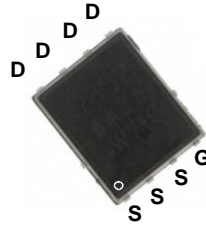
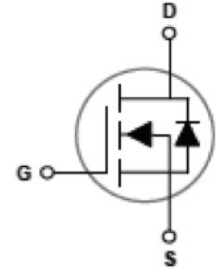


**Main Product Characteristics**

$V_{(BR)DSS}$	65V
$R_{DS(ON)}$	3.5m $\Omega$
$I_D$	110A



PPAK5x6



Schematic Diagram

**Features and Benefits**

- Advanced MOSFET process technology
- Ideal for networking, load switch and LED applications
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



**Description**

The SSFP6978 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	Rating	Unit
Drain-Source Voltage	$V_{DS}$	65	V
Gate-Source Voltage	$V_{GS}$	+20/-12	V
Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	110	A
Drain Current – Continuous ( $T_C=100^\circ\text{C}$ )		70	A
Drain Current – Pulsed <sup>1</sup>	$I_{DM}$	440	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	210	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	65	A
Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	138	W
Power Dissipation – Derate above 25 $^\circ\text{C}$		1.11	W/ $^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-50 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-50 to +150	$^\circ\text{C}$

**Thermal Characteristics**

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	$^\circ\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	0.9	$^\circ\text{C/W}$

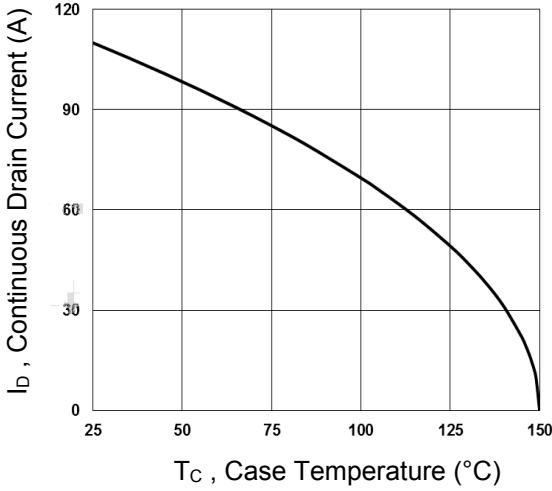
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	65	---	---	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^{\circ}\text{C}, I_D=1\text{mA}$	---	0.02	---	$V/^{\circ}\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	$\mu A$
		$V_{DS}=48V, V_{GS}=0V, T_J=85^{\circ}\text{C}$	---	---	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	---	---	100	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=18A$	---	2.8	3.5	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	4.3	6	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.5	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-4.5	---	$mV/^{\circ}\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=3A$	---	12	---	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3, 4</sup>	$Q_g$	$V_{DS}=48V, V_{GS}=10V, I_D=5A$	---	64.7	95	nC
Gate-Source Charge <sup>3, 4</sup>	$Q_{gs}$		---	5.6	8.4	
Gate-Drain Charge <sup>3, 4</sup>	$Q_{gd}$		---	29	43.5	
Turn-On Delay Time <sup>3, 4</sup>	$T_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	15.5	31	nS
Rise Time <sup>3, 4</sup>	$T_r$		---	15.8	32	
Turn-Off Delay Time <sup>3, 4</sup>	$T_{d(off)}$		---	45	90	
Fall Time <sup>3, 4</sup>	$T_f$		---	58	115	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	3590	5380	pF
Output Capacitance	$C_{oss}$		---	1130	1700	
Reverse Transfer Capacitance	$C_{rss}$		---	30	45	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.48	---	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	---	---	90	A
Pulsed Source Current	$I_{SM}$		---	---	180	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V

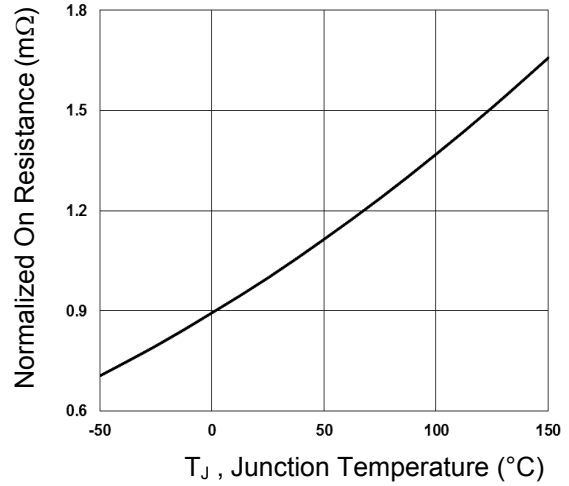
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=65A, R_G=25\Omega, \text{Starting } T_J=25^{\circ}\text{C}.$
3. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

