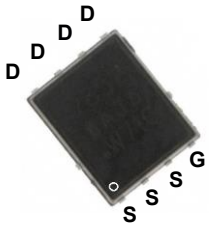
GOOD-ARK SEMICONDUCTOR

SSFP6978

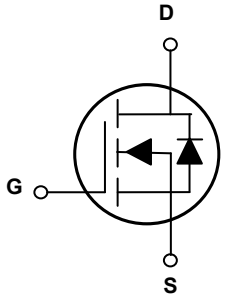
65V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	65V
$R_{DS(ON)}$	3.5mΩ
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°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°C)	I_D	110	A
Drain Current-Continuous (T_C=100°C)		70	
Drain Current-Pulsed[1]	I_{DM}	440	A
Single Pulse Avalanche Energy[2]	E_{AS}	210	mJ
Single Pulse Avalanche Current[2]	I_{AS}	65	A
Power Dissipation (T_C=25°C)	P_D	138	W
Power Dissipation-Derate above 25°C		1.11	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.9	°C/W
Operating Junction Temperature Range	T_J	-50 To +150	°C
Storage Temperature Range	T_{STG}	-50 To +150	°C

Electrical Characteristics (T_J=25°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=250μA	65	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=1mA	-	0.02	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=48V, V_{GS}=0V, T_J=85°C	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	-	-	100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=18A	-	2.8	3.5	mΩ
		V_{GS}=4.5V, I_D=10A	-	4.3	6	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	1	1.5	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	-4.5	-	mV/°C
Forward Transconductance	g_{fs}	V_{DS}=10V, I_D=3A	-	12	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=48V, I_D=5A, V_{GS}=10V	-	64.7	95	nC
Gate-Source Charge[3,4]	Q_{gs}		-	5.6	8.4	
Gate-Drain Charge[3,4]	Q_{gd}		-	29	43.5	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=30V, R_G=6Ω, V_{GS}=10V, I_D=1A	-	15.5	31	nS
Rise Time[3,4]	t_r		-	15.8	32	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	45	90	
Fall Time[3,4]	t_f		-	58	115	
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, F=1MHz	-	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=1MHz	-	1.48	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	110	A
Pulsed Source Current	I_{SM}		-	-	220	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1A, T_J=25°C	-	-	1	V

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=65A, R_G=25Ω,starting T_J=25°C.
3. Pulse test: pulse width ≤300us,duty cycle≤2%.
4. Essentially independent of operation temperature.

