}$		-	133	-	
Drain-Source Diode Characteristics and Maximum Ratings						
Peak Reverse Recovery Current	I_{rrm}	V_R=400V, I_S=6A, di/dt=100A/μs	-	18.7	-	A
Reverse Recovery Time	T_{rr}		-	260	-	ns
Reverse Recovery Charge	Q_{rr}		-	2.9	-	uc
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=6A	-	-	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=75mH, starting T_J=25°C.

Typical Electrical and Thermal Characteristic Curves

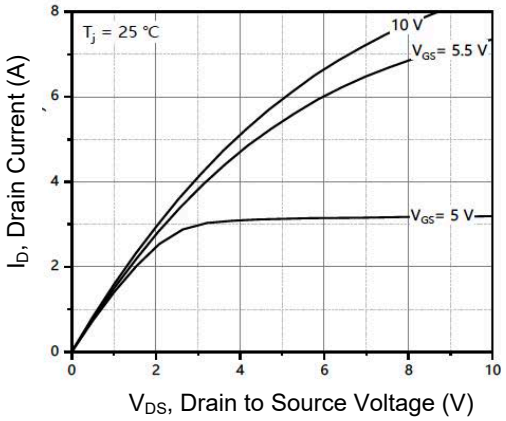


Figure 1. Output Characteristics

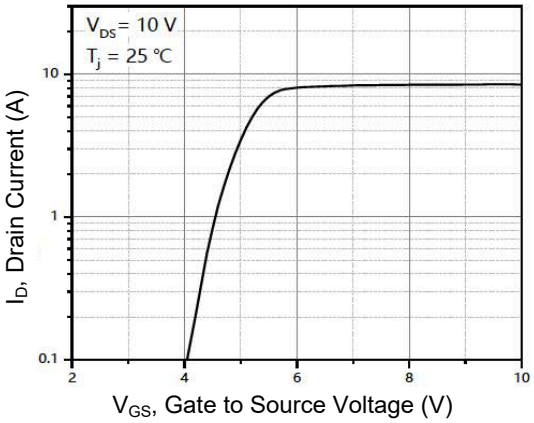


Figure 2. Transfer Characteristics

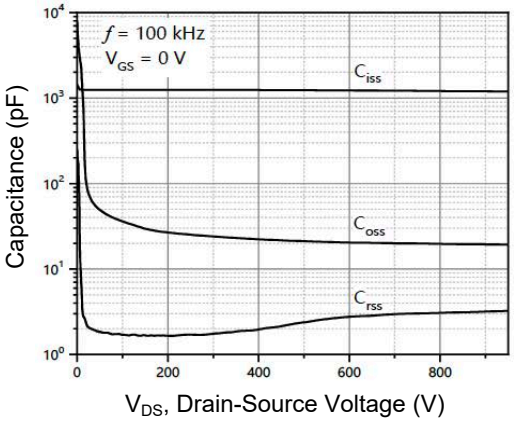


Figure 3. Capacitance Characteristics

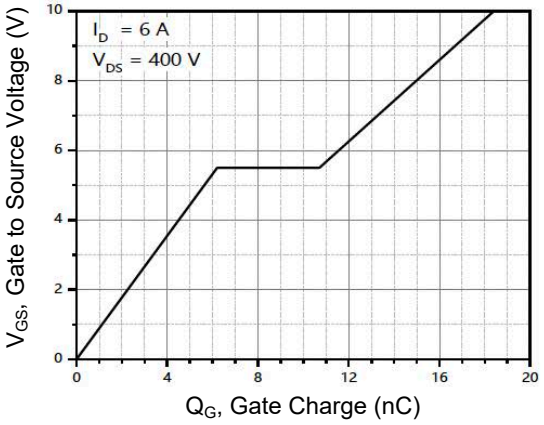


Figure 4. Gate Charge

