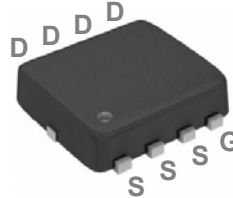
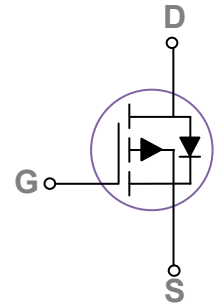


**Main Product Characteristics**

$V_{BDSS}$	-30V
$R_{DS(on)}$	8.5mΩ
$I_D$	-50A



PPAK3X3



Schematic Diagram

**Features and Benefits**

- Advanced MOSFET process technology
- Ideal for DC-DC converter, power management in portable battery, computer, printer, cellular and general purpose applications
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



**Description**

The SSFN3903 utilizes the latest trench processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable for use in battery protection, power switching and a wide variety of other applications.

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	±20	V
Drain Current – Continuous ( $T_C=25^{\circ}C$ )	$I_D$	-50	A
Drain Current – Continuous ( $T_C=100^{\circ}C$ )		-32	A
Drain Current – Pulsed <sub>1</sub>	$I_{DM}$	-200	A
Power Dissipation ( $T_C=25^{\circ}C$ )	$P_D$	59	W
Power Dissipation – Derate above 25°C		0.47	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	$R_{\theta JC}$	---	2.1	°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	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
BVDSS Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}, I_D=-1\text{mA}$	---	-0.03	---	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu A$
		$V_{DS}=-24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	-10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-10A$	---	7.1	8.5	m $\Omega$
		$V_{GS}=-4.5V, I_D=-8A$	---	11.5	14	m $\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	4	---	mV/ $^\circ\text{C}$
Forward Transconductance	gfs	$V_{DS}=-10V, I_D=-10A$	---	14	---	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2, 3</sup>	$Q_g$	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-10A$	---	35	56	nC
Gate-Source Charge <sup>2, 3</sup>	$Q_{gs}$		---	10.8	16	nC
Gate-Drain Charge <sup>2, 3</sup>	$Q_{gd}$		---	10.6	16	nC
Turn-On Delay Time <sup>2, 3</sup>	$T_{d(on)}$	$V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A$	---	24.5	38	ns
Rise Time <sup>2, 3</sup>	$T_r$		---	10.5	16	ns
Turn-Off Delay Time <sup>2, 3</sup>	$T_{d(off)}$		---	156.8	230	ns
Fall Time <sup>2, 3</sup>	$T_f$		---	50	75	ns
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	---	3300	4800	pF
Output Capacitance	$C_{oss}$		---	410	700	pF
Reverse Transfer Capacitance	$C_{rss}$		---	280	500	pF
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	8.5	12	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	---	---	-50	A
Pulsed Source Current	$I_{SM}$		---	---	-100	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V

Notes :

