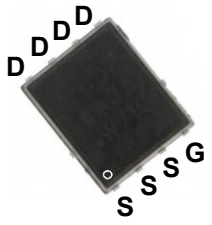
GOOD-ARK SEMICONDUCTOR

SSFP6986

65V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	65V
$R_{DS(ON)}$	11.6mΩ
I_D	55A



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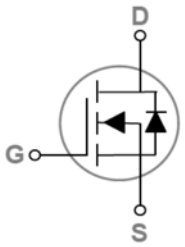


Schematic Diagram

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 SSFP6986 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	Rating	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	55	A
Drain Current – Continuous (T_C=100˚C)		34.8	A
Drain Current – Pulsed[1]	I_{DM}	220	A
Single Pulse Avalanche Energy[2]	E_{AS}	51.2	mJ
Single Pulse Avalanched Current[2]	I_{AS}	32	A
Power Dissipation (T_C=25˚C)	P_D	67	W
Power Dissipation – Derate above 25˚C		0.54	W/˚C
Storage Temperature Range	T_{STG}	-55 to +150	˚C
Operating Junction Temperature Range	T_J	-55 to +150	˚C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	˚C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	1.86	˚C/W

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	65	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , I_D=1mA	---	0.03	---	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=48V , V_{GS}=0V , T_J=85°C	---	---	10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=+20V , V_{DS}=0V	---	---	100	nA
On Characteristics						
Static Drain-Source On-Resistance[3]	$R_{DS(ON)}$	V_{GS}=10V , I_D=20A	---	9.6	11.6	mΩ
		V_{GS}=4.5V , I_D=15A	---	16	22	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-5	---	mV/ °C
Forward Transconductance	gfs	V_{DS}=10V , I_D=3A	---	6	---	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=30V , V_{GS}=10V , I_D=15A	---	15.3	30.6	nC
Gate-Source Charge[3,4]	Q_{gs}		---	2.4	5.8	
Gate-Drain Charge[3,4]	Q_{gd}		---	5.4	10.8	
Turn-On Delay Time[3,4]	$T_{d(on)}$	V_{DD}=30V , V_{GS}=10V , R_G=3.3Ω I_D=1A	---	10	20	nS
Rise Time[3,4]	T_r		---	13.5	27	
Turn-Off Delay Time[3,4]	$T_{d(off)}$		---	28	56	
Fall Time[3,4]	T_f		---	20	40	
Input Capacitance	C_{iss}	V_{DS}=30V , V_{GS}=0V , F=1MHz	---	945	1890	pF
Output Capacitance	C_{oss}		---	275	550	
Reverse Transfer Capacitance	C_{rss}		---	26	52	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	0.3	---	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V , Force Current	---	---	55	A
Pulsed Source Current[3]	I_{SM}		---	---	220	A
Diode Forward Voltage[3]	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}=50V, V_{GS}=10V, L=0.1mH, I_{AS}=32A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

