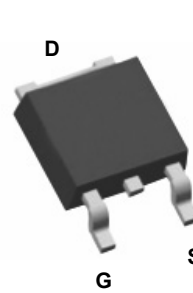
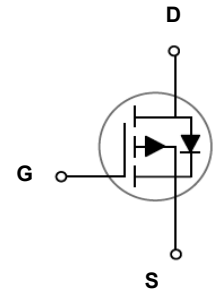


Main Product Characteristics

BV_{DSS}	-100V
$R_{DS(ON)}$	50m Ω (max.)
I_D	-30A



TO-252 (DPAK)



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 GSFD500P10 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 ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{(BR)DSS}$	-100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous, @ Steady-State ($T_C=25^\circ\text{C}$)	I_D	-30	A
Drain Current-Continuous, @ Steady-State ($T_C=100^\circ\text{C}$)		-20	
Drain Current-Pulsed ¹ ($T_C=25^\circ\text{C}$)	I_{DM}	-120	A
Power Dissipation ² ($T_C=25^\circ\text{C}$)	P_D	104	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	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.2	$^\circ\text{C/W}$
Maximum Junction Temperature Range	T_J	-55 To +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^\circ\text{C}$
Soldering Temperature (SMD)	T_{SOLD}	260	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-100	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-100V, V_{GS}=0V$ $T_J=25^\circ\text{C}$	-	-	-1	μA
		$V_{DS}=-100V, V_{GS}=0V$ $T_J=25^\circ\text{C}$	-	-1	-10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-15A$	-	35	50	m Ω
Gate Resistance	R_G	F=1MHz	-	12	-	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.5	-	-2.5	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{3,4}	Q_g	$V_{DD}=-50V, I_D=-15A$ $V_{GS}=-10V$	-	80	-	nC
Gate-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}	$t_{d(on)}$	$V_{DD}=-50V, R_G=9.1\Omega$ $V_{GS}=-10V, I_D=-15A$	-	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	-	
Input Capacitance	C_{iss}	$V_{DS}=-25V, V_{GS}=0V,$ F=1MHz	-	4440	-	pF
Output Capacitance	C_{oss}		-	233	-	
Reverse Transfer Capacitance	C_{rss}		-	144	-	
Drain-Source Diode Characteristics and Maximum Ratings						
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}	$V_{GS}=0V, I_S=-10A$	-	-	-1.4	V
Reverse Recovery Time ³	T_{rr}	$V_{GS}=0V, I_S=-15A,$ $di/dt=100A/\mu s$	-	31	-	ns
Reverse Recovery Charge ³	Q_{rr}		-	0.05	-	uc

Note:

1. Pulse time is 5 μ S.
2. The dissipated power value will change with the temperature. When it is greater than 25 $^\circ\text{C}$, the dissipated power value will decrease by 0.83 $^\circ\text{C}/\text{W}$ for every 1 degree increase in temperature.
3. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

