

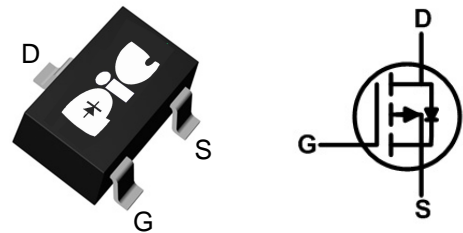
➤ General Description

This PAP3117NS P-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent $R_{ds(On)}$ performance and efficiency for power switching and load switching application., this device also comply with the RoHS and Green Product requirement with full function reliability approved.

➤ Feature

- Green Device Available
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology
- SOT-23S package design

➤ SOT-23S



➤ Application

- Load Switch
- Portable instrument
- MB / NB / 3C device

➤ Absolute Maximum Ratings

Parameter	Symbol	Rating		Units
		10s	Steady State	
Drain-Source Voltage	V_{DS}	-30		V
Gate-Source Voltage	V_{GS}	±20		V
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D@T_A=25^\circ C$	-3.6	-3.2	A
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D@T_A=70^\circ C$	-2.9	-2.5	A
Pulsed Drain Current ²	I_{DM}	-13		A
Total Power Dissipation ³	$P_D@T_A=25^\circ C$	1.32	1	W
Total Power Dissipation ³	$P_D@T_A=70^\circ C$	0.84	0.64	W
Storage Temperature Range	T_{STG}	-55 to 150		°C
Operating Junction Temperature Range	T_J	-55 to 150		°C
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	125		°C/W
Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	$R_{\theta JA}$	95		°C/W
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	80		°C/W

➤ Electrical Characteristics ($T_J=25^\circ C$ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
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 $25^\circ C$, $I_D=-1mA$	---	-0.02	---	$V/^\circ C$
Static Drain-Source On-Resistance ²	$R_{DS(ON)}$	$V_{GS}=-10V$, $I_D=-3A$	---	55	70	m Ω
		$V_{GS}=-4.5V$, $I_D=-1.5A$	---	90	120	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1.2	-1.5	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	4.32	---	$mV/^\circ C$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-24V$, $V_{GS}=0V$, $T_J=25^\circ C$	---	---	-1	μA
		$V_{DS}=-24V$, $V_{GS}=0V$, $T_J=55^\circ C$	---	---	-5	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
Forward Transconductance	g_{fs}	$V_{DS}=-5V$, $I_D=-3A$	---	4.8	---	S
Gate Resistance	R_g	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	24	48	Ω
Total Gate Charge (-4.5V)	Q_g	$V_{DS}=-20V$, $V_{GS}=-4.5V$, $I_D=-3A$	---	5.22	7.3	nC
Gate-Source Charge	Q_{gs}		---	1.25	1.8	
Gate-Drain Charge	Q_{gd}		---	2.3	3.2	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=-15V$, $V_{GS}=-10V$, $R_G=3.3\Omega$ $I_D=-1A$	---	18.4	37	ns
Rise Time	T_r		---	11.4	21	
Turn-Off Delay Time	$T_{d(off)}$		---	39.4	79	
Fall Time	T_f		---	5.2	10.4	
Input Capacitance	C_{iss}	$V_{DS}=-15V$, $V_{GS}=0V$, $f=1MHz$	---	463	650	pF
Output Capacitance	C_{oss}		---	82	115	
Reverse Transfer Capacitance	C_{rss}		---	68	95	

➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current ^{1,4}	I_S	$V_G=V_D=0V$, Force Current	---	---	-3.2	A
Pulsed Source Current ^{2,4}	I_{SM}		---	---	-13	A
Diode Forward Voltage ²	V_{SD}	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ C$	---	---	-1	V

Note :

- 1.Pulse width limited by maximum junction temperature.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.Ensure that the channel temperature does not exceed $150^\circ C$.
- 4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