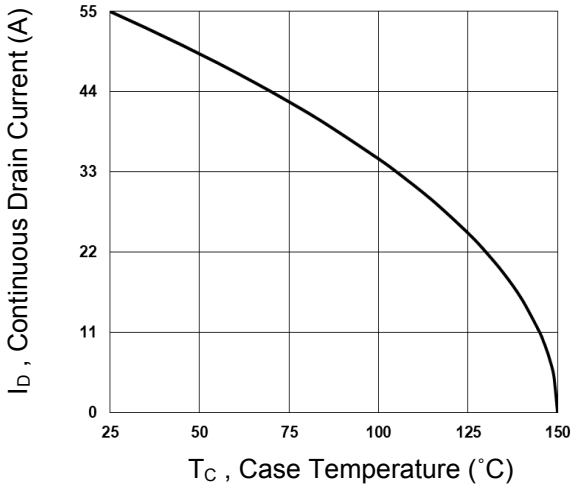


Fig.1 Continuous Drain Current vs. T_C

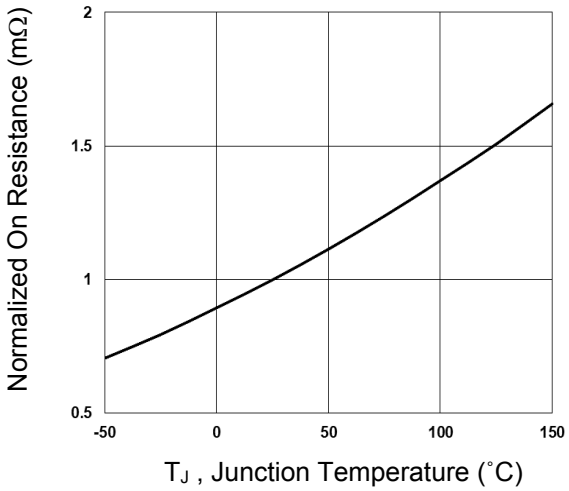


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

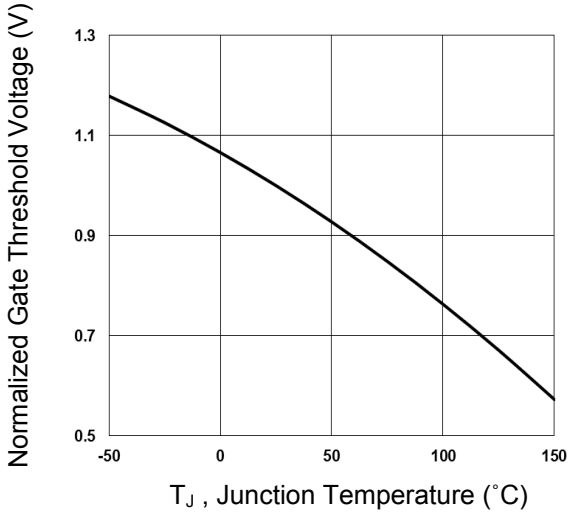


Fig.3 Normalized V_{th} vs. T_J

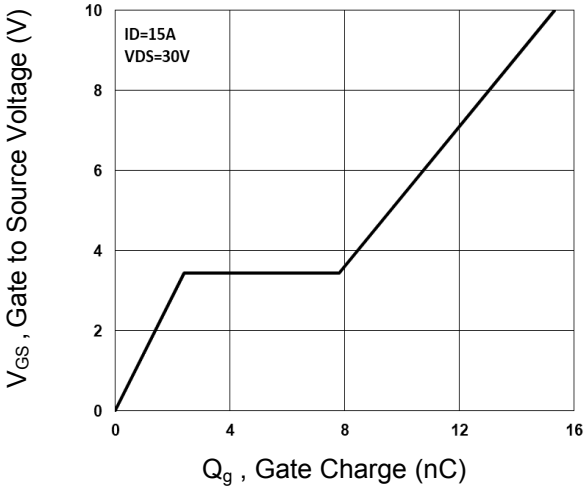


Fig.4 Gate Charge Waveform

