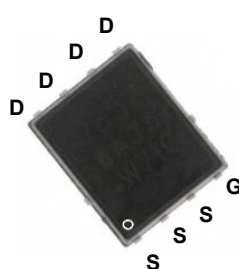
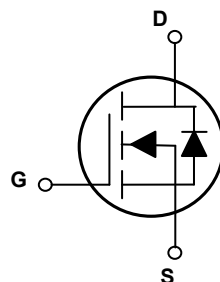


### Main Product Characteristics

$BV_{DSS}$	100V
$R_{DS(ON)}$	4.3m $\Omega$ (Max)
$I_D$	136A



PPAK5x6



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 GSFP4R310 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	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous, @ Steady-State ( $T_C=25^{\circ}\text{C}$ )	$I_D$	136	A
Drain Current-Continuous, @ Steady-State ( $T_C=100^{\circ}\text{C}$ )		88	
Drain Current-Pulsed ( $T_C=25^{\circ}\text{C}$ ) <sup>1</sup>	$I_{DM}$	544	A
Single Pulse Avalanche Energy	$E_{AS}$	289	mJ
Single Pulse Avalanche Current	$I_{AS}$	34	A
Power Dissipation ( $T_C=25^{\circ}\text{C}$ ) <sup>2</sup>	$P_D$	147	W
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.85	$^{\circ}\text{C/W}$
Operating 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
<b>On / Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	-	-	1.0	$\mu A$
		$V_{DS}=100V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	-	2.0	-	$\mu A$
Gate-Source Forward Leakage	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=50A$	-	3.3	4.3	m $\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.1	-	3.9	V
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{DD}=50V, I_D=50A, V_{GS}=10V$	-	62	-	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{gs}$		-	30	-	
Gate-Drain ("Miller") Charge <sup>3,4</sup>	$Q_{gd}$		-	9.2	-	
Gate to Plateau <sup>3,4</sup>	$V_{plateau}$		-	5.8	-	V
Turn-On Delay Time <sup>3,4</sup>	$t_{d(on)}$	$V_{DD}=50V, R_G=3\Omega, V_{GS}=10V, I_D=50A$	-	32	-	nS
Rise Time <sup>3,4</sup>	$t_r$		-	95	-	
Turn-Off Delay Time <sup>3,4</sup>	$t_{d(off)}$		-	60	-	
Fall Time <sup>3,4</sup>	$t_f$		-	26	-	
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	-	4755	-	pF
Output Capacitance	$C_{oss}$		-	630	-	
Reverse Transfer Capacitance	$C_{rss}$		-	18	-	
Gate Resistance	$R_g$	$F=1\text{MHz}$	-	3.3	-	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current (Body Diode)	$I_S$	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	136	A
Pulsed Source Current	$I_{S,pulse}$		-	-	544	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=50A$	-	-	1.4	V
Reverse Recovery Time <sup>3</sup>	$t_{rr}$	$V_{GS}=0V, V_R=50V, I_S=50A, dI_F/dt=100A/\mu s$	-	59	-	nS
Reverse Recovery Charge <sup>3</sup>	$Q_{rr}$		-	98	-	nC

Note:

1. Pulse time of 5 $\mu s$ .
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 0.55 $^{\circ}\text{C}/\text{W}$  for every 1 degree of temperature increase.
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

