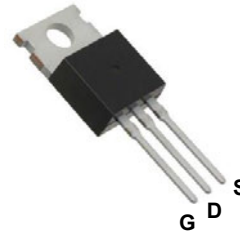
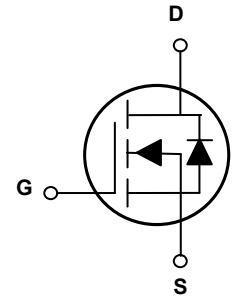


**Main Product Characteristics**

$V_{(BR)DSS}$	950V
$R_{DS(ON)}$	1.2Ω (Max.)
$I_D$	5A



TO-220



Schematic Diagram

**Features and Benefits**

- Advanced MOSFET process technology
- Low on-resistance
- Fast switching and reverse body recovery



**Description**

The GSFH9506 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	$V_{DS}$	950	V
Gate-Source Voltage	$V_{GS}$	±30	V
Drain Current-Continuous <sup>1</sup> ( $T_C=25^\circ\text{C}$ )	$I_D$	5	A
Drain Current-Continuous <sup>1</sup> ( $T_C=100^\circ\text{C}$ )		3.2	
Drain Current-Pulsed <sup>2</sup> ( $T_C=25^\circ\text{C}$ )	$I_{D,pulse}$	15	A
Continuous Diode Forward Current <sup>1</sup> ( $T_C=25^\circ\text{C}$ )	$I_S$	5	A
Diode Pulsed Current <sup>2</sup> ( $T_C=25^\circ\text{C}$ )	$I_{S,pulse}$	15	A
Power Dissipation <sup>3</sup> ( $T_C=25^\circ\text{C}$ )	$P_D$	83	W
Single Pulsed Avalanche Energy <sup>4</sup>	$E_{AS}$	160	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	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.5	$^\circ\text{C/W}$
Junction Temperature Range	$T_J$	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 To +150	$^\circ\text{C}$

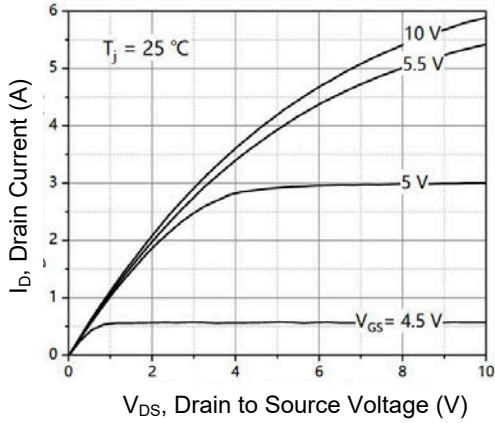
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	950	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=950V, V_{GS}=0V$	-	-	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2A$	-	0.92	1.2	$\Omega$
		$V_{GS}=10V, I_D=2A, T_J=150^\circ\text{C}$	-	2.82	-	
Gate Resistance	$R_G$	F=1MHz, Open Drain	-	29.5	-	$\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.9	-	3.9	V
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS}=400V, I_D=2.5A, V_{GS}=10V$	-	14.9	-	nC
Gate-Source Charge	$Q_{gs}$		-	4.8	-	
Gate-to-Drain Charge	$Q_{gd}$		-	3.4	-	
Gate Plateau Voltage	$V_{plateau}$		-	5	-	V
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=400V, R_G=2\Omega, V_{GS}=10V, I_D=2.5A$	-	30	-	nS
Rise Time	$t_r$		-	14	-	
Turn-Off Delay Time	$t_{d(off)}$		-	59.6	-	
Fall Time	$t_f$		-	27.2	-	
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, F=100kHz$	-	878	-	pF
Output Capacitance	$C_{oss}$		-	34	-	
Reverse Transfer Capacitance	$C_{rss}$		-	1.5	-	
Effective Output Capacitance, Energy Related	$C_{o(er)}$	$V_{GS}=0V, V_{DS}=0V-400V$	-	21	-	
Effective Output Capacitance, Time Related	$C_{o(tr)}$		-	108	-	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Peak Reverse Recovery Current	$I_{rrm}$	$V_R=400V, I_S=2.5A, di/dt=100A/\mu s$	-	15.8	-	A
Reverse Recovery Time	$T_{rr}$		-	216	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	1.8	-	$\mu C$
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=5A$	-	-	1.3	V