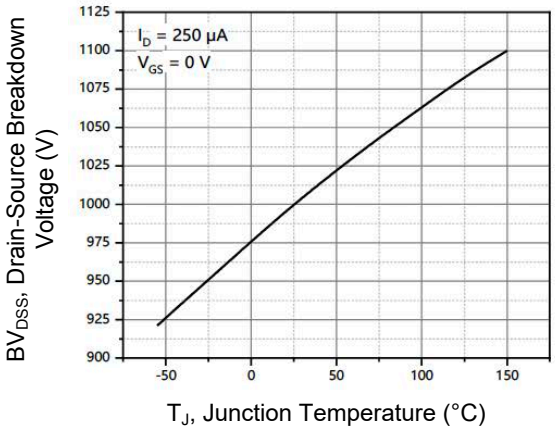


Figure 5. Drain-Source Breakdown Voltage

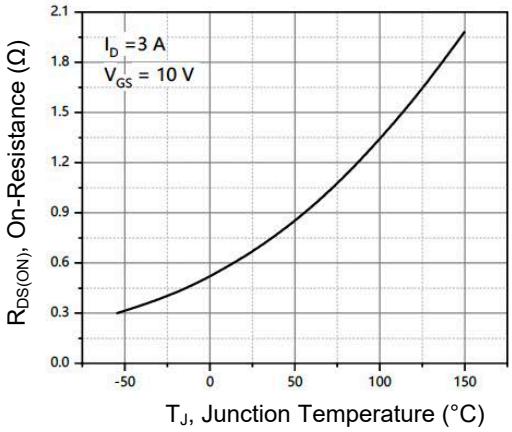


Figure 6. Drain-Source On-State Resistance

Typical Electrical and Thermal Characteristic Curves

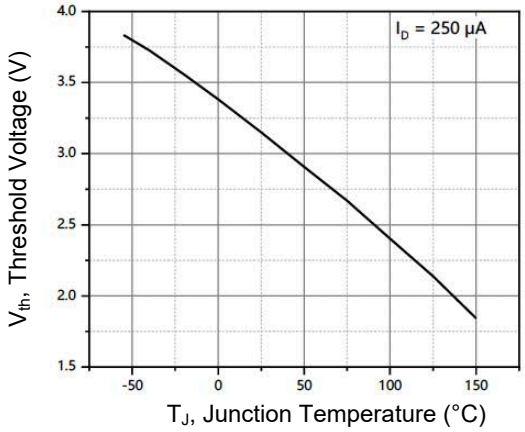


Figure 7. Threshold Voltage

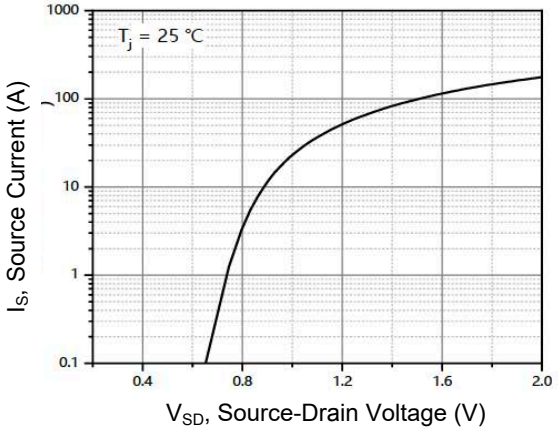


Figure 8. Forward Characteristics of Body Diode

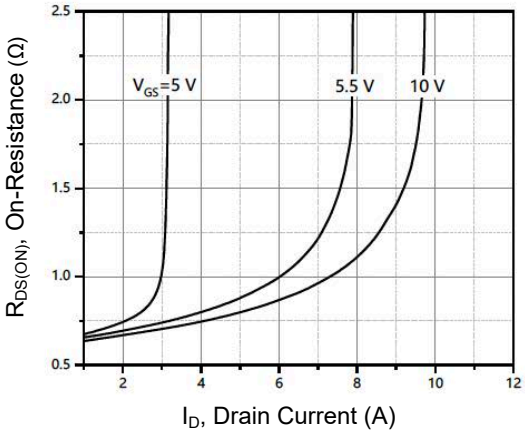


Figure 9. $R_{DS(ON)}$ vs. Drain Current

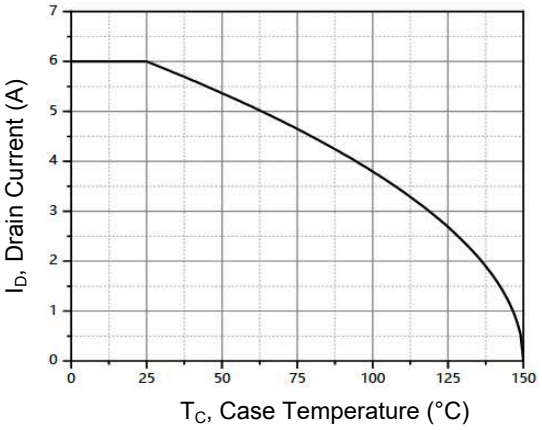


Figure 10. Drain Current

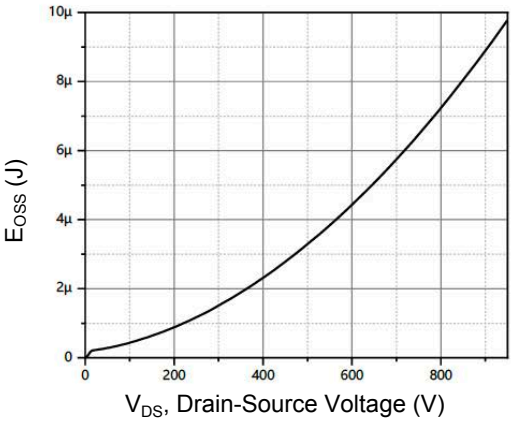


Figure 11. Typ. Coss Stored Energy

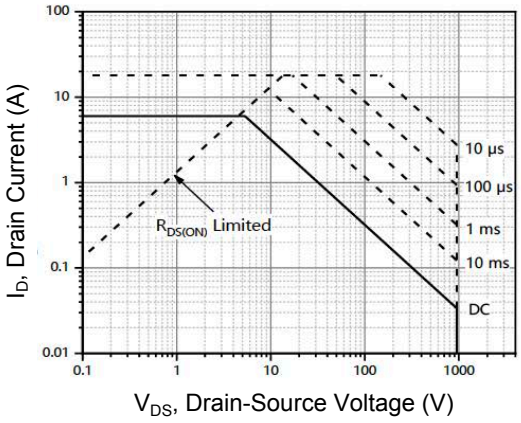


Figure 12. Safe Operation Area, T_C=25°C

Typical Electrical and Thermal Characteristic Curves

