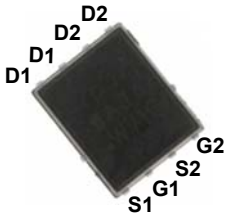
GOOD-ARK SEMICONDUCTOR

SSFP03N50T

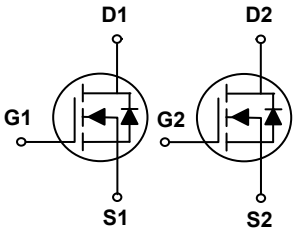
500V Dual N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	500V
$R_{DS(ON)}$	3.6Ω
I_D	3A



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

RoHS Compliant

Description

The SSFP03N50T 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}	500	V
Gate-Source Voltage	V_{GS}	±30	V
Drain Current – Continuous (T_C=25°C)	I_D	3	A
Drain Current – Continuous (T_C=100°C)		1.9	A
Drain Current – Pulsed[1]	I_{DM}	15	A
Single Pulse Avalanche Energy[2]	E_{AS}	13	mJ
Single Pulse Avalanche Current[2]	I_{AS}	5	A
Power Dissipation (T_C=25°C)	P_D	63	W
Power Dissipation – Derate above 25°C		0.5	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	$R_{\theta JC}$	---	2	°C/W

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	500	---	---	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	---	0.5	---	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=500V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=400V , V_{GS}=0V , T_J=125°C	---	---	10	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±30V , V_{DS}=0V	---	---	±100	nA
On characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V , I_D=1A	---	2.6	3.6	Ω
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	3	4	5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	-7	---	mV/°C
Forward Transconductance	gfs	V_{DS}=10V , I_D=1A	---	2.8	---	S
Dynamic Characteristics						
Total Gate Charge[3, 4]	Q_g	V_{DS}=400V , V_{GS}=10V , I_D=1A	---	10	---	nC
Gate-Source Charge[3, 4]	Q_{gs}		---	2.6	---	
Gate-Drain Charge[3, 4]	Q_{gd}		---	3.2	---	
Turn-On Delay Time[3, 4]	$T_{d(on)}$	V_{DD}=300V , V_{GS}=10V , R_G=2.5Ω , I_D=1A	---	18	---	nS
Rise Time[3, 4]	T_r		---	7	---	
Turn-Off Delay Time[3, 4]	$T_{d(off)}$		---	23	---	
Fall Time[3, 4]	T_f		---	16	---	
Input Capacitance	C_{iss}	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	440	---	pF
Output Capacitance	C_{oss}		---	35	---	
Reverse Transfer Capacitance	C_{rss}		---	4	---	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.6	---	Ω
Drain-Source Diode Characteristics						
Parameter	**Symbol**	**Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Continuous Source Current	I_S	V_G=V_D=0V , Force Current	---	---	3	A
Pulsed Source Current	I_{SM}		---	---	12	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1	V
Reverse Recovery Time	trr	V_{GS}=0V, Is=1A, di/dt=100A/μS, T_J=25°C	---	160	240	nS
Reverse Recovery Charge	Qrr		---	430	650	nC

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, V_{GS}=10V, L=1mH, I_{AS}=5A, 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