➤ Typical Characteristics

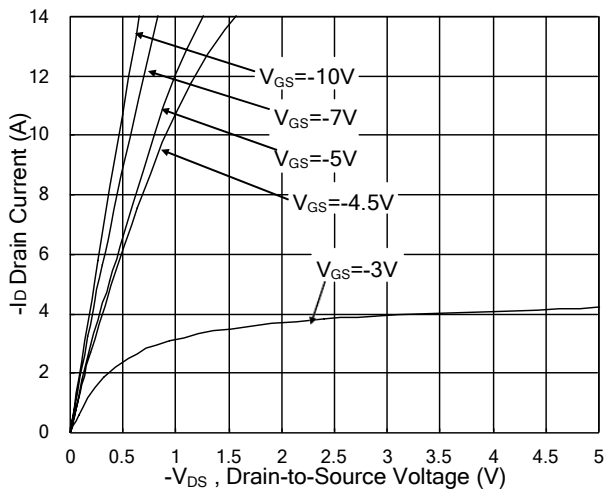


Fig.1 Typical Output Characteristics

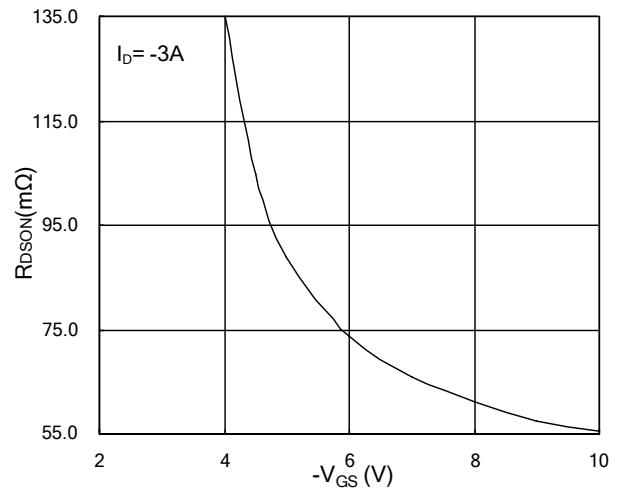


Fig.2 On-Resistance vs. G-S Voltage

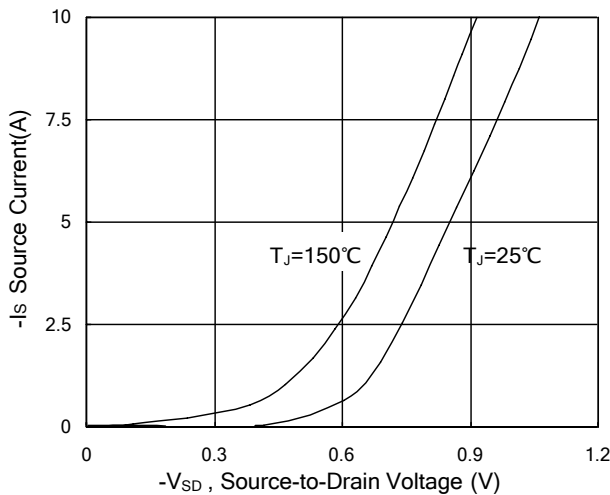


Fig.3 Source Drain Forward Characteristics

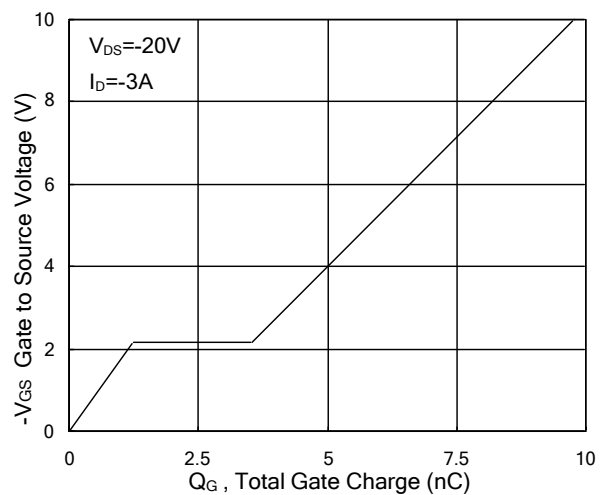