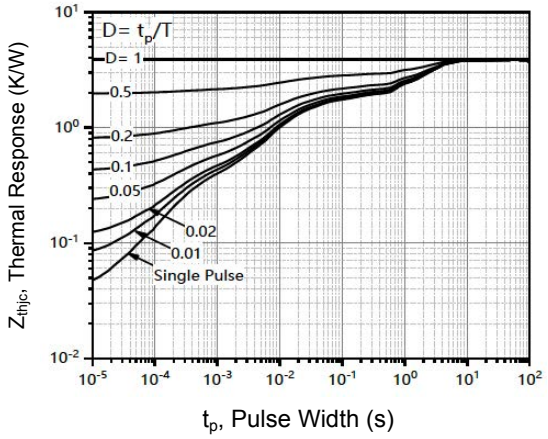
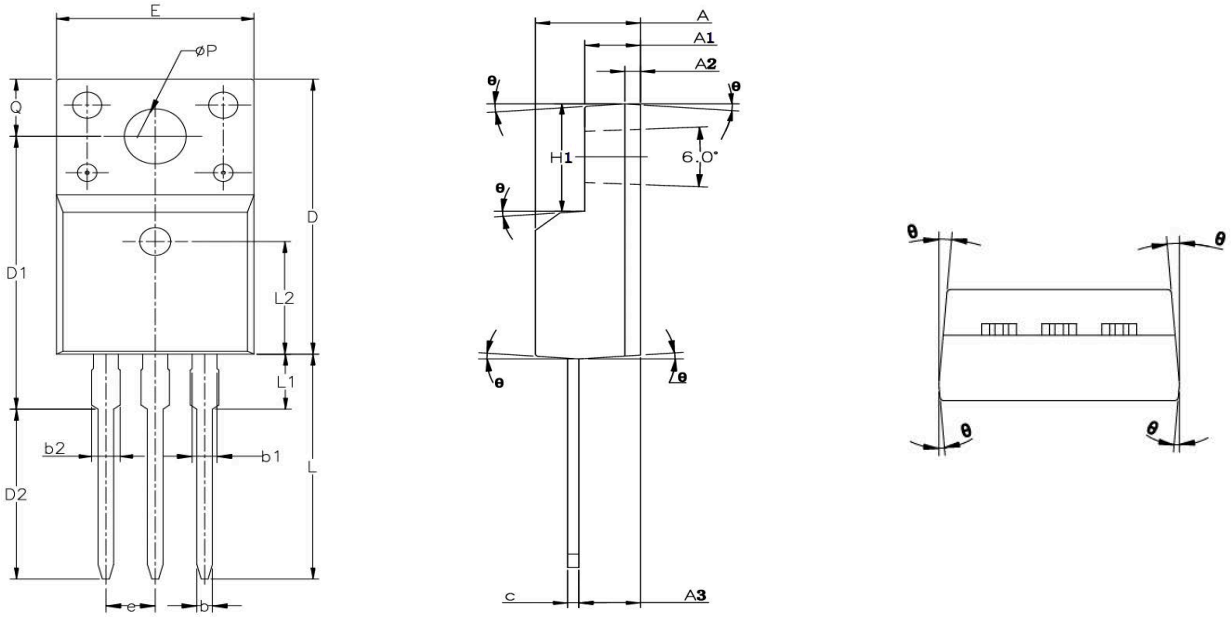


Figure 13. Max. Transient Thermal Impedance

Package Outline Dimensions (TO-220F)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.500	4.830	0.177	0.190
A1	2.340	2.740	0.092	0.108
A2	0.700 REF		0.028 REF	
A3	2.560	2.930	0.101	0.115
b	0.700	0.900	0.028	0.035
b1	1.180	1.380	0.046	0.054
b2	-	1.470	-	0.058
c	0.450	0.600	0.018	0.024
D	15.670	16.070	0.617	0.633
D1	15.550	15.950	0.612	0.628
D2	9.600	10.000	0.378	0.394
E	9.960	10.360	0.392	0.408
e	2.540 BSC		0.100 BSC	
H1	6.480	6.880	0.255	0.271
L	12.680	13.280	0.499	0.523
L1	-	3.500	-	0.138
L2	6.500 REF		0.256 REF	
ΦP	3.080	3.280	0.121	0.129
Q	3.200	3.400	0.126	0.134
θ	1°	5°	1°	5°