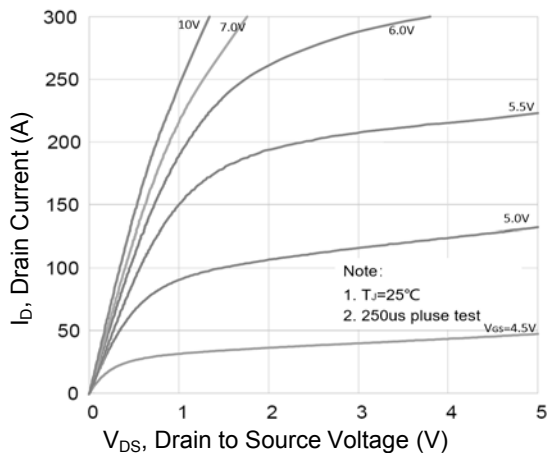


Figure 1. Typical Output Characteristics

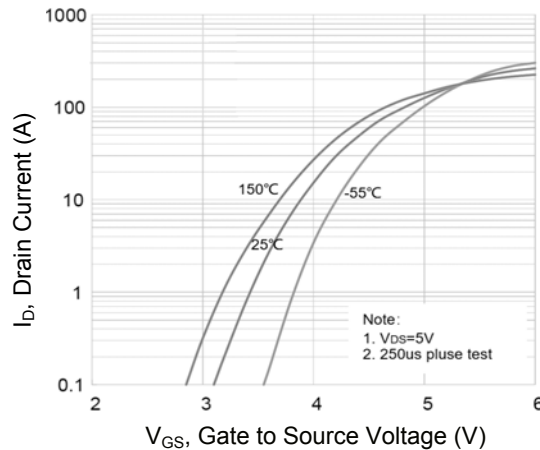


Figure 2. Transfer Characteristics

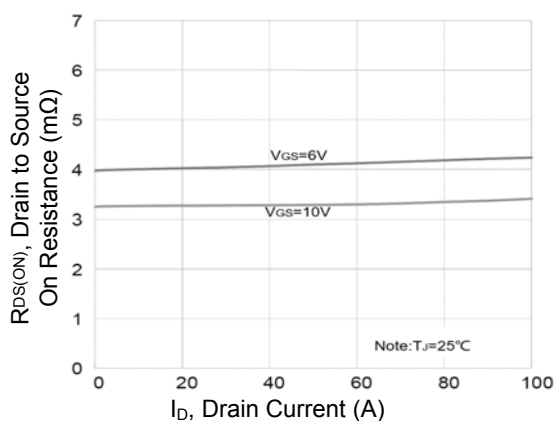


Figure 3.  $R_{DS(ON)}$  vs. Drain Current

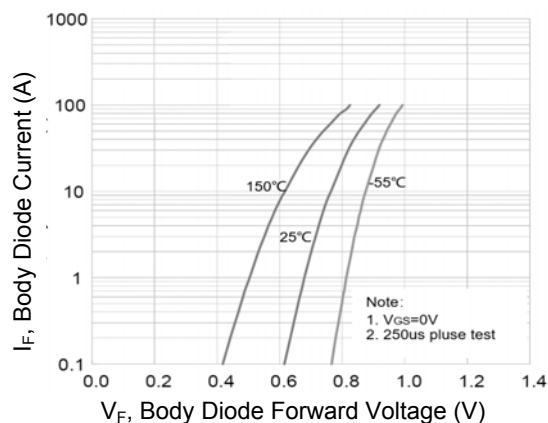


Figure 4. Body Diode Characteristics

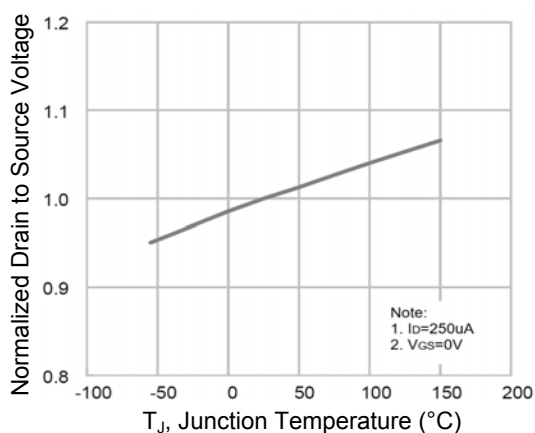


Figure 5. Normalized  $BV_{DSS}$  vs.  $T_J$

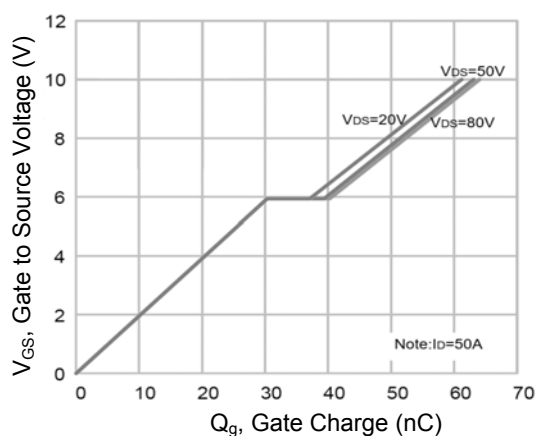
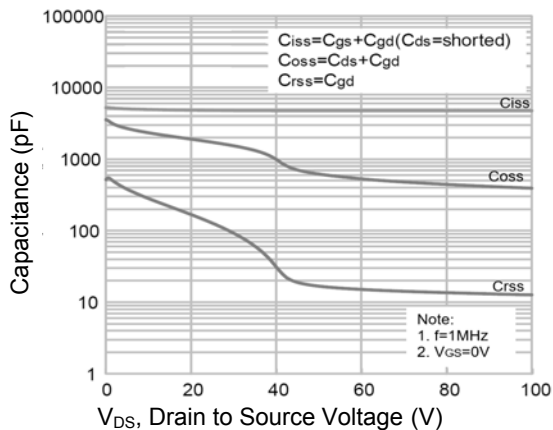
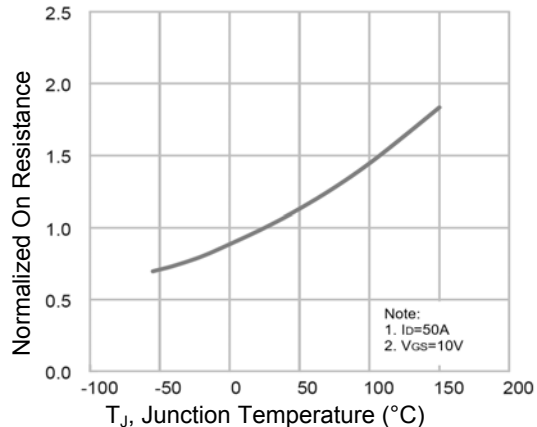


