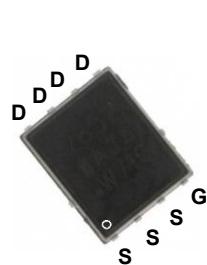
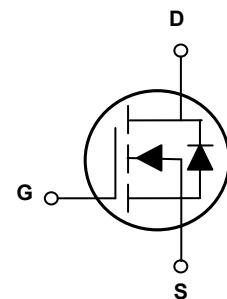


## Main Product Characteristics

$V_{(BR)DSS}$	65V
$R_{DS(ON)}$	2.8mΩ
$I_D$	130A



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 SSFP6975 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 supply and a wide variety of other applications.

## Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	$V_{DS}$	65	V
Gate-Source Voltage	$V_{GS}$	+20/-12	V
Drain Current-Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	130	A
Drain Current-Continuous ( $T_C=100^\circ\text{C}$ )		82	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	520	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	245	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	70	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	142	W
Power Dissipation-Derate above 25°C		1.14	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.88	°C/W
Operating Junction Temperature Range	$T_J$	-55 To +150	°C
Storage Temperature Range	$T_{STG}$	-55 To +150	°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	$\text{BV}_{\text{DSS}}$	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$	65	-	-	V
$\text{BV}_{\text{DSS}}$ Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $\text{I}_D=1\text{mA}$	-	0.05	-	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$\text{I}_{\text{DS}}^{\text{SS}}$	$\text{V}_{\text{DS}}=60\text{V}, \text{V}_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$\text{V}_{\text{DS}}=48\text{V}, \text{V}_{\text{GS}}=0\text{V}, T_J=85^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$\text{I}_{\text{GS}}^{\text{SS}}$	$\text{V}_{\text{GS}}=20\text{V}, \text{V}_{\text{DS}}=0\text{V}$	-	-	100	nA
Static Drain-Source On-Resistance	$\text{R}_{\text{DS}(\text{ON})}$	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=20\text{A}$	-	2.3	2.8	$\text{m}\Omega$
		$\text{V}_{\text{GS}}=4.5\text{V}, \text{I}_D=10\text{A}$	-	4.2	5.4	
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	$\text{V}_{\text{GS}}=\text{V}_{\text{DS}}, \text{I}_D=250\mu\text{A}$	1	1.6	2.5	V
$\text{V}_{\text{GS}(\text{th})}$ Temperature Coefficient	$\Delta \text{V}_{\text{GS}(\text{th})}$		-	-5	-	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$\text{g}_{\text{fs}}$	$\text{V}_{\text{DS}}=10\text{V}, \text{I}_D=5\text{A}$	-	11	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$\text{Q}_g$	$\text{V}_{\text{DS}}=48\text{V}, \text{I}_D=10\text{A}, \text{V}_{\text{GS}}=10\text{V}$	-	59	120	nC
Gate-Source Charge <sup>3,4</sup>	$\text{Q}_{\text{gs}}$		-	10.4	20	
Gate-Drain Charge <sup>3,4</sup>	$\text{Q}_{\text{gd}}$		-	19.6	38	
Turn-On Delay Time <sup>3,4</sup>	$\text{t}_{\text{d}(\text{on})}$	$\text{V}_{\text{DD}}=30\text{V}, \text{R}_G=6\Omega, \text{V}_{\text{GS}}=10\text{V}, \text{I}_D=1\text{A}$	-	22	44	nS
Rise Time <sup>3,4</sup>	$\text{t}_r$		-	14	28	
Turn-Off Delay Time <sup>3,4</sup>	$\text{t}_{\text{d}(\text{off})}$		-	40	80	
Fall Time <sup>3,4</sup>	$\text{t}_f$		-	20	40	
Input Capacitance	$\text{C}_{\text{iss}}$	$\text{V}_{\text{DS}}=25\text{V}, \text{V}_{\text{GS}}=0\text{V}, \text{F}=1\text{MHz}$	-	4780	9500	pF
Output Capacitance	$\text{C}_{\text{oss}}$		-	1365	2700	
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$		-	51	102	
Gate Resistance	$\text{R}_g$	$\text{V}_{\text{GS}}=0\text{V}, \text{V}_{\text{DS}}=0\text{V}, \text{F}=1\text{MHz}$	-	1.8	3.6	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$\text{I}_s$	$\text{V}_G=\text{V}_D=0\text{V}, \text{Force Current}$	-	-	130	A
Pulsed Source Current	$\text{I}_{\text{SM}}$		-	-	260	A
Diode Forward Voltage	$\text{V}_{\text{SD}}$	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_s=1\text{A}, T_J=25^\circ\text{C}$	-	-	1	V
Reverse Recovery Time	$\text{t}_{\text{rr}}$	$\text{V}_R=50\text{V}, \text{I}_s=10\text{A}, \text{di/dt}=100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$	-	70	-	nS
Reverse Recovery Charge	$\text{Q}_{\text{rr}}$		-	140	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $\text{V}_{\text{DD}}=25\text{V}, \text{V}_{\text{GS}}=10\text{V}, \text{L}=0.1\text{mH}, \text{I}_{\text{AS}}=70\text{A}, \text{R}_G=25\Omega$ , starting  $T_J=25^\circ\text{C}$ .
3. Pulse test: pulse width  $\leq 300\text{us}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