Typical Electrical and Thermal Characteristic Curves

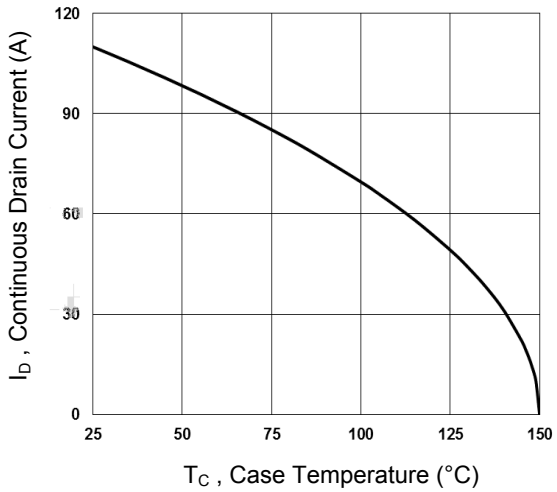


Figure 1. Continuous Drain Current vs. T_C

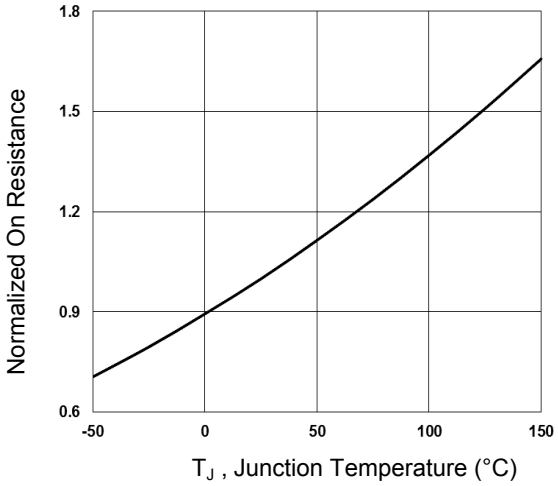


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

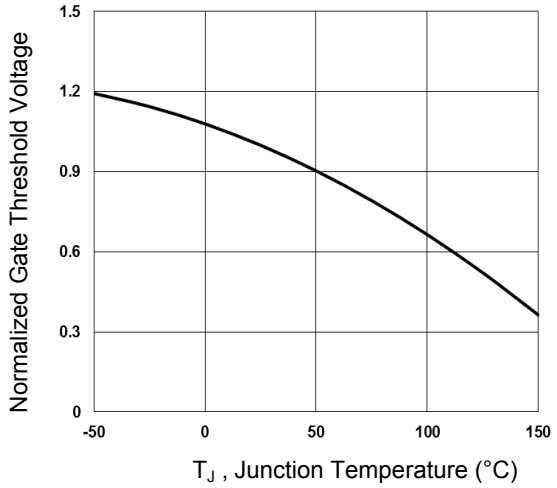


Figure 3. Normalized V_{th} vs. T_J

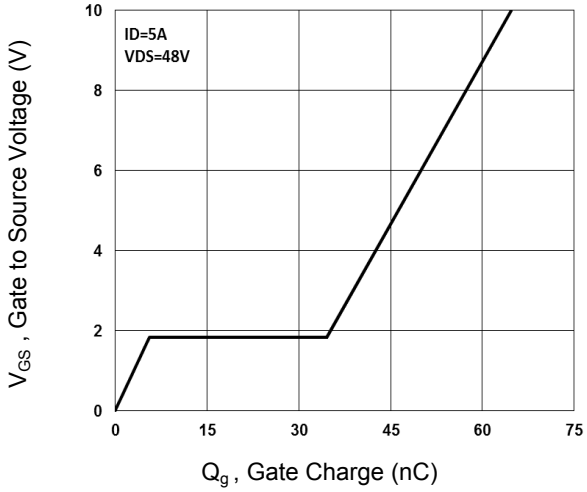


Figure 4. Gate Charge Characteristics

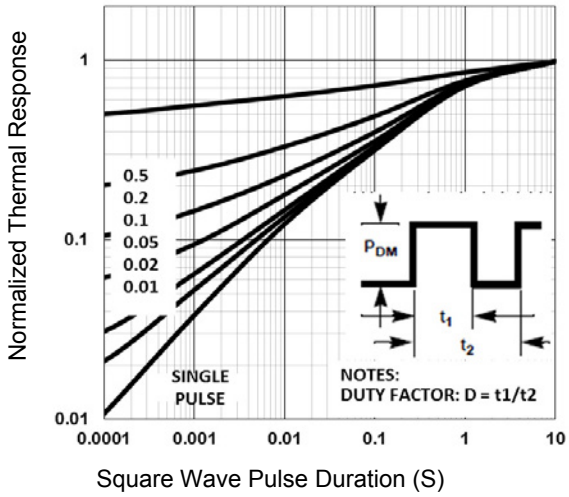