Fig.4 Gate-Charge Characteristics

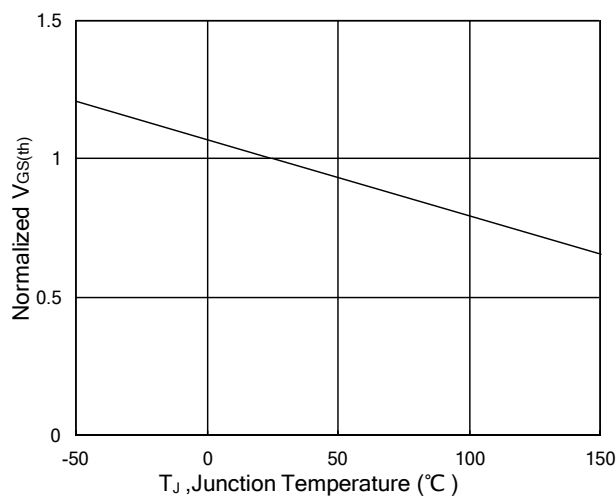


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

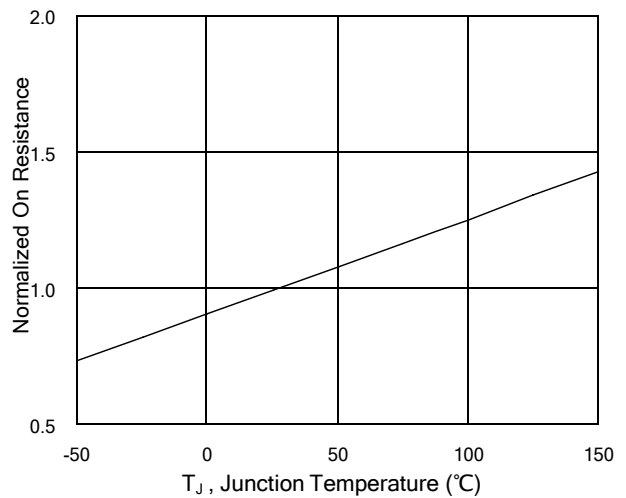


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

P-Ch -30V Fast Switching MOSFET
 $V_{DS}=-30V$, $I_D=-3.2A$, $R_{DS(ON)}=70m\Omega$

