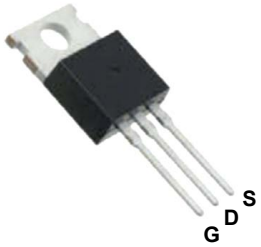
GOOD-ARK SEMICONDUCTOR

GSFH500P10

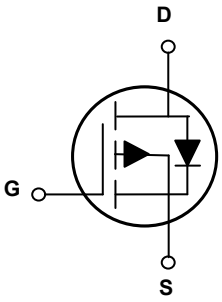
100V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-100V
$R_{DS(ON)}$	50mΩ (Max.)
I_D	-30A



TO-220



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 GSFH500P10 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_A=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_C=25°C)	I_D	-30	A
Continuous Drain Current, @ Steady-State (T_C=100°C)		-20	A
Pulsed Drain Current (T_C=25°C)[1]	I_{DM}	-120	A
Power Dissipation (T_C=25°C)[2]	P_D	130	W
Single Pulse Avalanche Energy	E_{AS}	289	mJ
Single Pulse Current	I_{AS}	-34	A
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	62.0	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.96	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	°C
Soldering Temperature (SMD)	T_{sold}	260	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-100	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=-100V, V_{GS}=0V, T_J=25°C	-	-	-1.0	μA
		V_{DS}=-100V, V_{GS}=0V, T_J=125°C	-	-1.0	-10	
Gate-to-Source Forward Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=20V	-	-	100	nA
		V_{DS}=0V, V_{GS}=-20V	-	-	-100	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-15A	-	35	50	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.2	-	-2.9	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-25V, f=1MHz	-	4440	-	pF
Output Capacitance	C_{oss}		-	233	-	
Reverse Transfer Capacitance	C_{rss}		-	144	-	
Total Gate Charge[3,4]	Q_g	I_D=-15A, V_{DD}=-50V, V_{GS}=-10V	-	80	-	nC
Gate-to-Source Charge[3,4]	Q_{gs}		-	19	-	
Gate-to-Drain ("Miller") Charge[3,4]	Q_{gd}		-	15	-	
Gate-to-Plateau[3,4]	$V_{plateau}$		-	4.1	-	V
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=-50V, V_{GS}=-10V, R_G=9.1Ω, I_D=-15A	-	9.8	-	nS
Rise Time[3,4]	t_r		-	41	-	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	258	-	
Fall Time[3,4]	t_f		-	90	-	
Gate Resistance	R_g	f=1MHz	-	12	-	Ω
Drain-Source Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	-30	A
Diode Pulse Current	$I_{S.pulse}$		-	-	-120	A
Diode Forward Voltage	V_{SD}	I_S=-10A, V_{GS}=0V	-	-	-1.4	V
Reverse Recovery Time[3]	t_{rr}	I_S=-15A, V_{GS}=0V, dI_F/dt=100A/us	-	31	-	nS
Reverse Recovery Charge[3]	Q_{rr}		-	0.05	-	μC

Notes:

1. Pulse time is 5μs.
2. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power value will decrease by 0.83°C/W for every 1 degree increase in temperature.
3. Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%
4. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