Figure 5. Normalized Transient Impedance

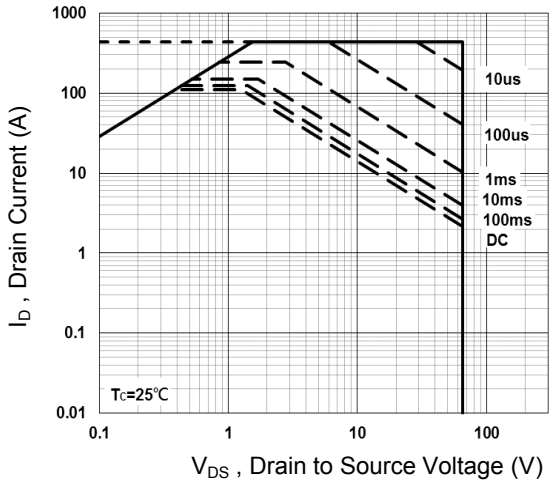


Figure 6. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

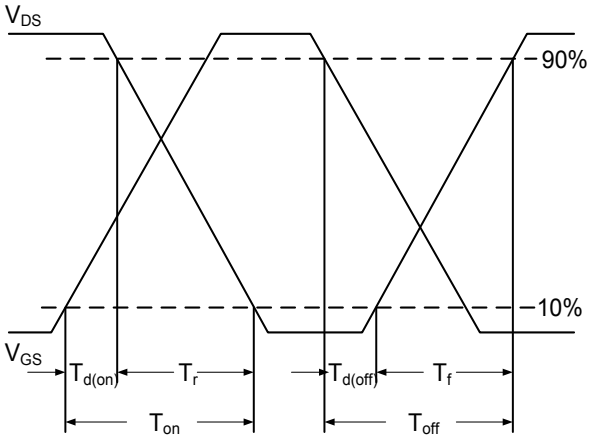


Figure 7. Switching Time Waveform

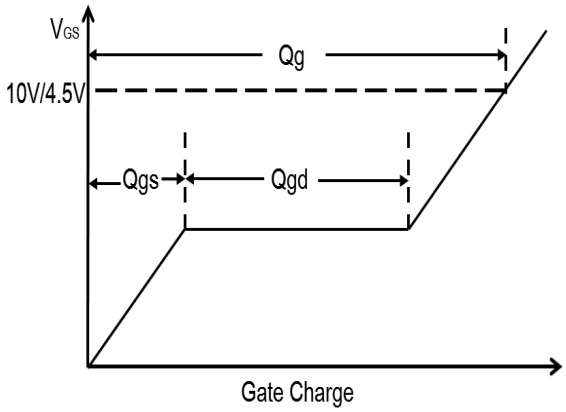
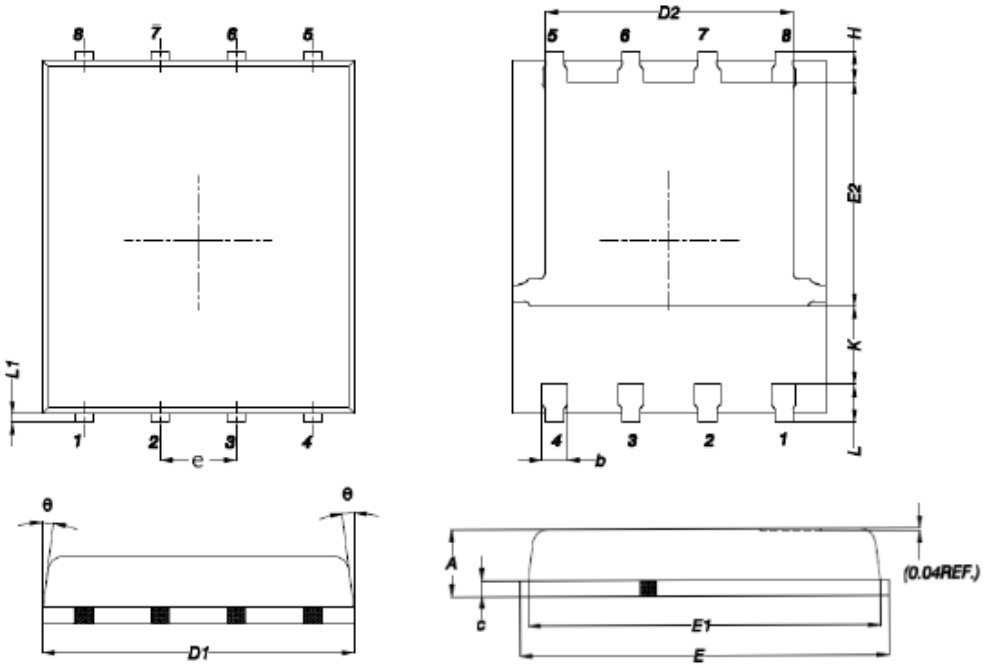


Figure 8. Gate Charge Waveform

Package Outline Dimensions PPAK5x6



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°