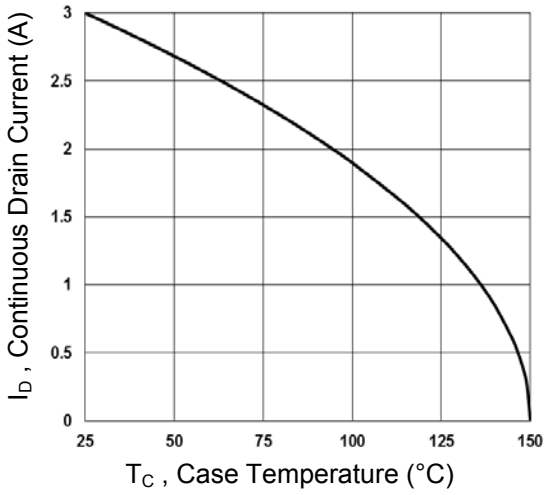


Fig.1 Continuous Drain Current vs. T_C

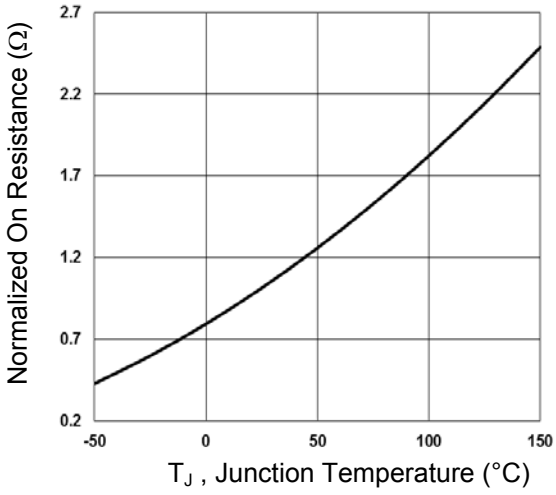


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

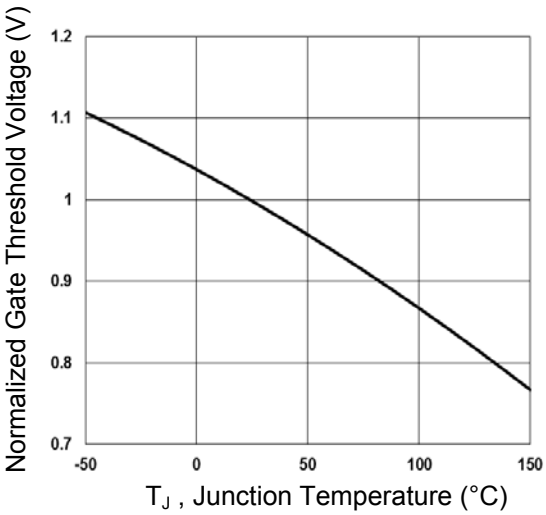


Fig.3 Normalized V_{th} vs. T_J

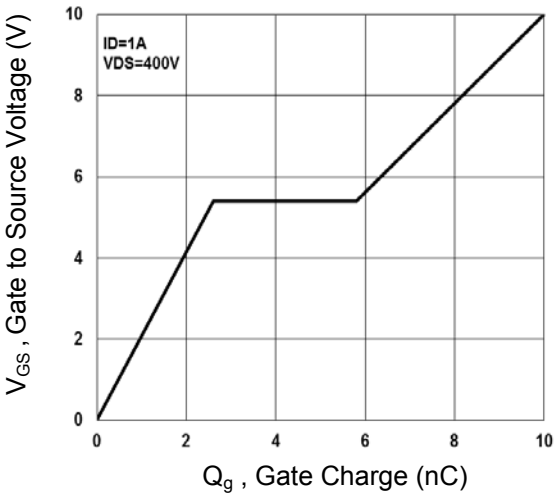


Fig.4 Gate Charge Waveform

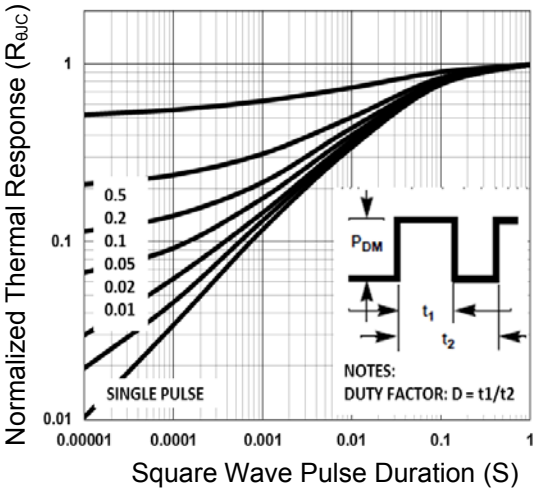


Fig.5 Normalized Transient Impedance

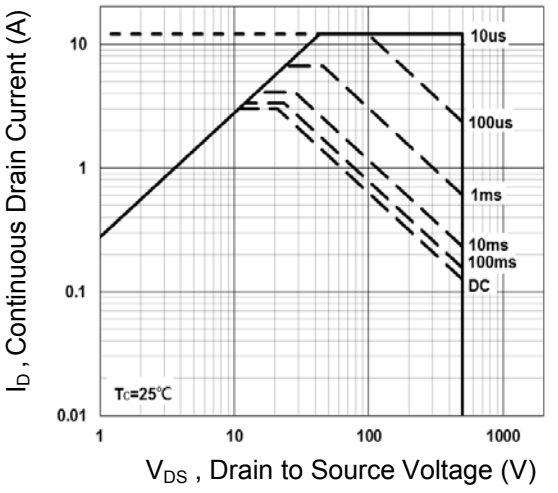


