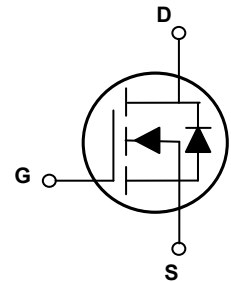
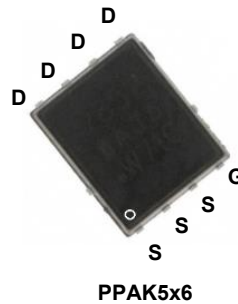


Main Product Characteristics

BV_{DSS}	40V
$R_{DS(ON)}$	0.70m Ω (Typ.)
I_D	280A



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 GSFPR8504 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}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous, @Steady-State ($T_C=25^\circ\text{C}$) ¹	I_D	280	A
Drain Current-Continuous, @Steady-State ($T_C=100^\circ\text{C}$) ¹		176	
Drain Current-Pulsed ($T_C=25^\circ\text{C}$) ²	I_{DM}	1120	A
Single Pulse Avalanche Energy	E_{AS}	169	mJ
Single Pulse Current	I_{AS}	52	A
Power Dissipation ($T_C=25^\circ\text{C}$) ³	P_D	139	W
Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	$^\circ\text{C/W}$
Junction-to-Case	$R_{\theta JC}$	0.74	$^\circ\text{C/W}$
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
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	1	μA
		$V_{DS}=40V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	2.5	-	μA
Gate-Source Forward Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=50A$	-	0.7	0.85	m Ω
		$V_{GS}=4.5V, I_D=50A$	-	1.0	1.4	
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.1	1.8	2.9	V
Dynamic and Switching Characteristics						
Total Gate Charge ^{4,5}	Q_g	$V_{DD}=15V, I_D=45A, V_{GS}=10V$	-	121	-	nC
Gate-Source Charge ^{4,5}	Q_{gs}		-	36	-	
Gate-Drain ("Miller") Charge ^{4,5}	Q_{gd}		-	7.5	-	
Gate to Plateau ^{4,5}	$V_{plateau}$		-	4.0	-	V
Turn-On Delay Time ^{4,5}	$t_{d(on)}$	$V_{DD}=20V, R_G=3\Omega, V_{GS}=10V, I_D=20A$	-	27	-	nS
Rise Time ^{4,5}	t_r		-	71	-	
Turn-Off Delay Time ^{4,5}	$t_{d(off)}$		-	102	-	
Fall Time ^{4,5}	t_f		-	32	-	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$	-	9040	-	pF
Output Capacitance	C_{oss}		-	5389	-	
Reverse Transfer Capacitance	C_{rss}		-	291	-	
Gate Resistance	R_g	$F=1\text{MHz}$	-	1.5	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	280	A
Diode Pulse Current	$I_{S,pulse}$		-	-	1120	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=50A$	-	-	1.4	V
Reverse Recovery Time ⁴	t_{rr}	$V_{GS}=0V, I_S=14A, V_R=30V, dI_F/dt=100A/\mu s$	-	90	-	nS
Reverse Recovery Charge ⁴	Q_{rr}		-	170	-	nC

Note:

1. The rated value only refers to the maximum absolute value under the case temperature of 25 degrees in the manual. If the case temperature is higher than 25 degrees, the frequency needs to be reduced according to the actual environmental conditions.
2. Pulse time of 5 μs , pulse width limited by maximum junction temperature.
3. 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 0.74 $^\circ\text{C}/\text{W}$ for every 1 degree of temperature increase.
4. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

