

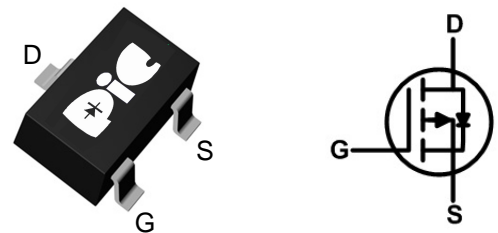
## ➤ General Description

This PAP6117N P-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent Rds(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

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

## ➤ SOT-23



## ➤ Application

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

## ➤ Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	-60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_A=25^\circ C$	-1.7	A
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_A=70^\circ C$	-1.4	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	-7	A
Total Power Dissipation <sup>3</sup>	$P_D @ T_A=25^\circ C$	1	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^\circ C$
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	125	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	80	$^\circ C/W$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ C, I_D=-1mA$	---	-0.021	---	V/ $^\circ C$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-1.5A$	---	---	180	m $\Omega$
		$V_{GS}=-4.5V, I_D=-1A$	---	---	266	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	---	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	4.08	---	mV/ $^\circ C$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-48V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	uA
		$V_{DS}=-48V, V_{GS}=0V, T_J=55^\circ C$	---	---	5	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
Forward Transconductance	$g_{fs}$	$V_{DS}=-5V, I_D=-1.5A$	---	5.9	---	S
Total Gate Charge (-4.5V)	$Q_g$	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-1.5A$	---	4.6	---	nC
Gate-Source Charge	$Q_{gs}$		---	1.4	---	
Gate-Drain Charge	$Q_{gd}$		---	1.62	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DS}=-15V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-1A$	---	17.4	---	ns
Rise Time	$T_r$		---	5.4	---	
Turn-Off Delay Time	$T_{d(off)}$		---	37.2	---	
Fall Time	$T_f$		---	2.4	---	
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	---	531	---	pF
Output Capacitance	$C_{oss}$		---	59	---	
Reverse Transfer Capacitance	$C_{rss}$		---	38	---	

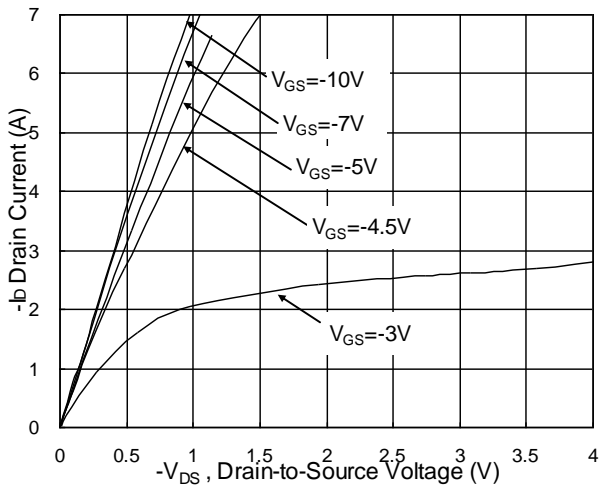
## ➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current <sup>1,4</sup>	$I_S$	$V_G=V_D=0V, \text{Force Current}$	---	---	-1.7	A
Pulsed Source Current <sup>2,4</sup>	$I_{SM}$		---	---	-7	A
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	---	---	-1.2	V

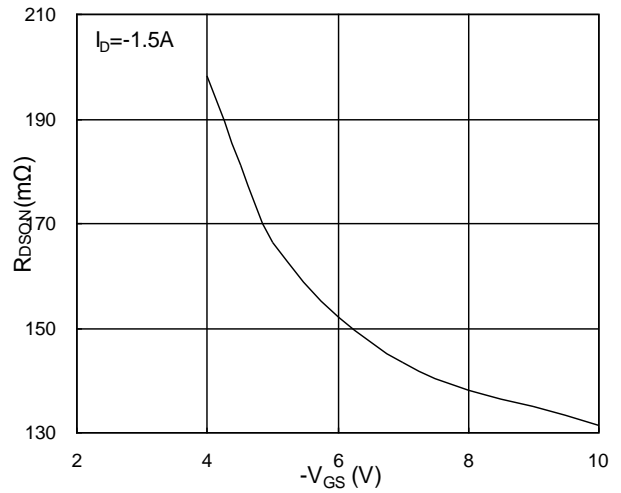
Note :

- 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.