Figure 6. Gate Charge Characteristics

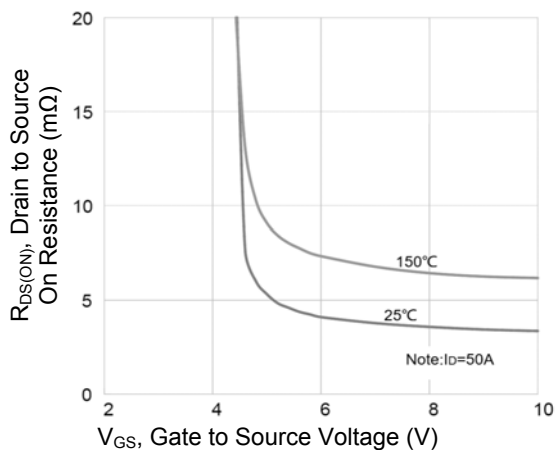
## Typical Electrical and Thermal Characteristic Curves



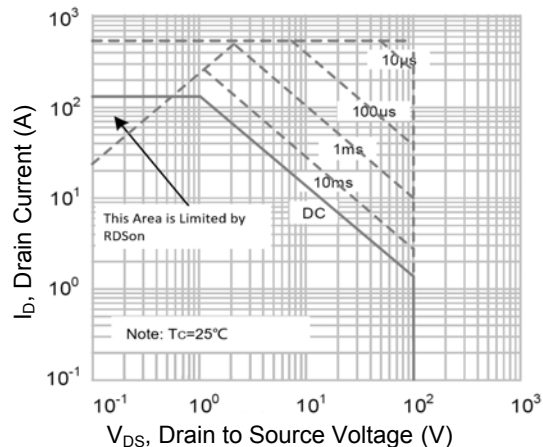
**Figure 7. Capacitance Characteristics**



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

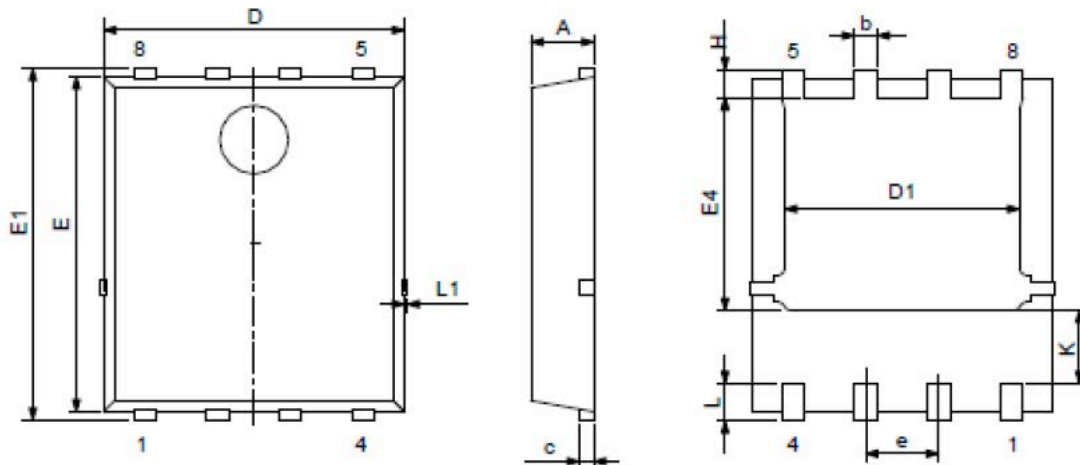


**Figure 9. Normalized  $R_{DS(ON)}$  vs.  $V_{GS}$**



**Figure 10. Safe Operation Area**

## Package Outline Dimensions (PPAK5x6)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.047
c	0.154	0.354	0.006	0.014
D	4.800	5.400	0.189	0.213
E	5.660	6.060	0.223	0.239
D1	3.760	4.300	0.148	0.169
E1	5.900	6.350	0.232	0.250
b	0.300	0.550	0.012	0.022
k	1.100	1.500	0.043	0.059
e	1.070	1.370	0.042	0.054
E4	3.340	3.920	0.131	0.154
L	0.300	0.710	0.012	0.028
L1	-	0.120	-	0.005
H	0.400	0.710	0.016	0.028