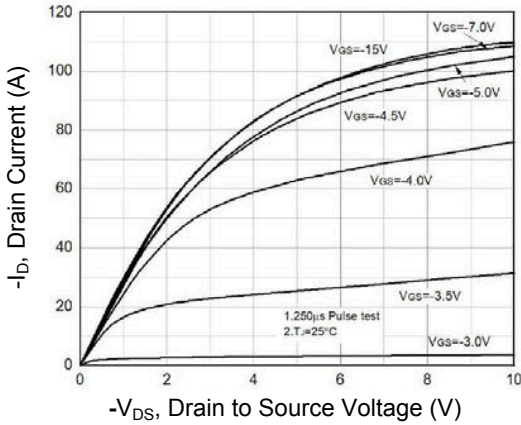


Figure 1. Typical Output Characteristics

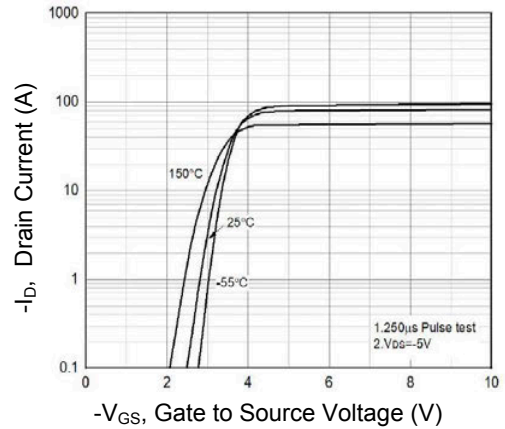


Figure 2. Transfer Characteristics

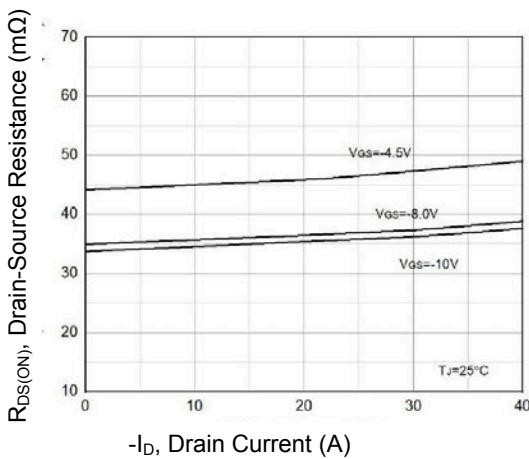


Figure 3. $R_{DS(ON)}$ vs. Drain Current

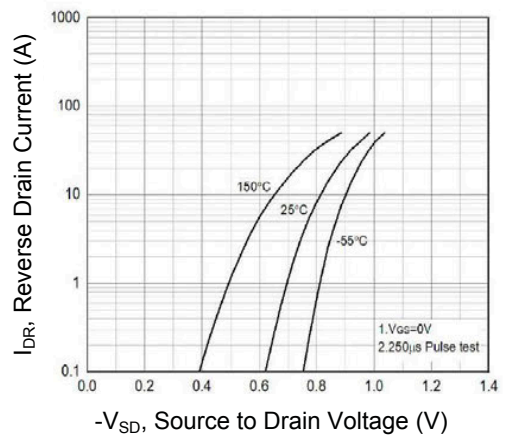


Figure 4. Body Diode Characteristics

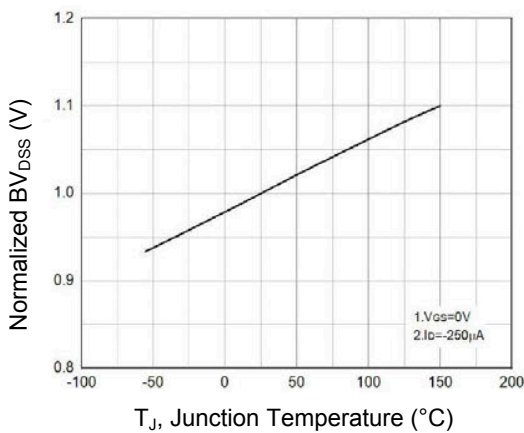


Figure 5. Normalized BV_{DSS} vs. T_J

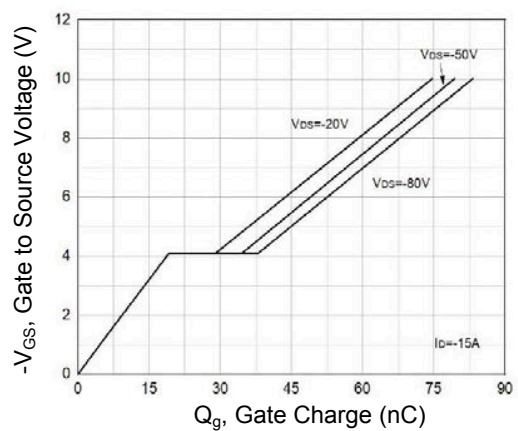


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

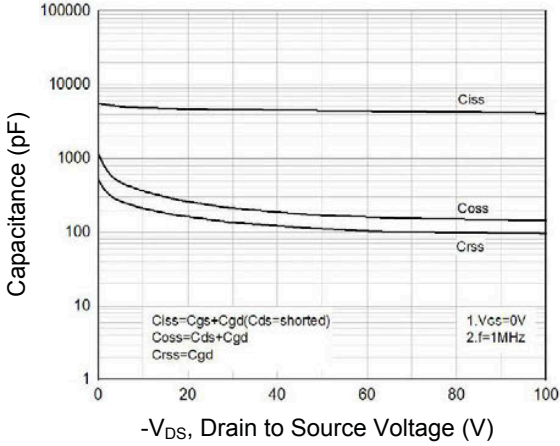


Figure 7. Capacitance Characteristics

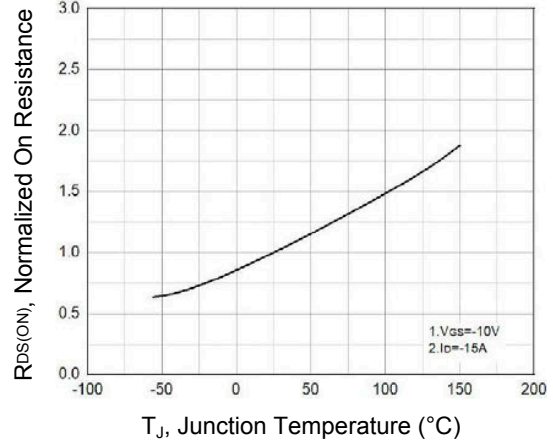


Figure 8. Normalized $R_{DS(on)}$ vs. T_J

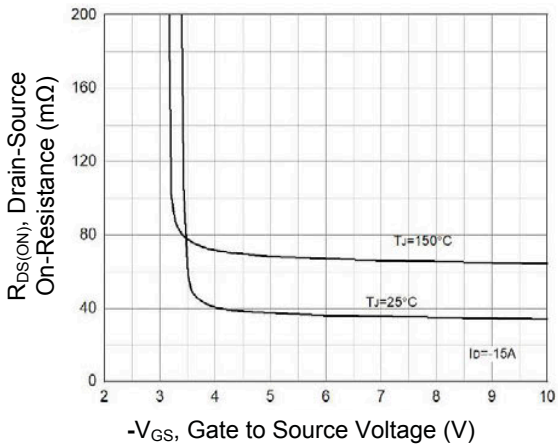