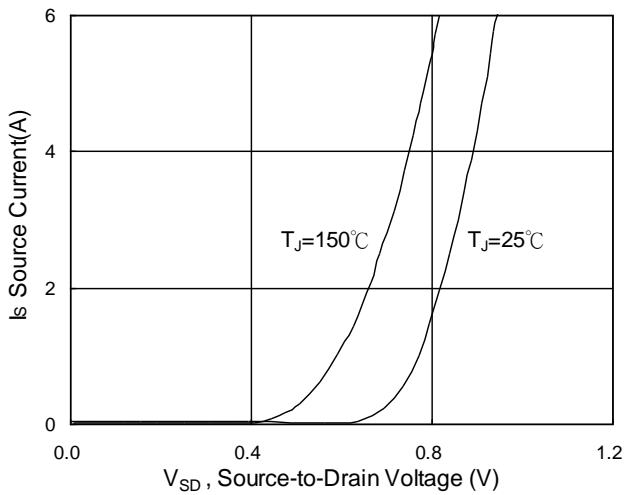
## ➤ Typical Characteristics



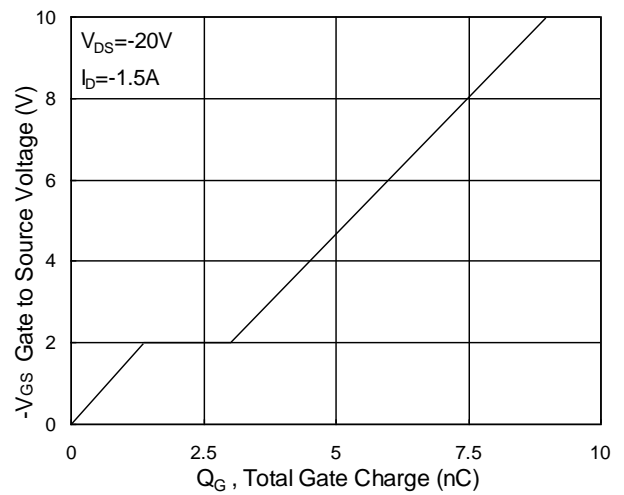
**Fig.1 Typical Output Characteristics**



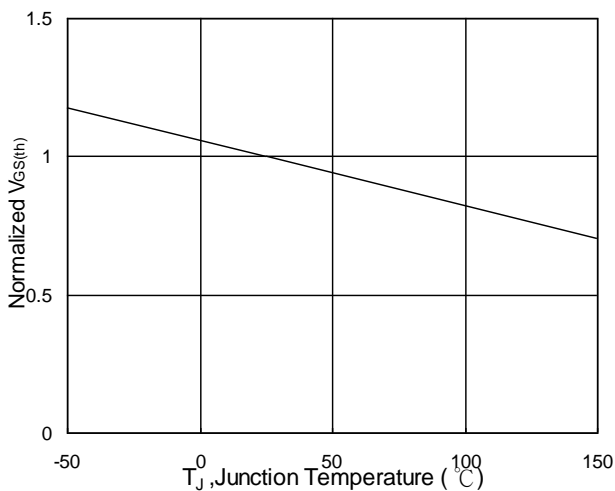
**Fig.2 On-Resistance v.s Gate-Source**



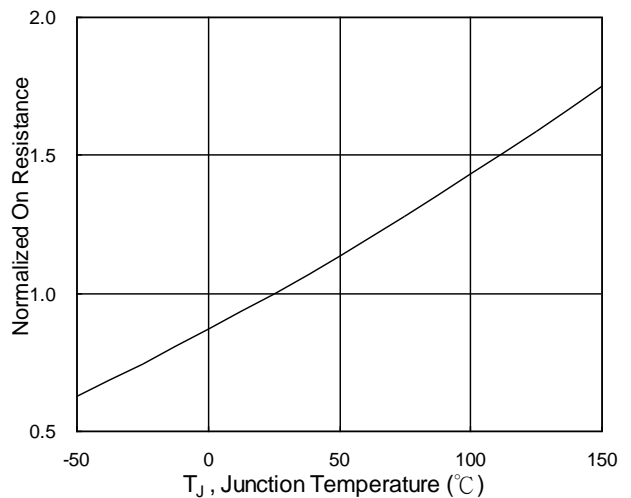
**Fig.3 Forward Characteristics Of Reverse**