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

**Typical Electrical and Thermal Characteristics**

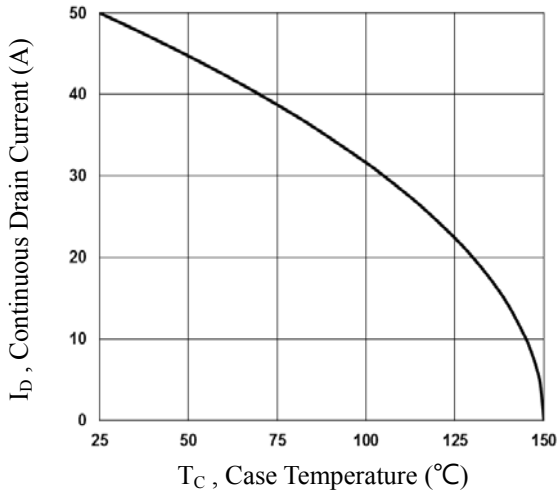


Fig.1 Continuous Drain Current vs.  $T_C$

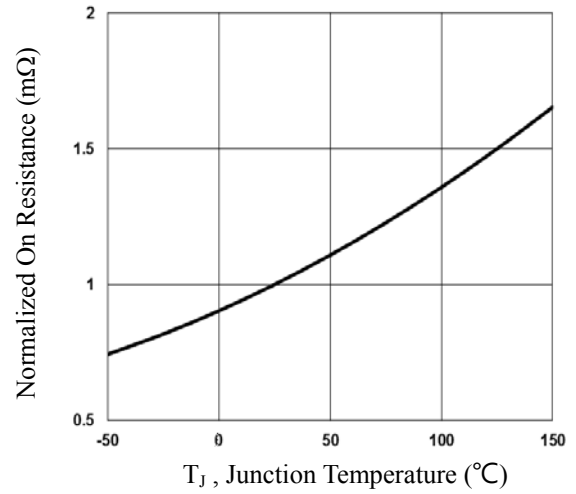


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

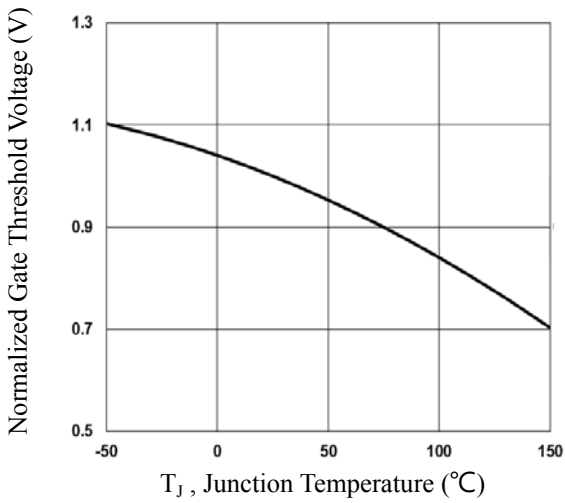


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

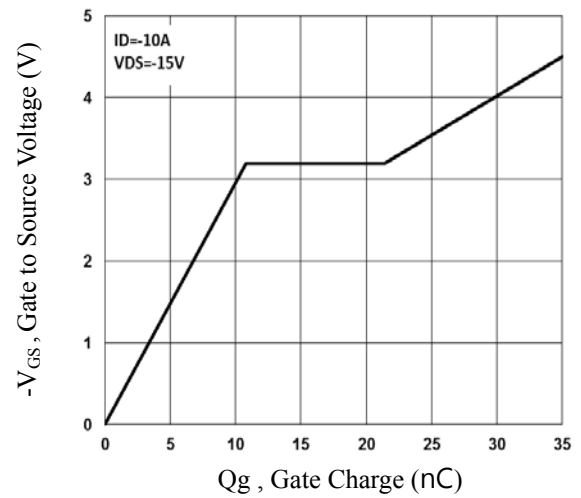


Fig.4 Gate Charge Waveform

**Typical Electrical and Thermal Characteristics**

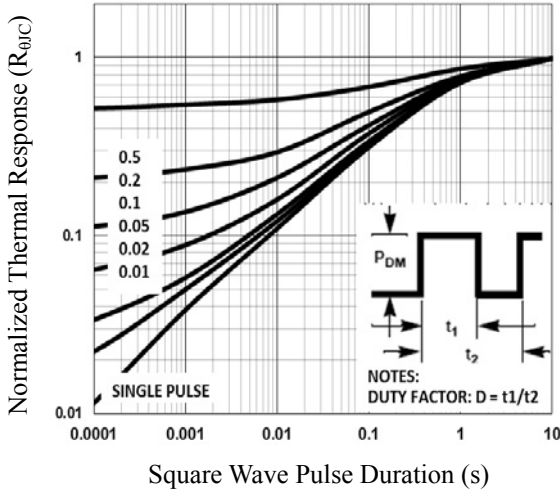


Fig.5 Normalized Transient Impedance

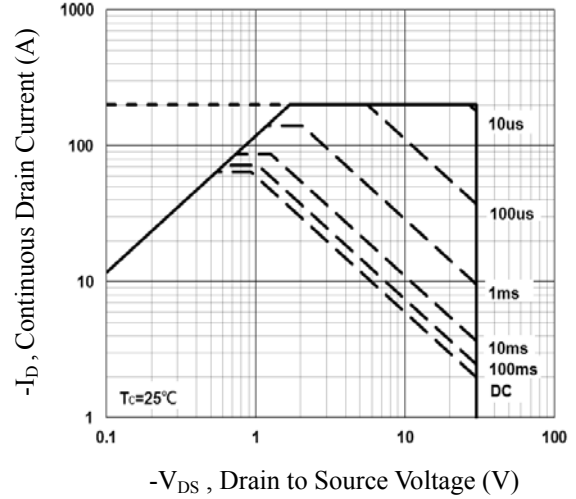


Fig.6 Maximum Safe Operation Area