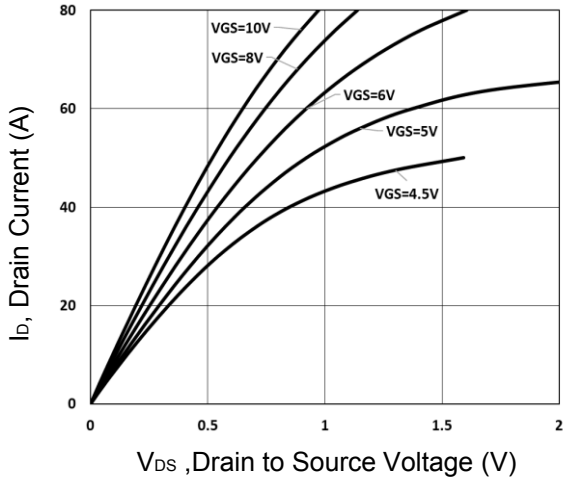


Fig.5 Typical Output Characteristics

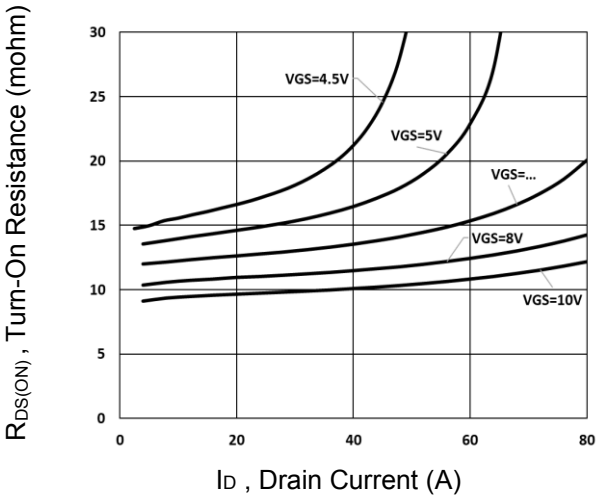


Fig.6 Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

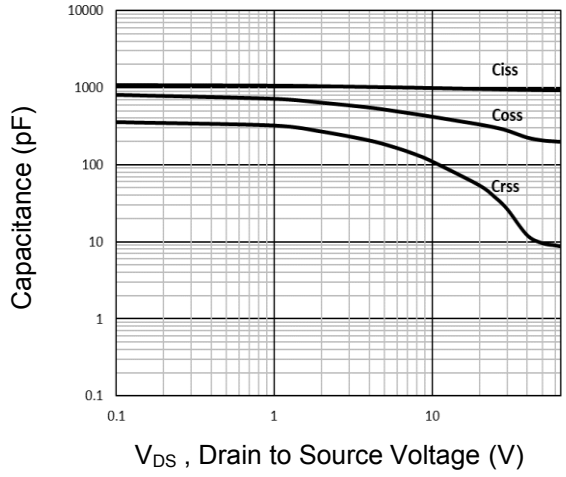


Fig.7 Capacitance Characteristics

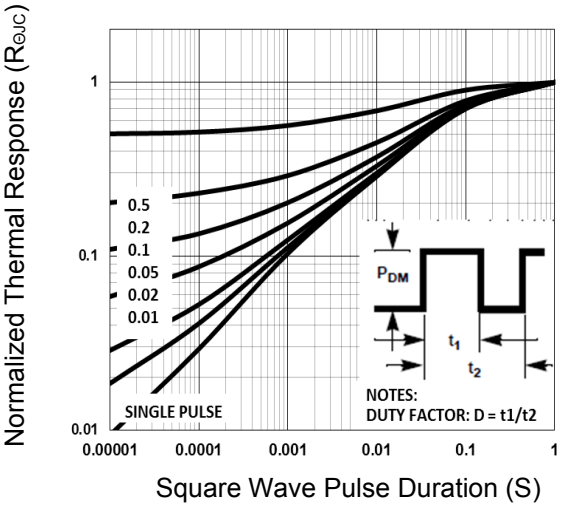


Fig.8 Normalized Transient Response