**Fig.4 Gate-Charge Characteristics**



**Fig.5 Normalized V<sub>GS(th)</sub> v.s T<sub>J</sub>**



**Fig.6 Normalized R<sub>DS(ON)</sub> v.s T<sub>J</sub>**

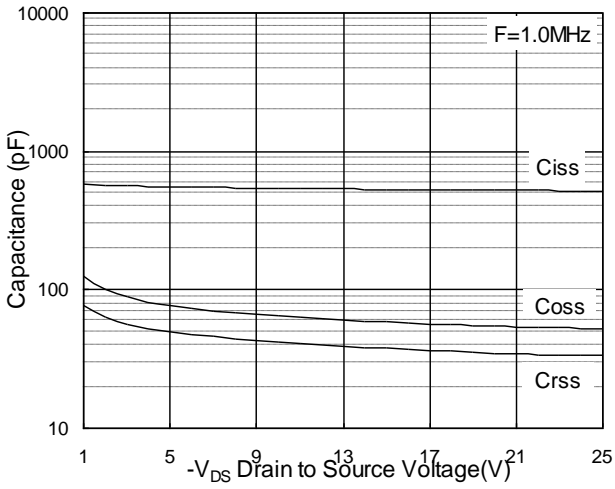


Fig.7 Capacitance

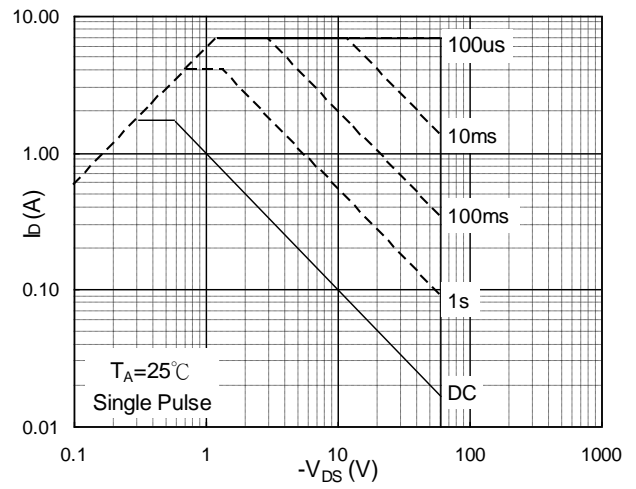


Fig.8 Safe Operating Area

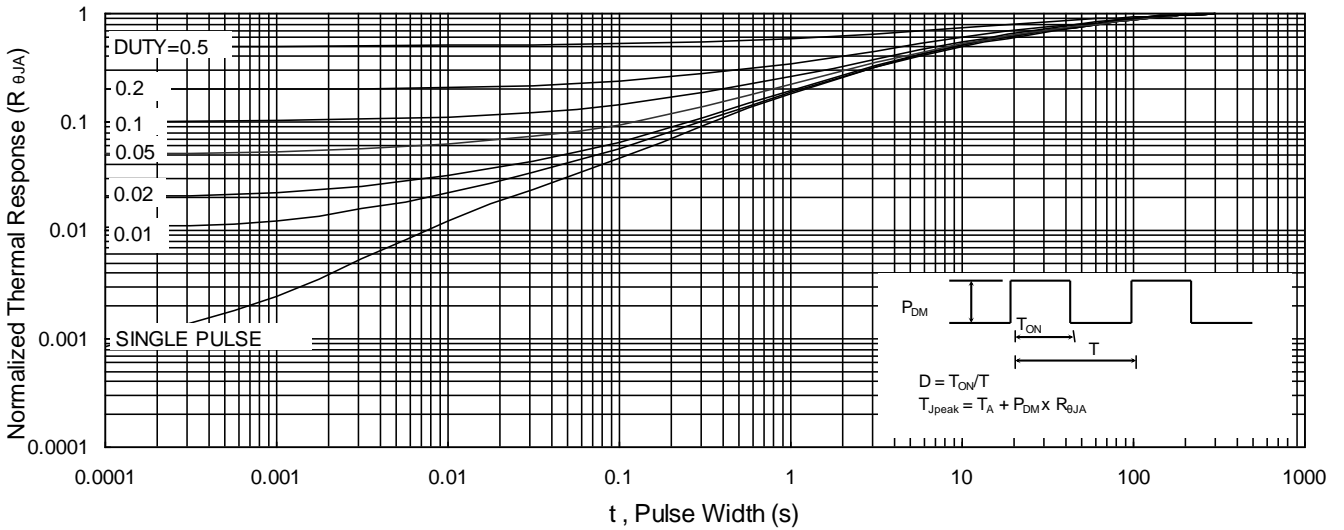


Fig.9 Normalized Maximum Transient Thermal Impedance

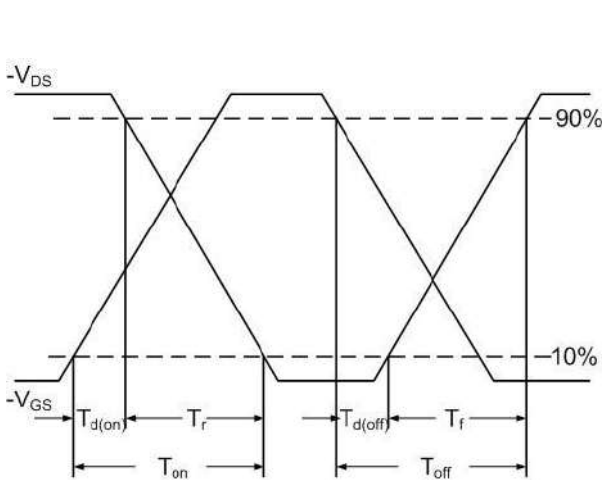


Fig.10 Switching time waveform

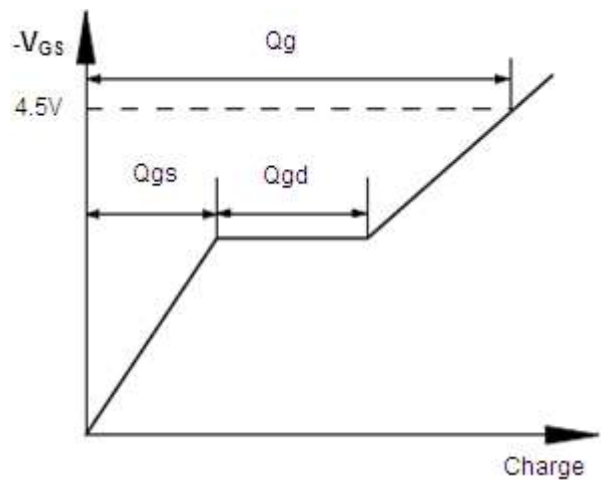


Fig.11 Gate Charge waveform