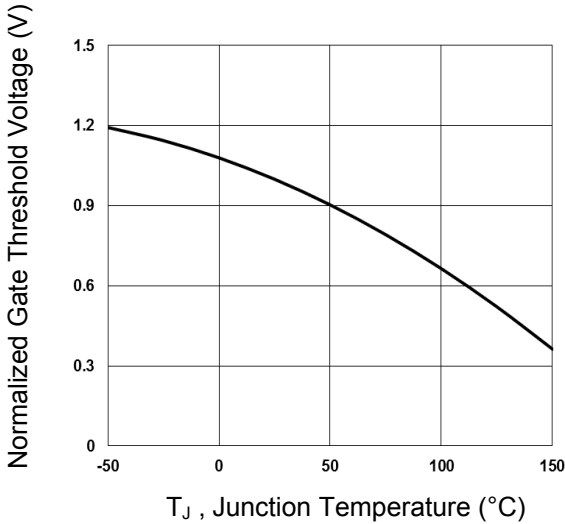
**Typical Electrical and Thermal Characteristic Curves**



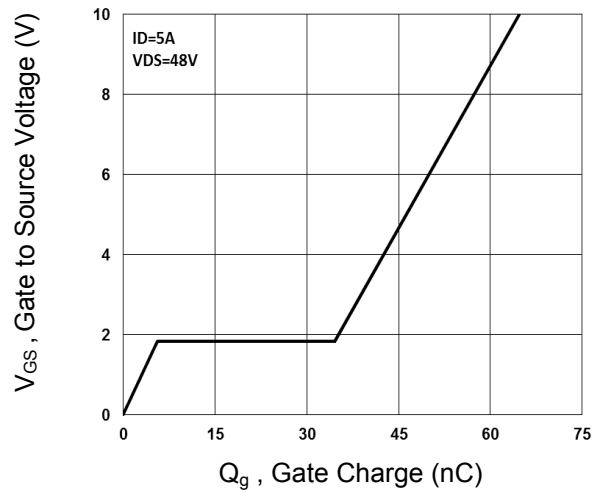
**Fig.1 Continuous Drain Current vs.  $T_c$**



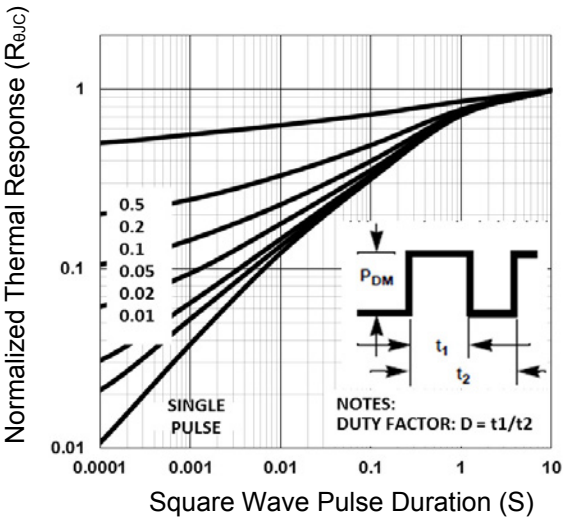
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_j$**



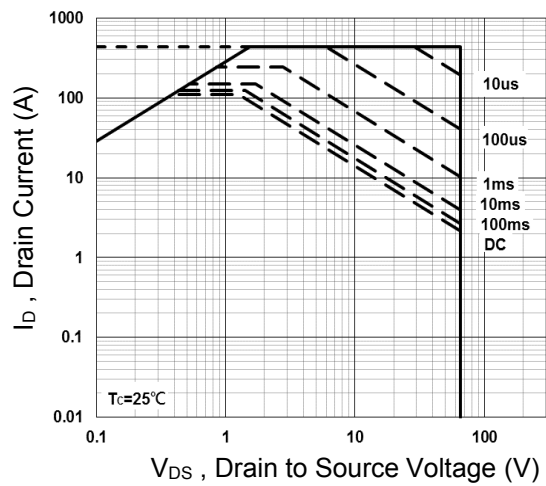
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Characteristics**