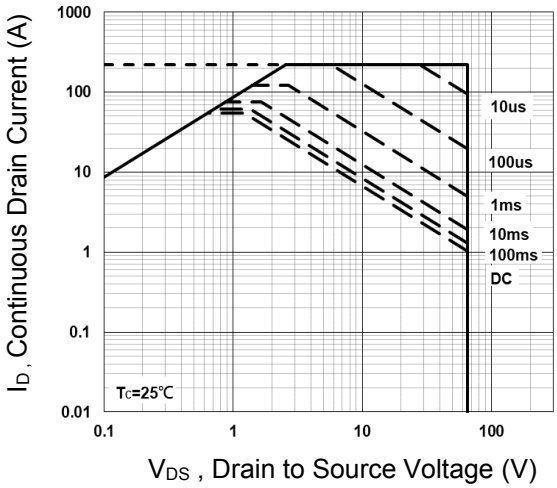


Fig.9 Maximum Safe Operation Area

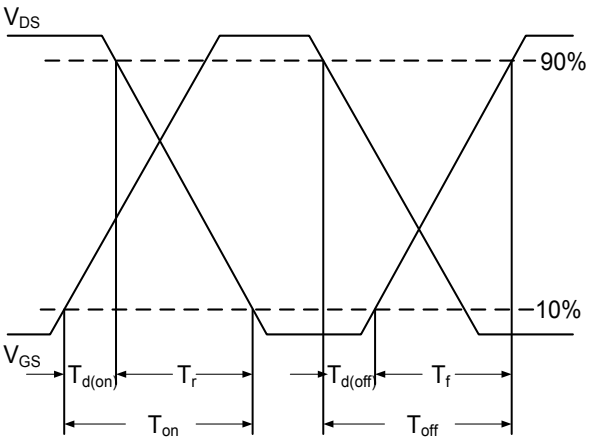


Fig.10 Switching Time Waveform

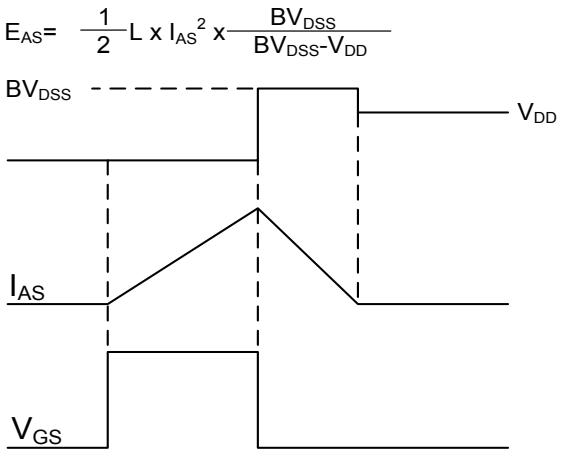
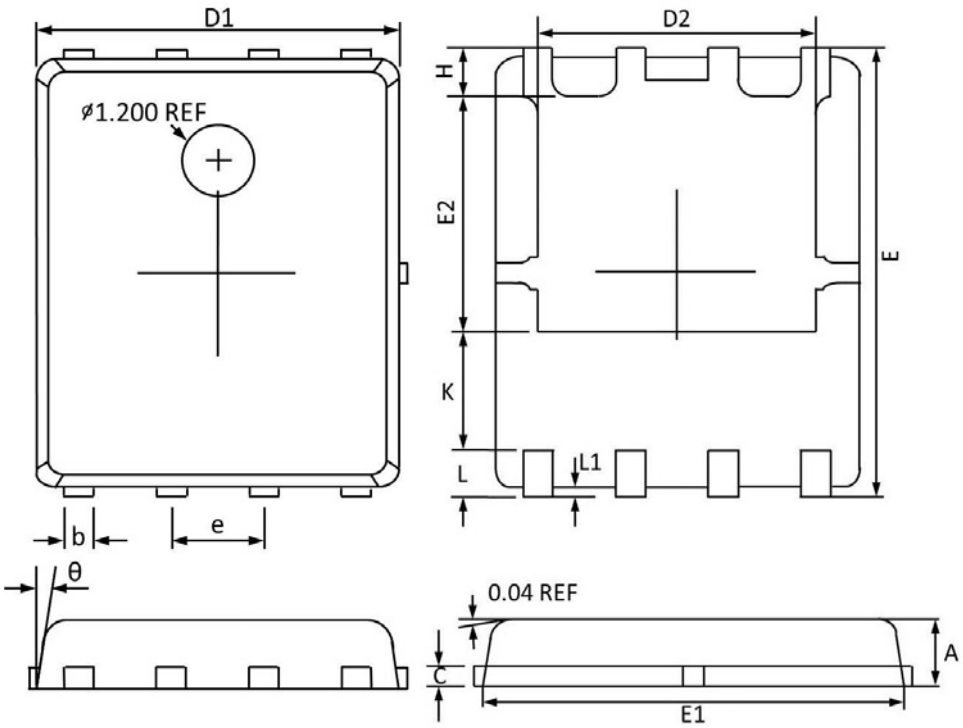


Fig.11 E_{AS} Waveform

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
θ	12°	0°	12°	0°