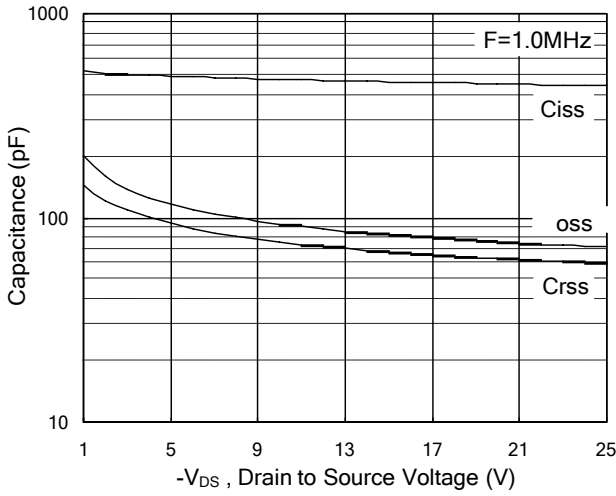


Fig.7 Capacitance

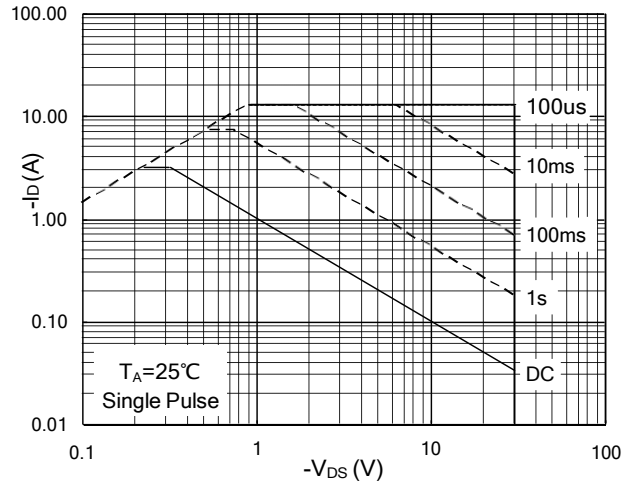


Fig.8 Safe Operating Area

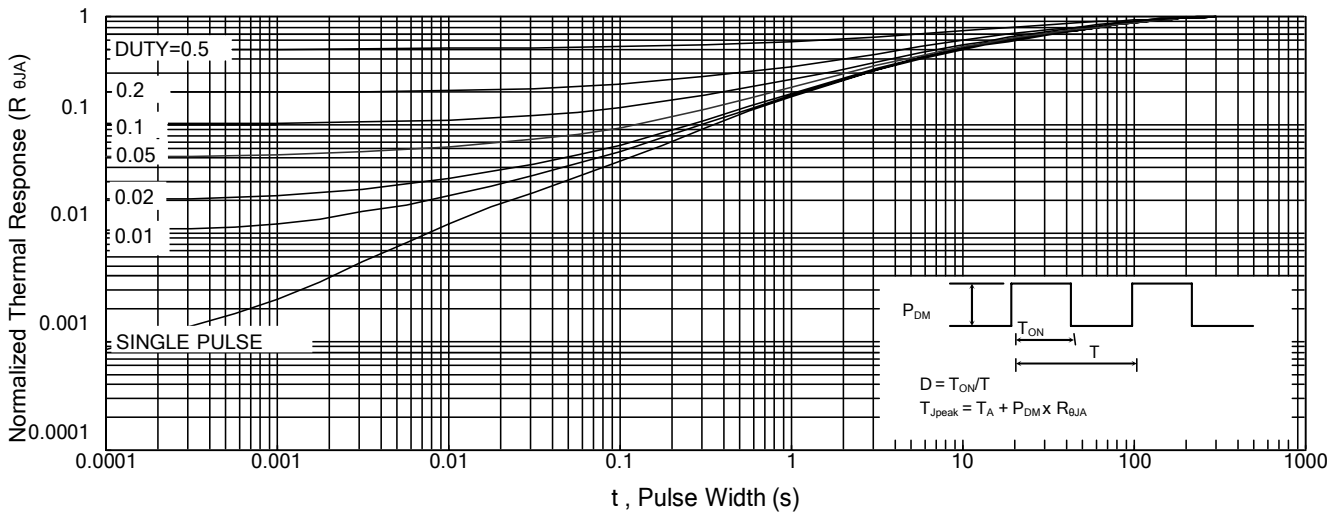


Fig.9 Normalized Maximum Transient Thermal Impedance

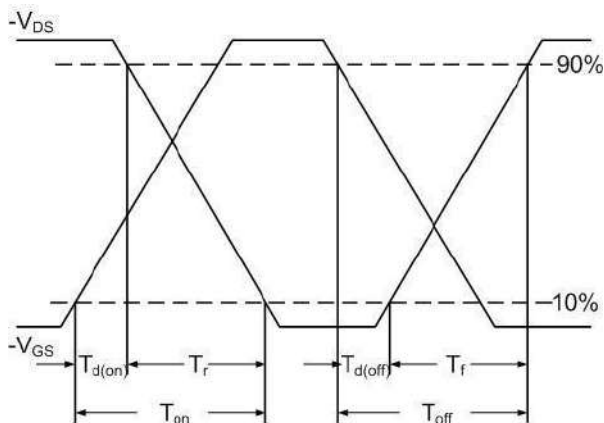


Fig.10 Switching Time Waveform

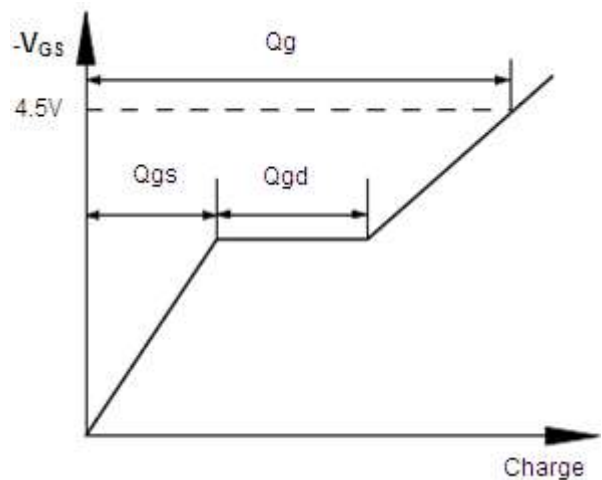


Fig.11 Gate Charge Waveform

➤ Recommand IR Reflow Soldering Thermal Profile