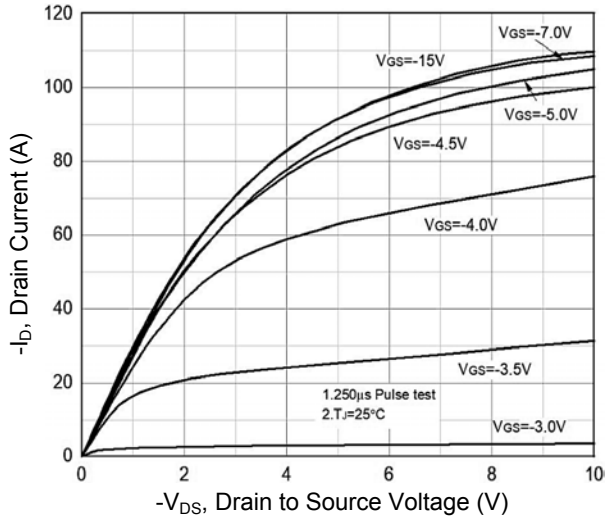


Figure 1. Typical Output Characteristics

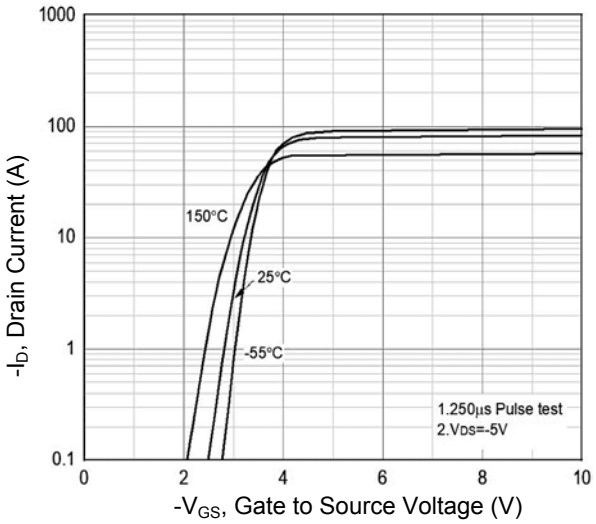


Figure 2. Transfer Characteristics

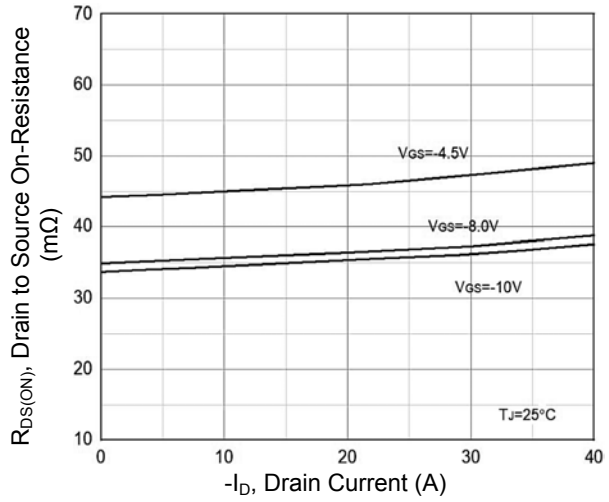


Figure 3. $R_{DS(ON)}$ vs. Drain Current

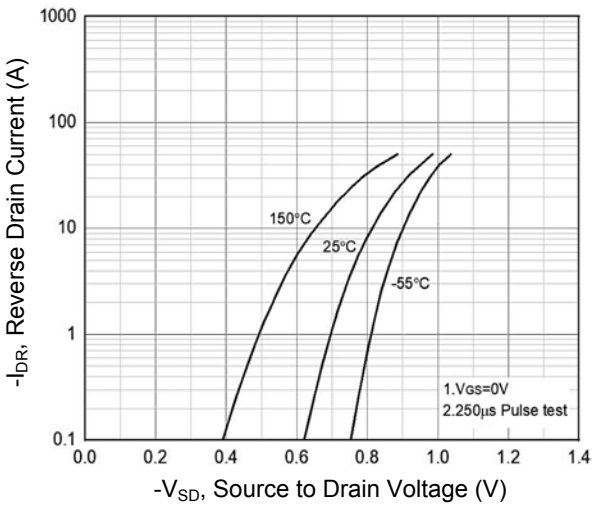


Figure 4. Body Diode Characteristics

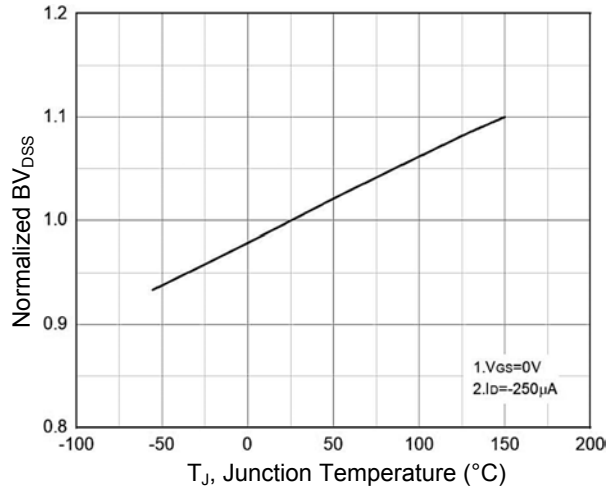


Figure 5. Normalized BV_{DSS} vs. T_J

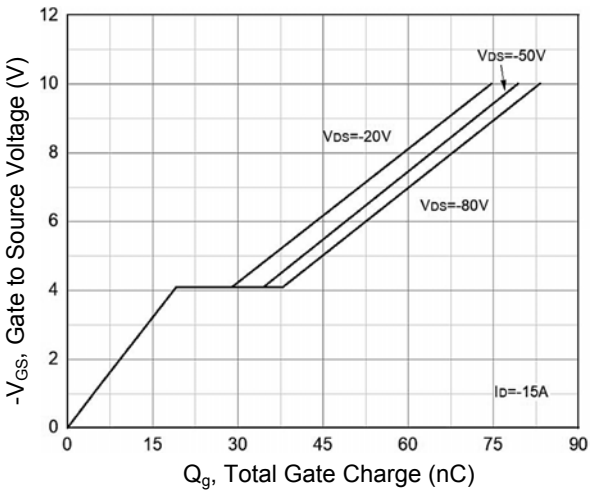


Figure 6. Gate Charge