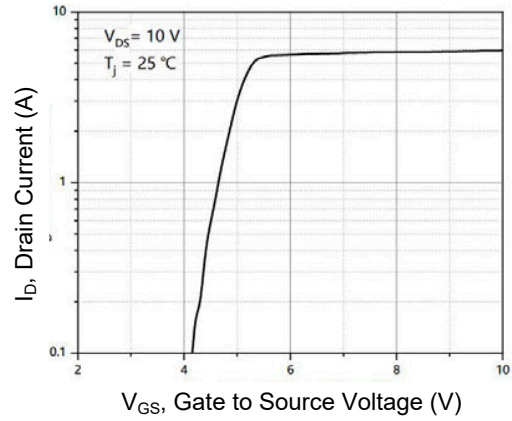
Note:

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.  $V_{DD}=100V, V_{GS}=10V, L=79.9mH$ , starting  $T_J=25^\circ\text{C}$ .

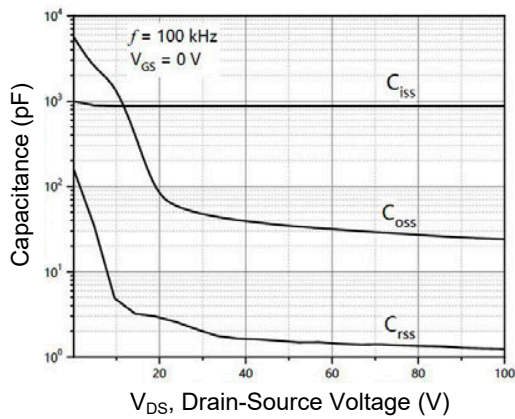
**Typical Electrical and Thermal Characteristic Curves**



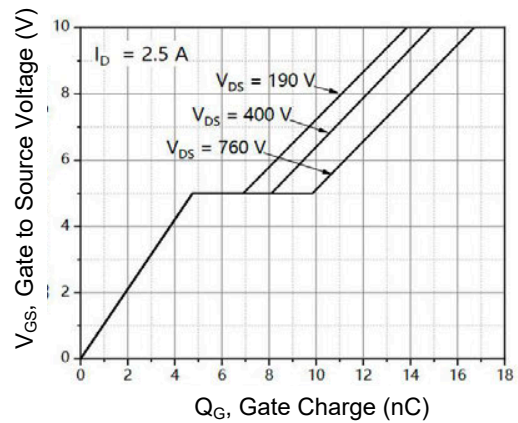
**Figure 1. Output Characteristics**



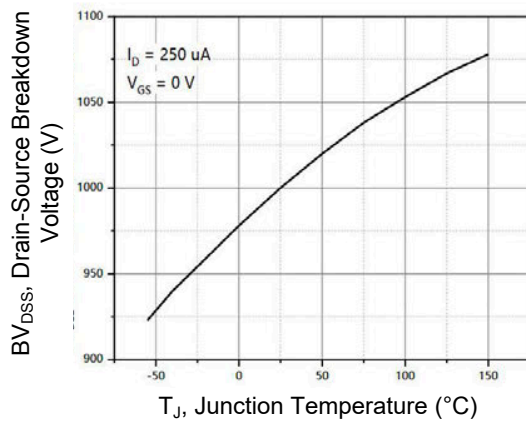
**Figure 2. Transfer Characteristics**



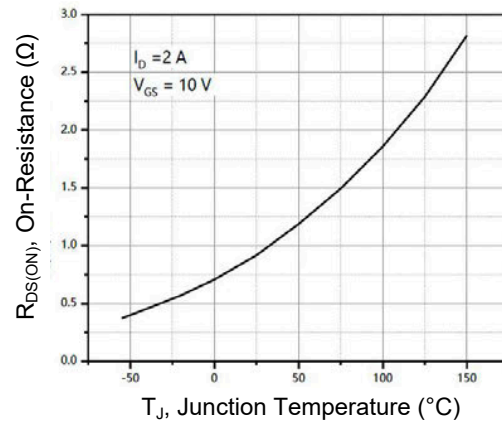
**Figure 3. Capacitance Characteristics**