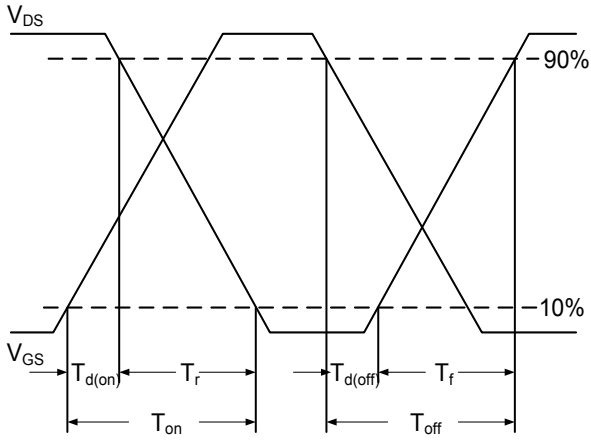


**Fig.5 Normalized Transient Impedance**

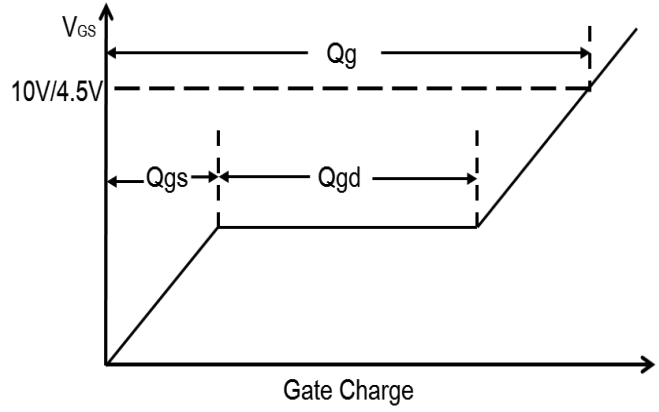


**Fig.6 Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**



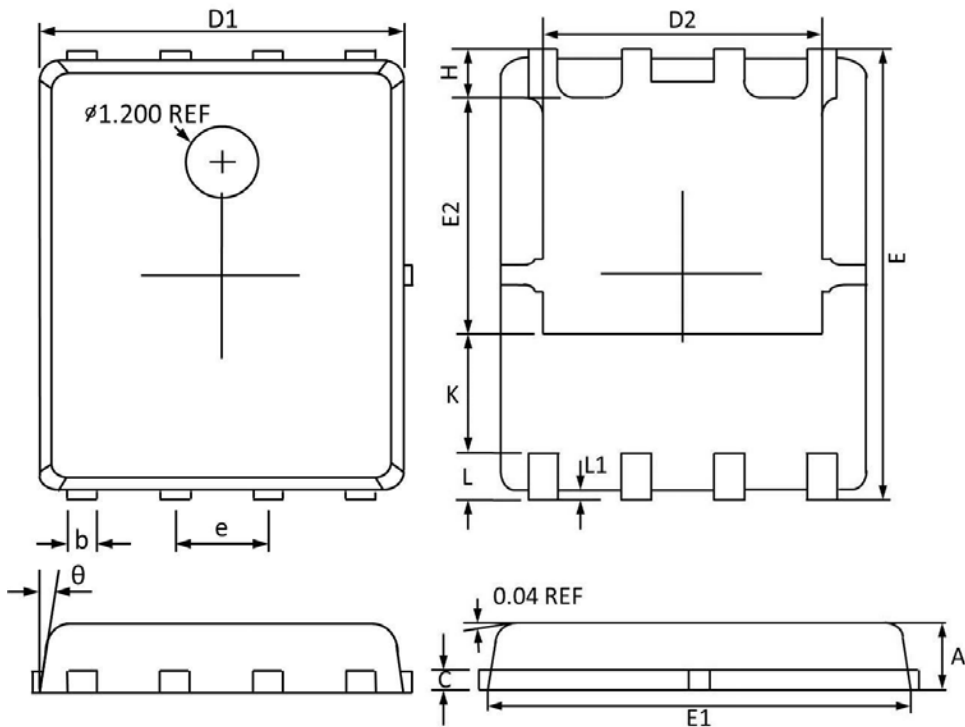
**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

**Package Outline Dimensions**

**PPAK5x6**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
$\theta$	12°	0°	12°	0°