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

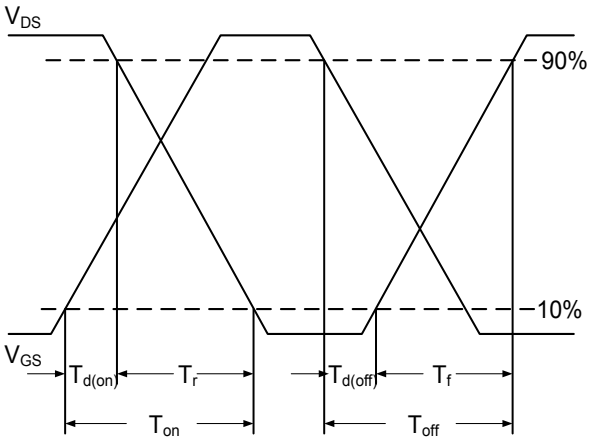


Fig.7 Switching Time Waveform

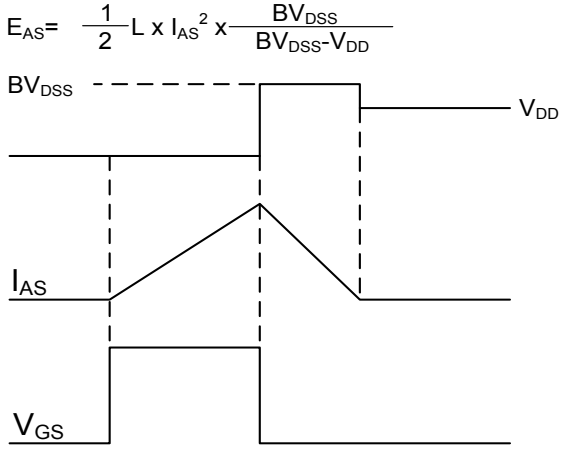
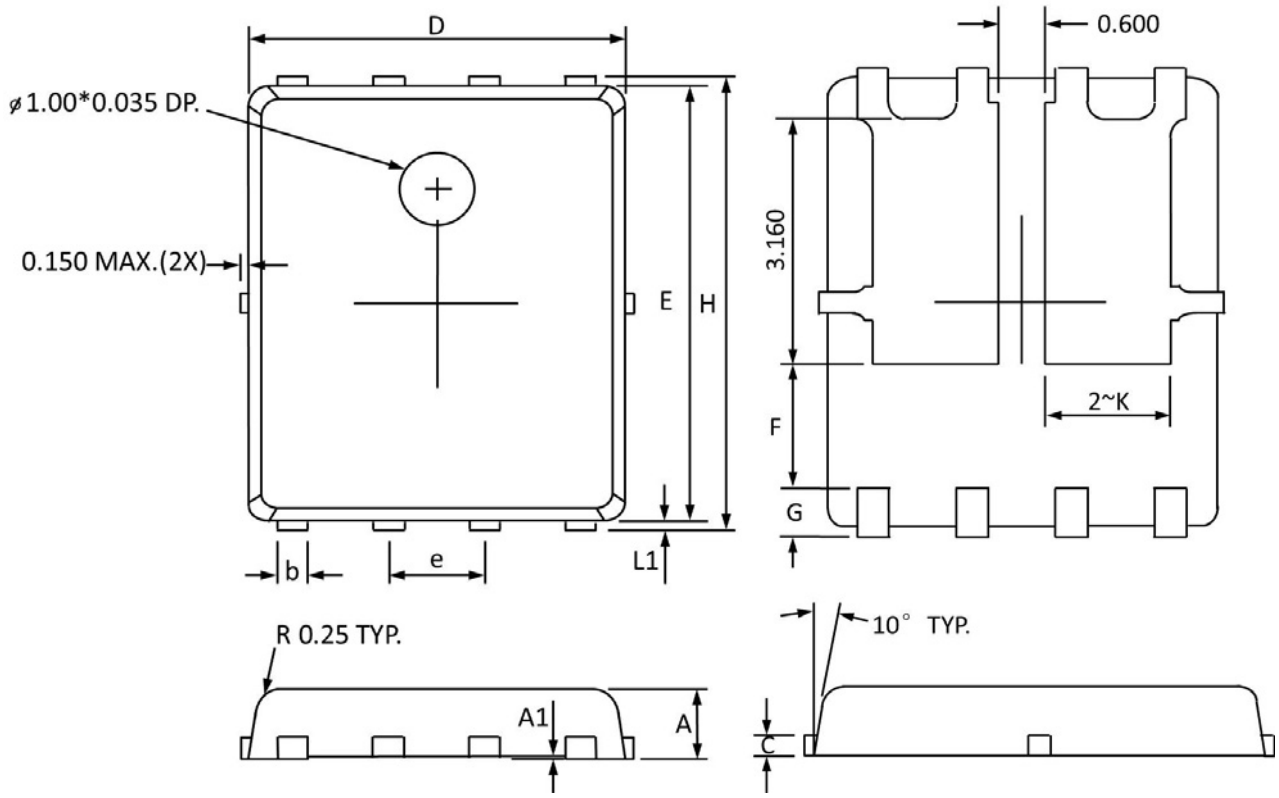


Fig.8 E_{AS} Waveform

Package Outline Dimensions PPAK5x6



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.600 Ref		1.600 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	1.600 Ref		1.600 Ref	