**Figure 4. Gate Charge**

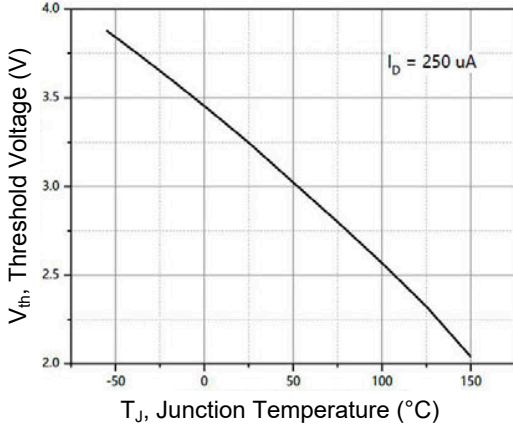


**Figure 5. Drain-Source Breakdown Voltage**

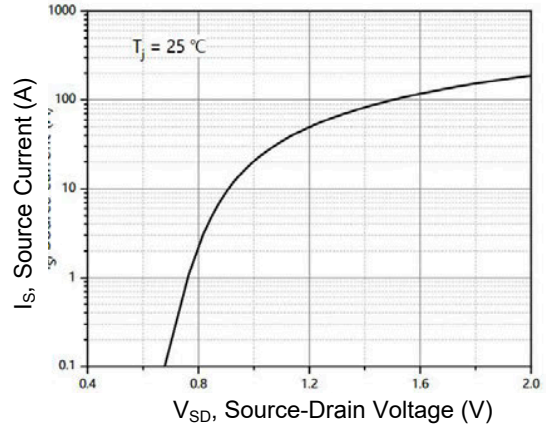


**Figure 6. Drain-Source On-State Resistance**

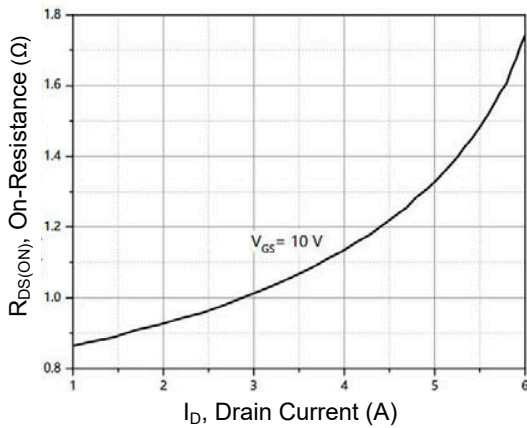
**Typical Electrical and Thermal Characteristic Curves**



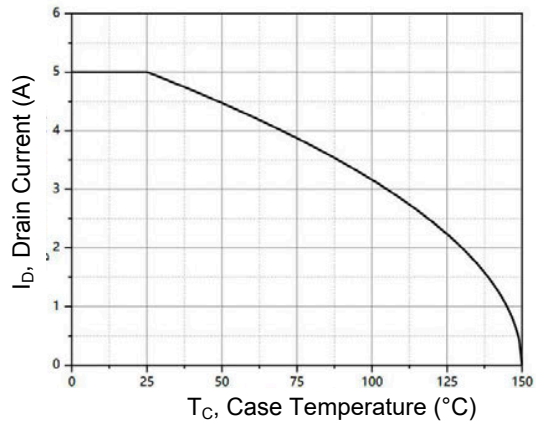
**Figure 7. Threshold Voltage**



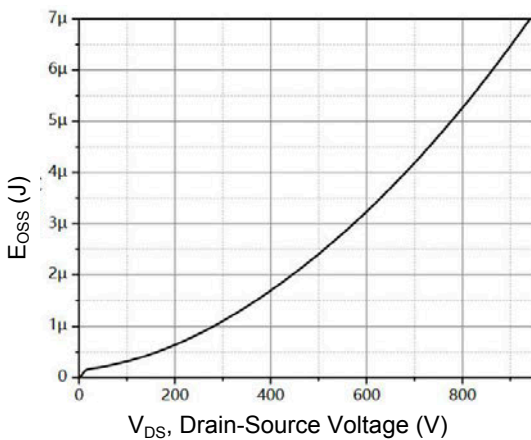
**Figure 8. Forward Characteristics of Body Diode**