Figure 9. Normalized $R_{DS(on)}$ vs. V_{GS}

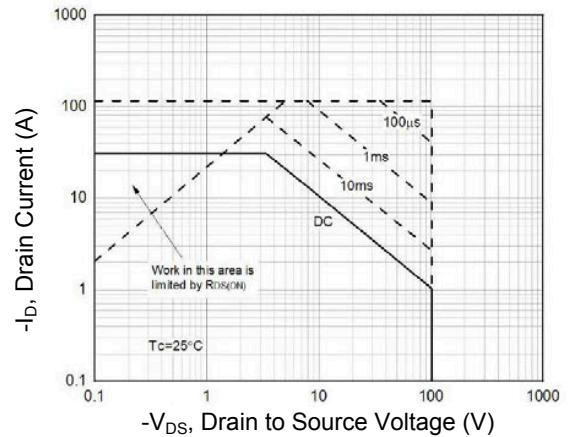


Figure 10. Safe Operation Area

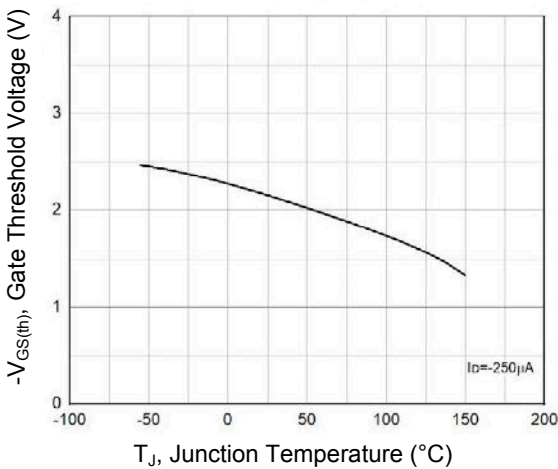


Figure 11. Gate Threshold Voltage vs. T_J

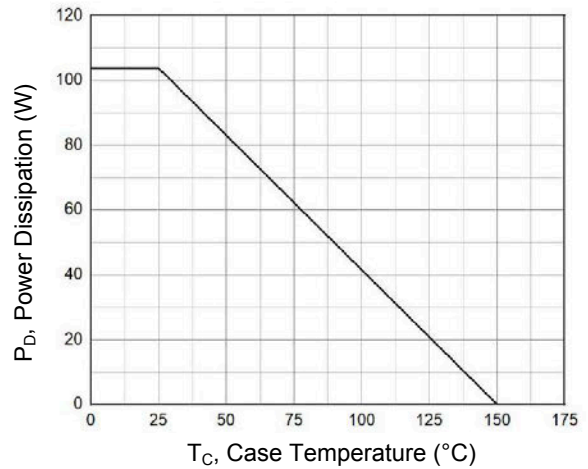
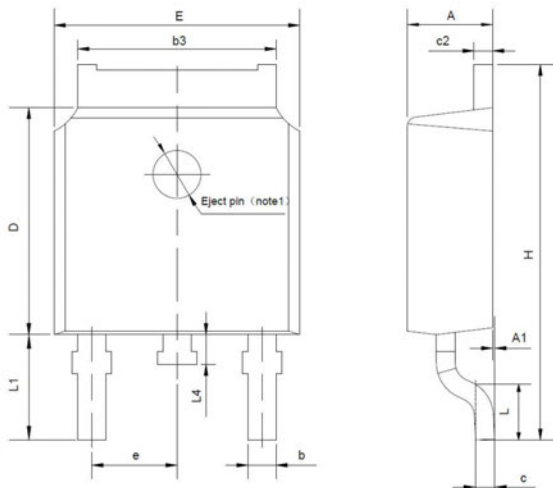


Figure 12. Power Dissipation vs. T_C

Package Outline Dimensions TO-252 (DPAK)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.100	2.500	0.083	0.098
A1	0.000	0.127	0.000	0.005
b	0.660	0.890	0.026	0.035
b3	5.100	5.460	0.201	0.215
c	0.450	0.650	0.018	0.026
c2	0.450	0.650	0.018	0.026
D	5.800	6.400	0.228	0.252
E	6.300	6.900	0.248	0.272
e	2.300 TYP		0.091 TYP	
H	9.600	10.600	0.378	0.417
L	1.400	1.700	0.055	0.067
L1	2.900 REF		0.114 REF	
L4	0.600	1.000	0.024	0.039