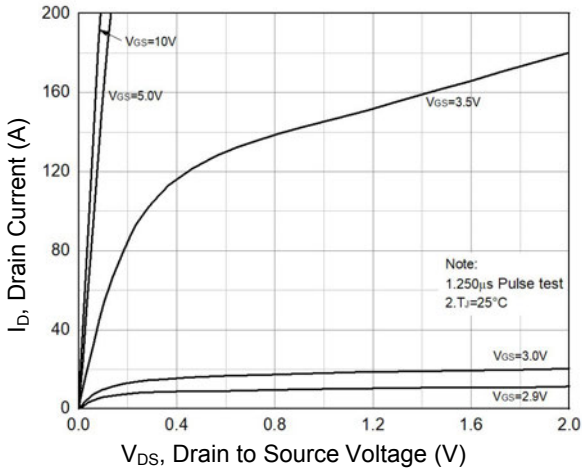


Figure 1. Typical Output Characteristics

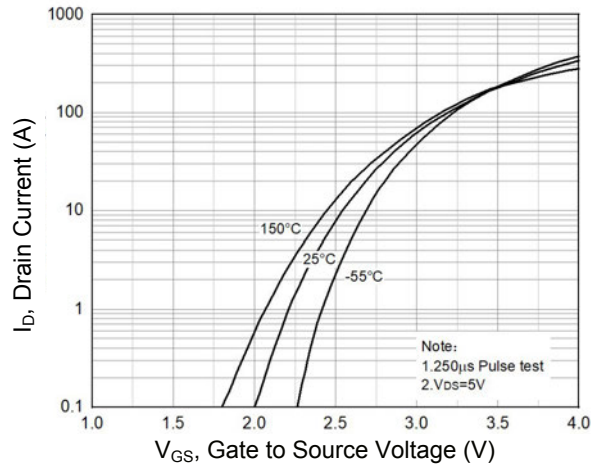


Figure 2. Transfer Characteristics

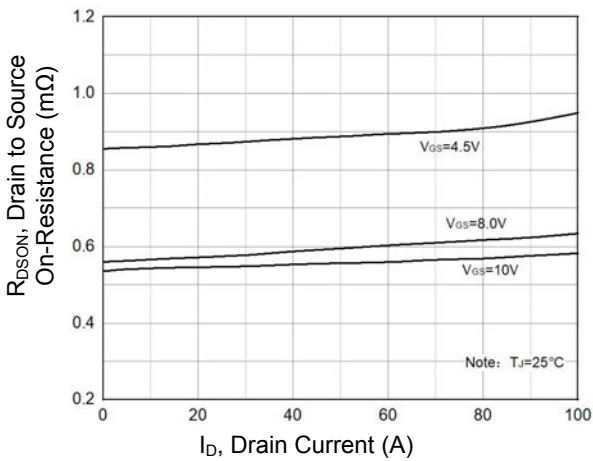


Figure 3. $R_{DS(ON)}$ vs. Drain Current

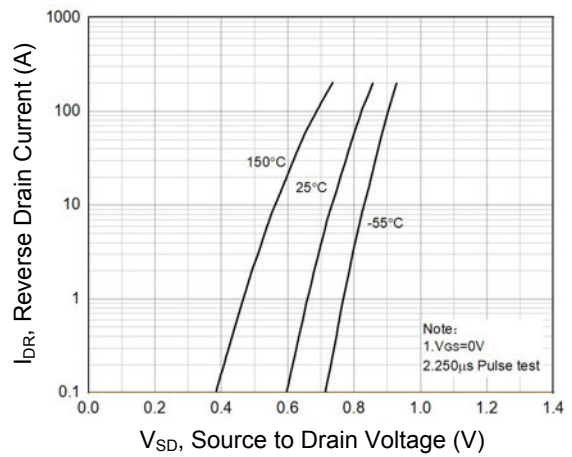


Figure 4. Body Diode Characteristics

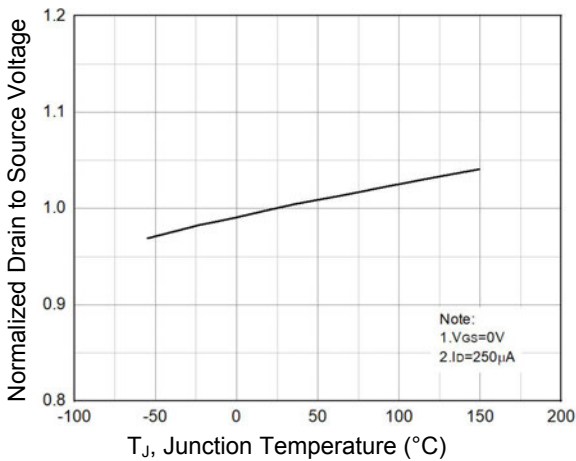


Figure 5. Normalized BV_{DSS} vs. T_J

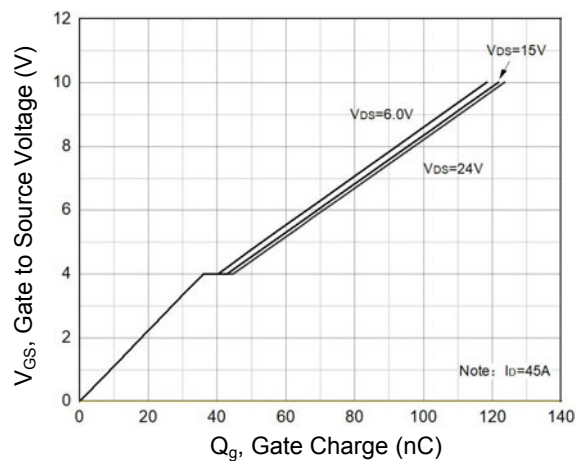


Figure 6. Gate Charge Characteristics