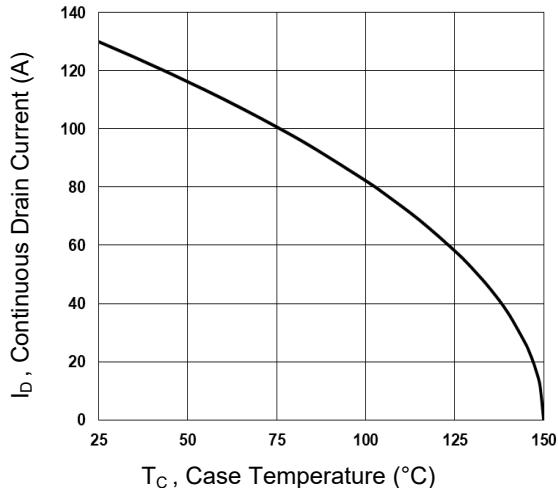


Figure 1. Continuous Drain Current vs. T<sub>c</sub>

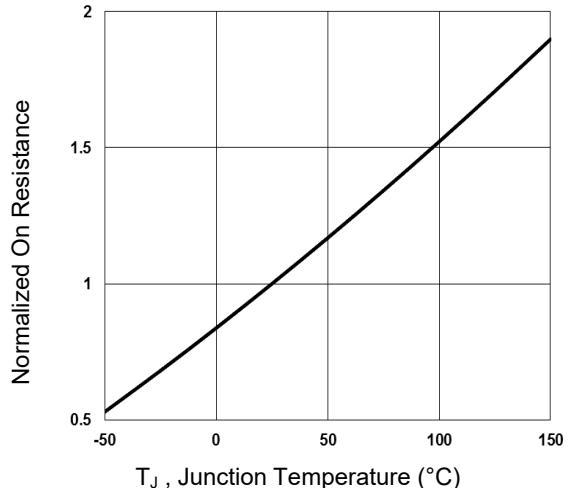


Figure 2. Normalized R<sub>DSON</sub> vs. T<sub>j</sub>

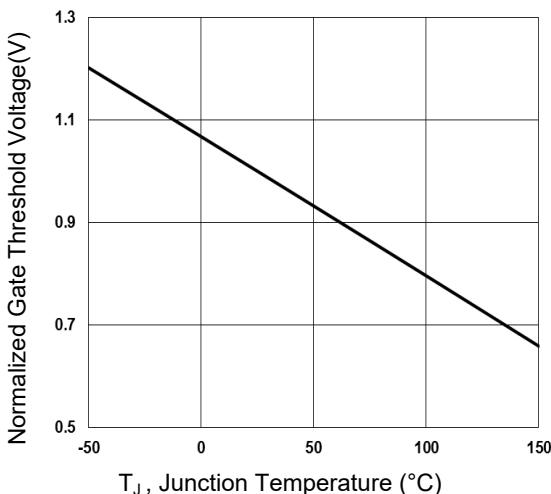


Figure 3. Normalized V<sub>th</sub> vs. T<sub>j</sub>

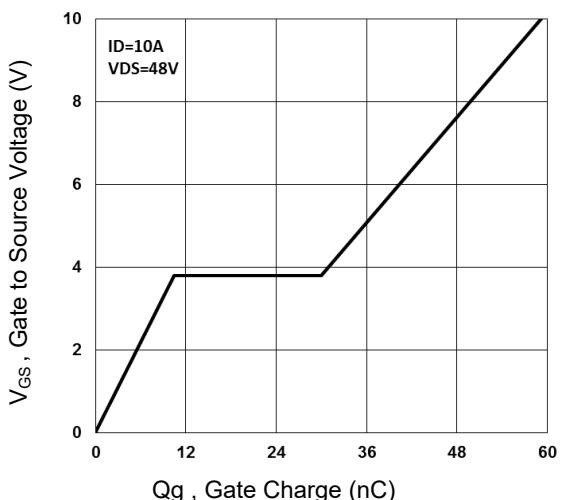


Figure 4. Gate Charge Characteristics

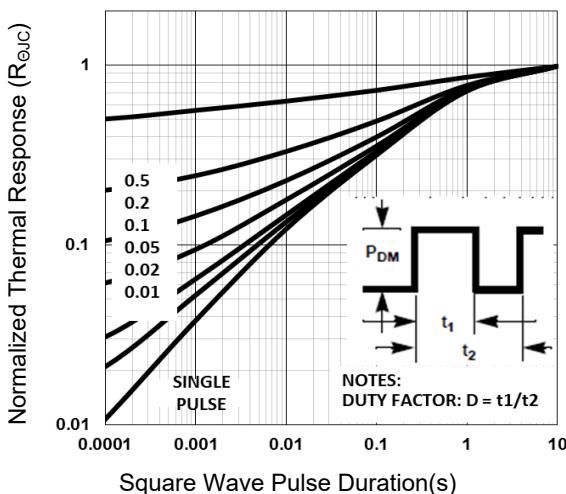