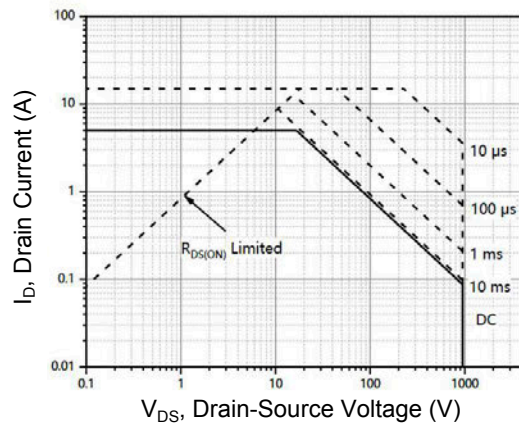
**Figure 9.  $R_{DS(ON)}$  vs. Drain Current**



**Figure 10. Drain Current**

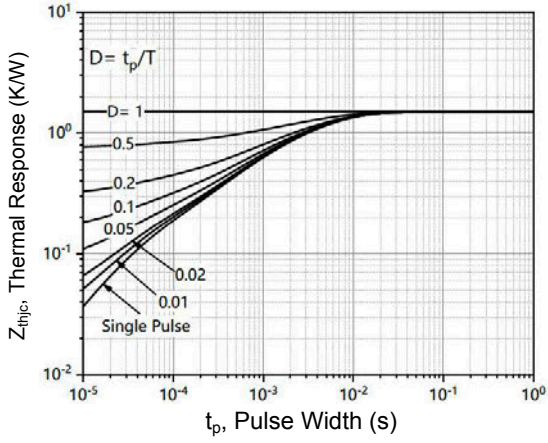


**Figure 11. Typ.  $C_{oss}$  Stored Energy**



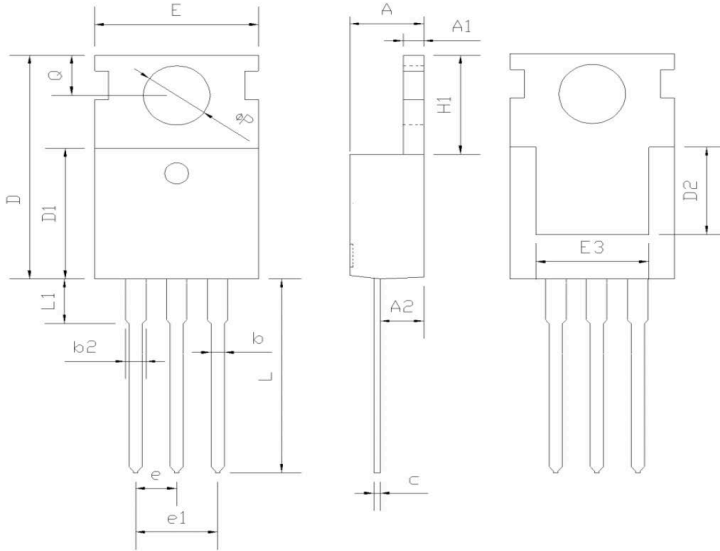
**Figure 12. Safe Operation Area,  $T_c=25^\circ\text{C}$**

### Typical Electrical and Thermal Characteristic Curves



**Figure 13. Max. Transient Thermal Impedance**

**Package Outline Dimensions (TO-220)**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.370	4.770	0.172	0.188
A1	1.250	1.450	0.049	0.057
A2	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b2	1.170	1.470	0.046	0.058
c	0.400	0.650	0.016	0.026
D	15.100	16.100	0.594	0.634
D1	8.800	9.400	0.346	0.370
D2	5.500	-	0.217	-
E	9.700	10.300	0.382	0.406
E3	7.000	-	0.276	-
e	2.540 BSC		0.100 BSC	
e1	5.080 BSC		0.200 BSC	
H1	6.250	6.850	0.246	0.270
L	12.750	13.800	0.502	0.543
L1	-	3.400	-	0.134
θP	3.400	3.800	0.134	0.150
Q	2.600	3.000	0.102	0.118