Typical Electrical and Thermal Characteristic Curves

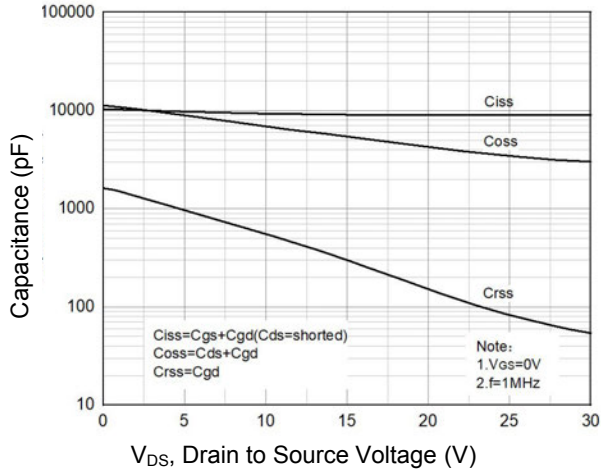


Figure 7. Capacitance Characteristics

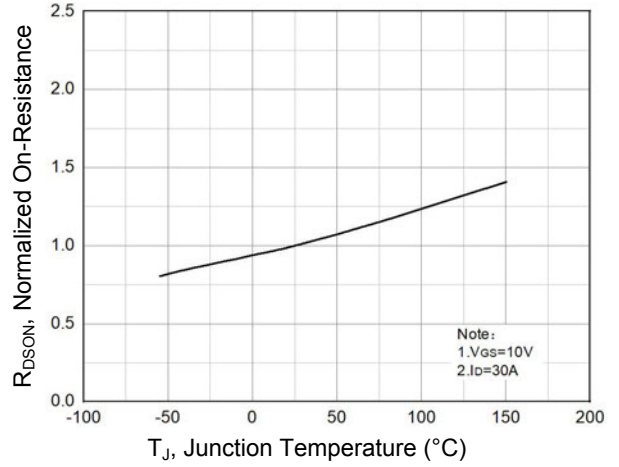


Figure 8. Normalized Rdson vs. T_J

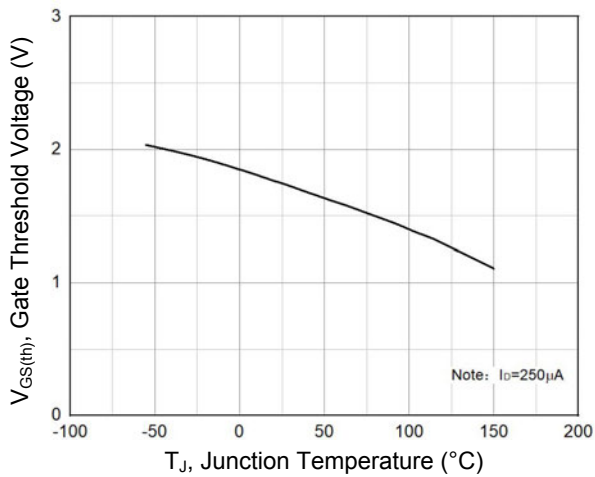


Figure 9. Gate Threshold Voltage vs. T_J

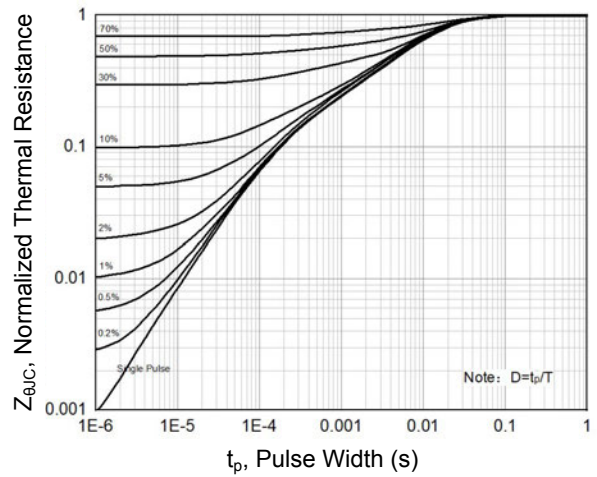
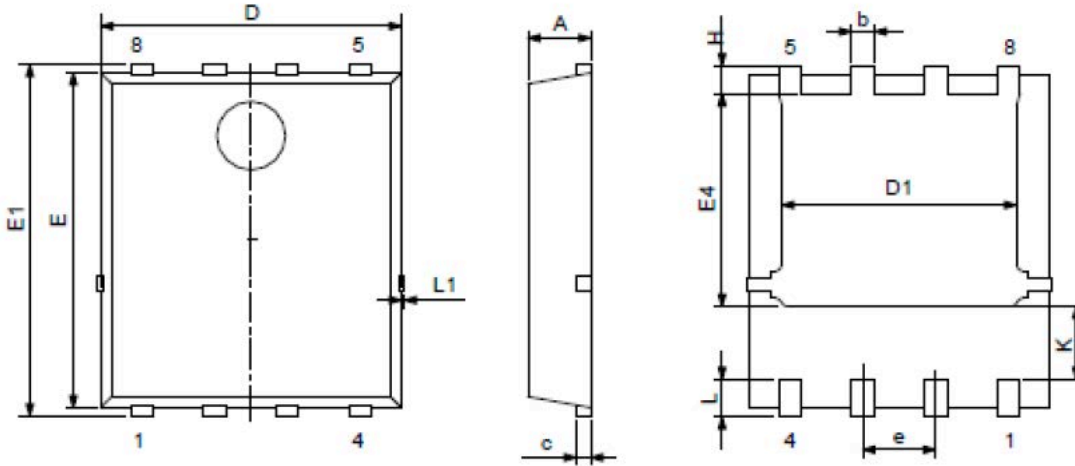


Figure 10. Transient Thermal Impedance vs. t_p

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