Figure 5. Normalized Transient Impedance

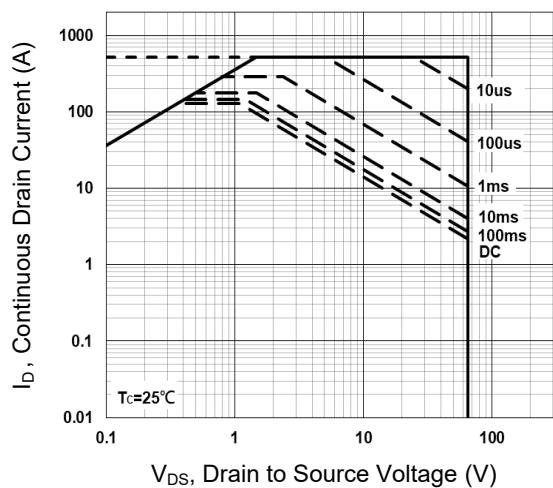


Figure 6. Maximum Safe Operation Area

## Typical Electrical and Thermal Characteristic Curves

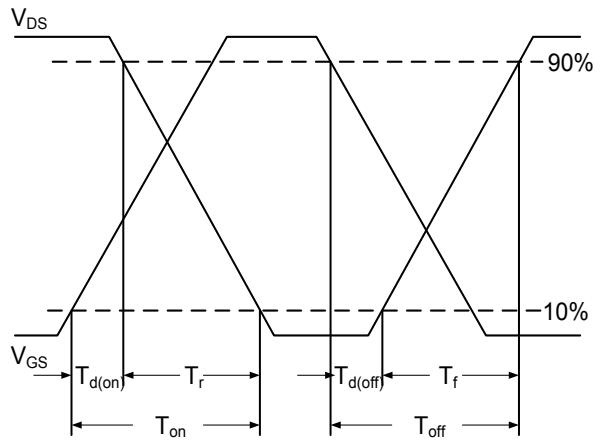


Figure 7. Switching Time Waveform

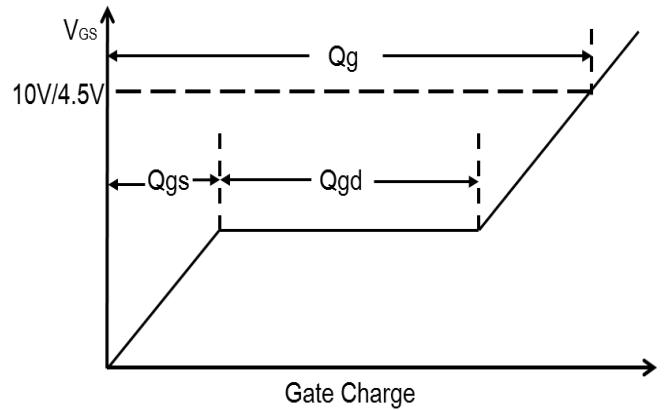
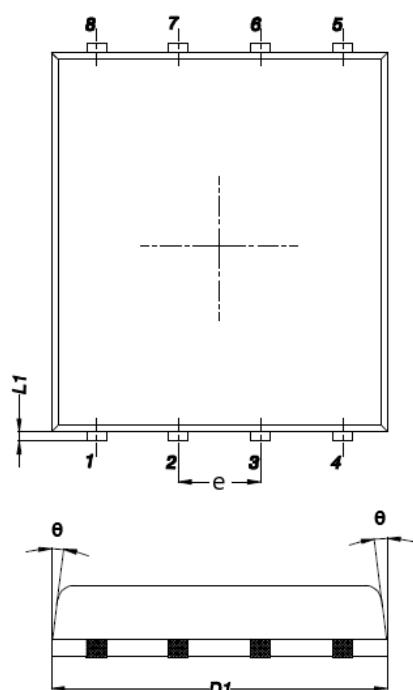
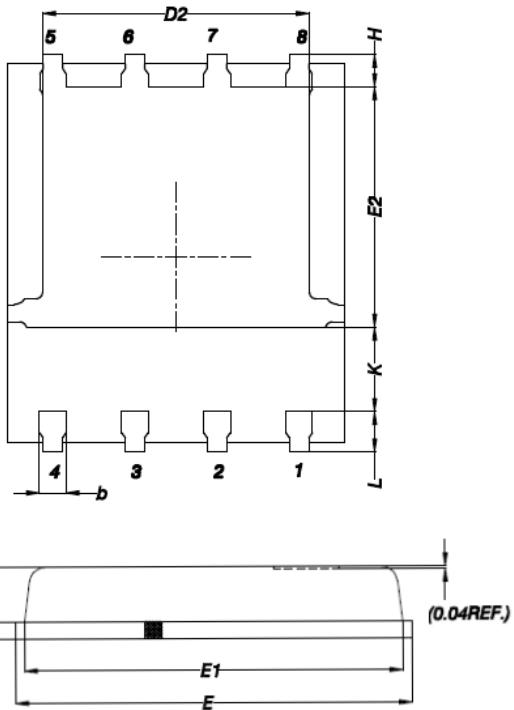


Figure 8. Gate Charge Waveform

### Package Outline Dimensions



### PRAK5X6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.200	0.850	0.047	0.031
b	0.510	0.300	0.020	0.012
C	0.300	0.200	0.012	0.008
D1	5.400	4.800	0.212	0.189
D2	4.310	3.610	0.170	0.142
E	6.300	5.850	0.248	0.230
E1	5.960	5.450	0.235	0.215
E2	3.920	3.300	0.154	0.130
e	1.27BSC		0.05BSC	
H	0.650	0.380	0.026	0.015
K	-	1.100	-	0.043
L	0.710	0.380	0.028	0.015
L1	0.250	0.050	0.009	0.002
θ	12°	0°	12°	0°