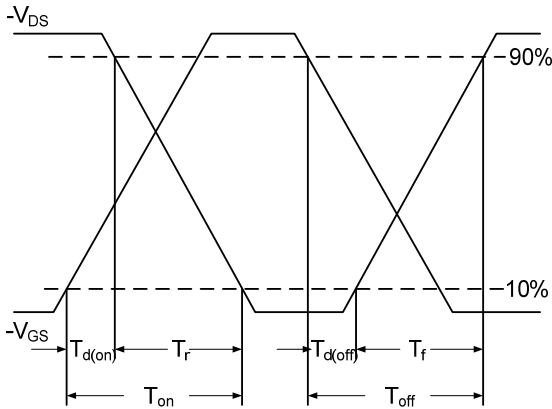


Fig.7 Switching Time Waveform

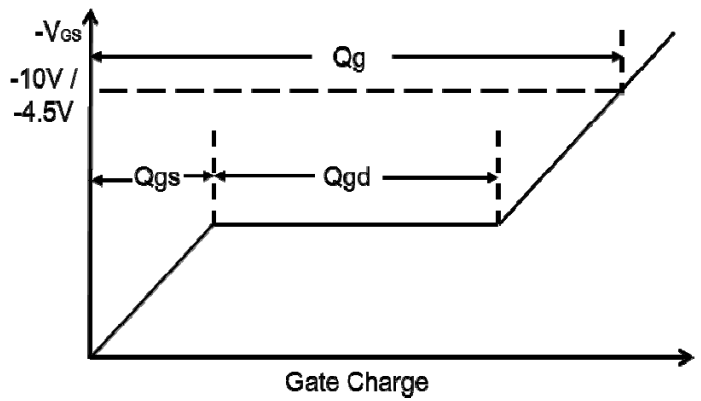
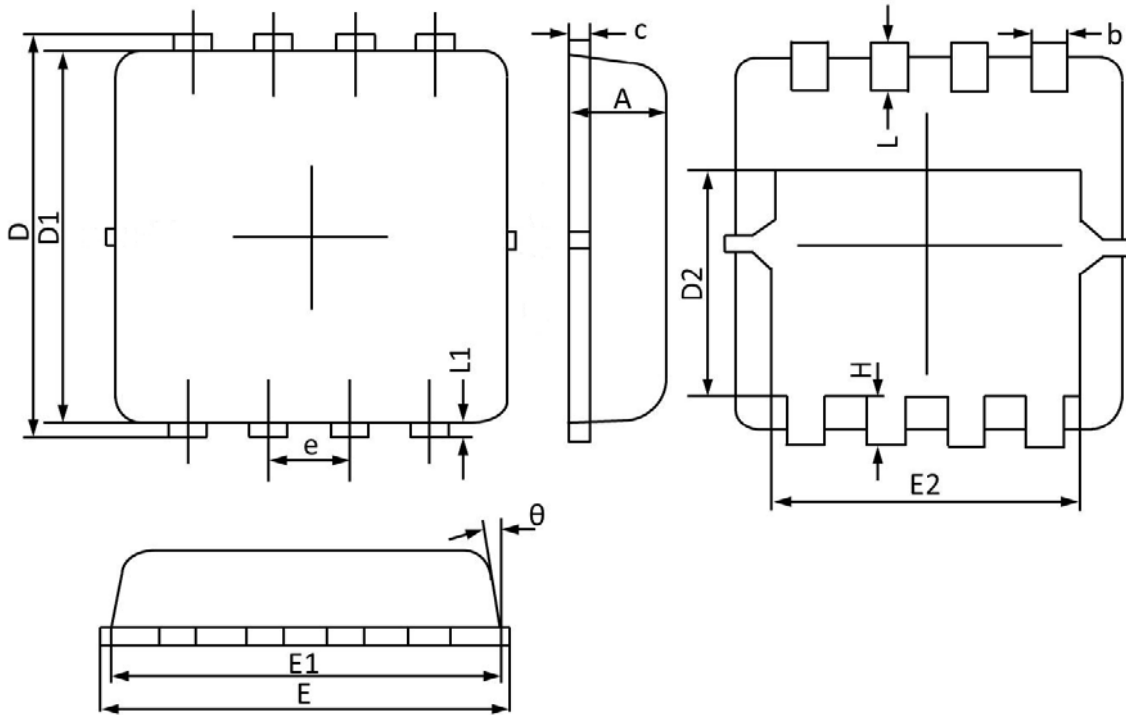


Fig.8 Gate Charge Waveform

**Package Outline Dimensions**

**PPAK3X3**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.9	0.7	0.035	0.028
b	0.35	0.24	0.014	0.009
c	0.25	0.1	0.01	0.004
D	3.45	3.05	0.136	0.12
D1	3.2	2.9	0.126	0.114
D2	1.85	1.35	0.073	0.053
E	3.4	3	0.134	0.118
E1	3.25	2.9	0.128	0.114
E2	2.6	2.35	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.5	0.3	0.02	0.012
L	0.5	0.3	0.02	0.012
L1	0.2	0.07	0.008	0.003
θ	12°	0°	12°	0°

**Suggested Pad Layout**

unit : mm