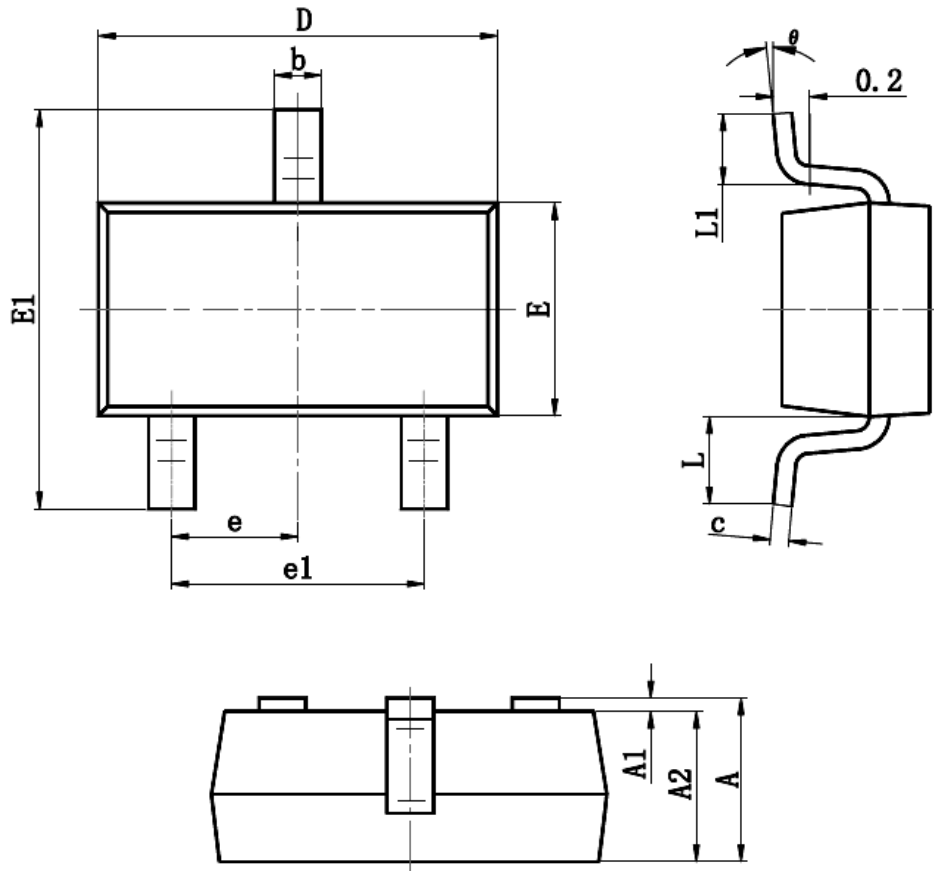


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Average Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (t _P) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

➤ Ordering Information

Part Number	Description	Quantity
PAP3117NS	SOT-23S Reel	3000 pcs

➤ Package Information (SOT-23S)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

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