Typical Electrical and Thermal Characteristic Curves

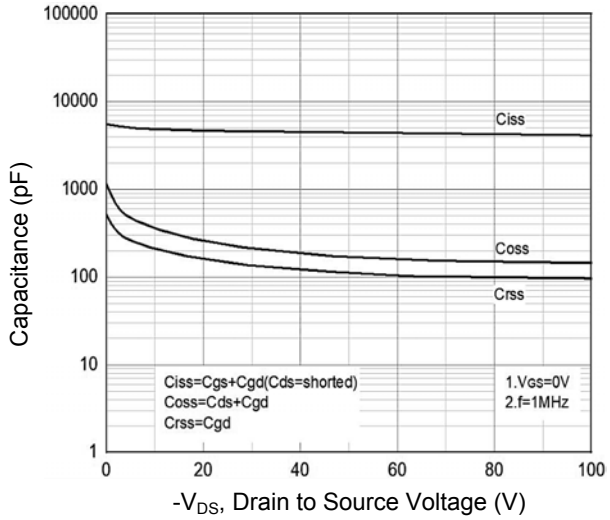


Figure 7. Capacitance Characteristics

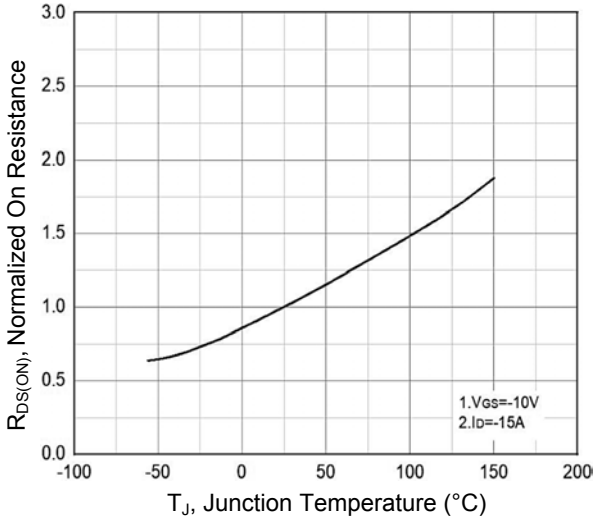


Figure 8. Normalized $R_{DS(ON)}$ vs. T_J

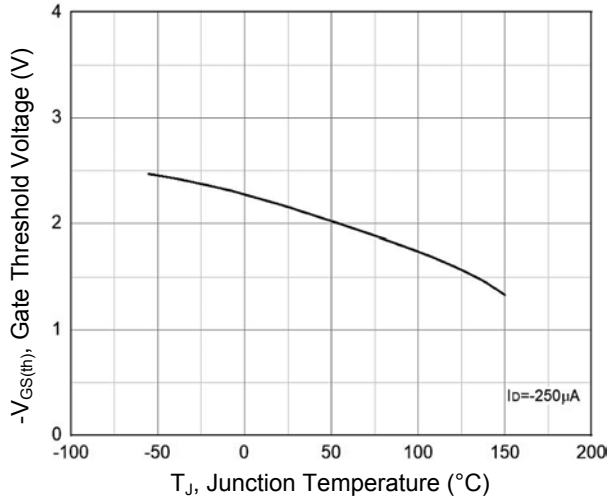


Figure 9. Gate Threshold Voltage vs. T_J

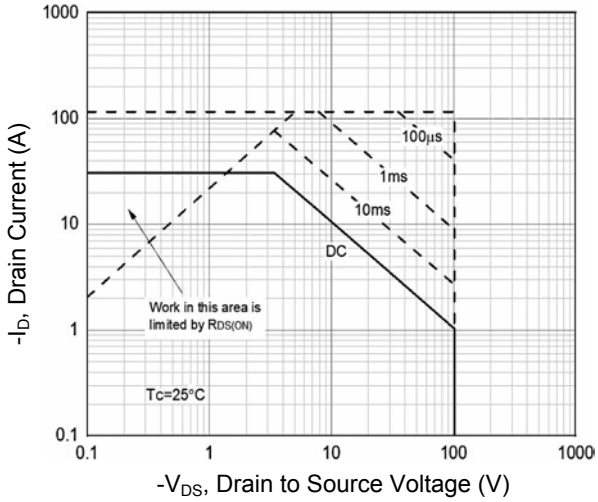
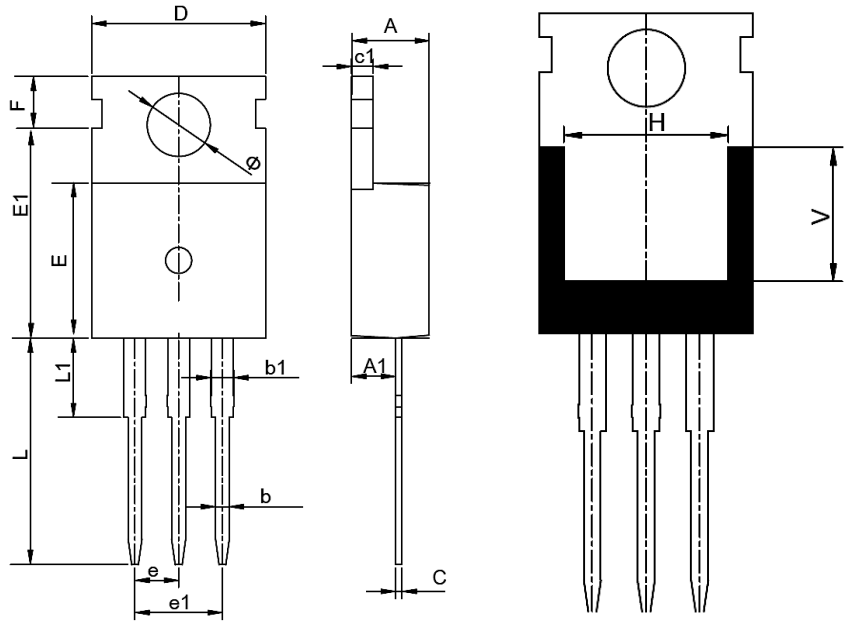


Figure 10. Safe Operation Area

Package Outline Dimensions (TO-220)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.40	4.60	0.173	0.181
A1	2.25	2.70	0.089	0.106
b	0.71	0.91	0.028	0.036
b1	1.17	1.37	0.046	0.054
C	0.33	0.65	0.013	0.026
c1	1.20	1.40	0.047	0.055
D	9.91	10.25	0.390	0.404
E	8.95	9.75	0.352	0.384
E1	12.65	13.00	0.498	0.512
e	2.54 TYP		0.100 TYP	
e1	4.98	5.18	0.196	0.204
F	2.65	2.95	0.104	0.116
H	7.90	8.10	0.311	0.319
L	12.90	13.40	0.508	0.528
L1	2.68	3.25	0.106	0.128
V	6.90 REF		0.272 REF	
Φ	3.40	3.80	0.134	0.150

Order Information

Device	Package	Marking	Carrier	Quantity
GSFH500P10	TO-220	H500P10	Tube	50 Pcs / Tube