## ➤ Recommnd IR Reflow Soldering Thermal Profile

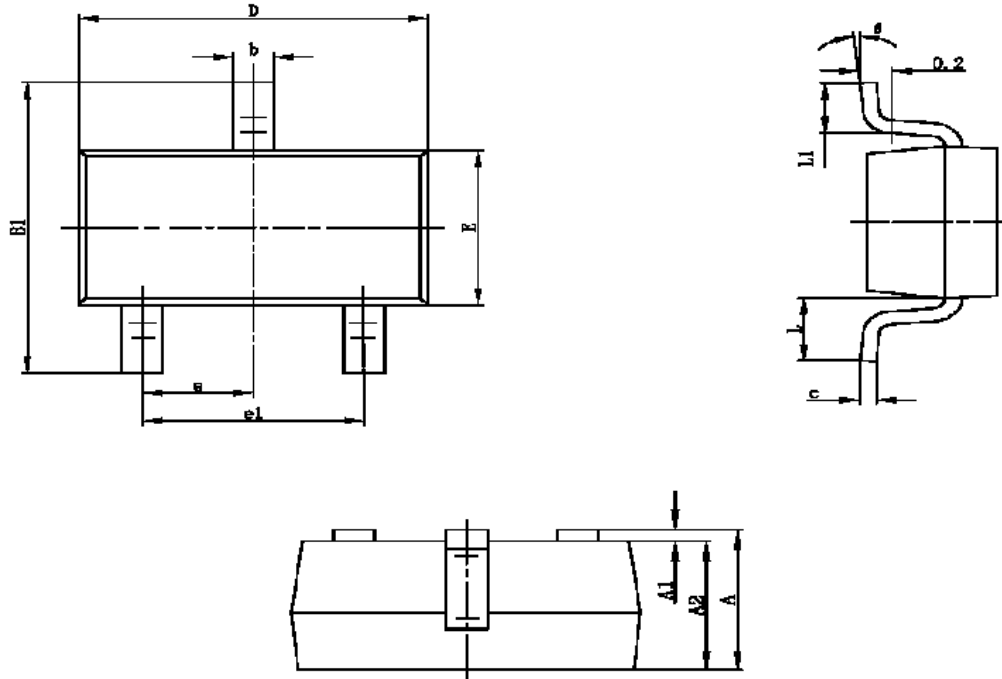


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Average Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature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

## ➤ Ordering Information

Part Number	Description	Quantity
PAP6117N	SOT-23 Reel	3000 pcs

➤ Package Information ( SOT-23 )



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.400	0.012	0.016
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

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