

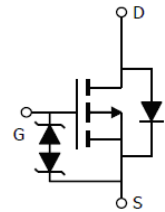
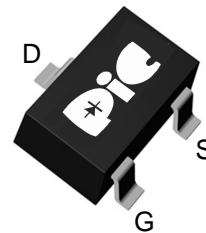
## ➤ General Description

This PAP0021SN 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

- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- ESD Protection ( >2KV) Diode design-in
- SOT-23 package design

## ➤ SOT-23



## ➤ Application

- Active Clamp Circuits in DC/DC Power Supplies
- Load switch

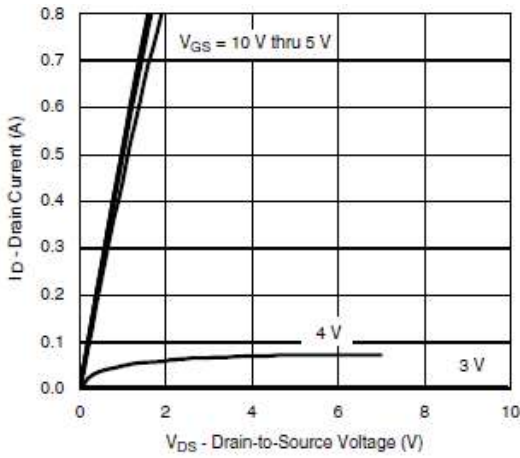
## ➤ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DSS}$	-200	V
Gate -Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current( $T_J=150^\circ C$ )	$I_D$	$T_C=25^\circ C$	-0.5
		$T_C=70^\circ C$	-0.3
Pulsed Drain Current	$I_{DM}$	-1.0	A
Continuous Source Current(Diode Conduction)	$I_S$	-1.0	A
Power Dissipation	$P_D$	$T_C=25^\circ C$	3.2
		$T_C=70^\circ C$	2.1
Operating Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature Range	$T_{STG}$	-55/150	$^\circ C$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	120	$^\circ C/W$

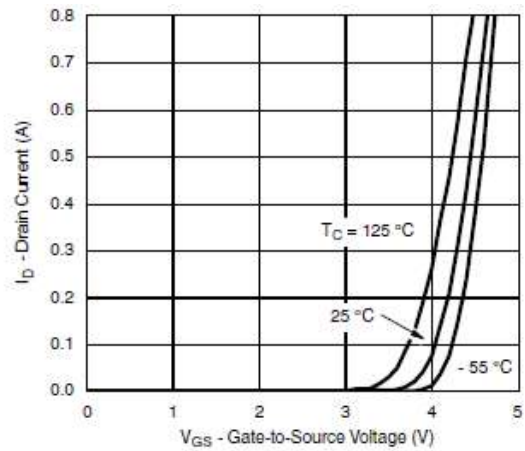
➤ **Electrical Characteristics ( $T_A=25^\circ C$  Unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-200			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0		-2.5	
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-160V, V_{GS}=0V$			-1	$\mu A$
		$V_{DS}=-160V, V_{GS}=0V$ $T_J=85^\circ C$			-30	
On-State Drain Current	$I_{D(on)}$	$V_{DS} \geq -10V, V_{GS}=-10V$	-0.6			A
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-0.5A$		2000	2400	$m\Omega$
		$V_{GS}=-4.5V, I_D=-0.3A$		2100	2600	
Forward Transconductance	$g_{FS}$	$V_{DS}=-10V, I_D=-0.5A$		1.5		S
Diode Forward Voltage	$V_{SD}$	$I_S=-0.3A, V_{GS}=0V$		-0.75	-1.2	V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=-75V, V_{GS}=-10V$ $I_D=-0.5A$		10	15	nC
Gate-Source Charge	$Q_{gs}$			2.5		
Gate-Drain Charge	$Q_{gd}$			5.0		
Input Capacitance	$C_{iss}$	$V_{DS}=-75V, V_{GS}=0V$ $f=1MHz$		520	700	$\mu F$
Output Capacitance	$C_{oss}$			30		
Reverse Transfer Capacitance	$C_{rss}$			20		
Turn-On Time	$t_{d(on)}$	$V_{DD}=-75V, R_L=75\Omega$ $I_D=-1.0A, V_{GEN}=-10V$ $R_G=1.0\Omega$		10	20	ns
	$t_r$			12	25	
Turn-Off Time	$t_{d(off)}$			30	60	
	$t_f$			12	25	

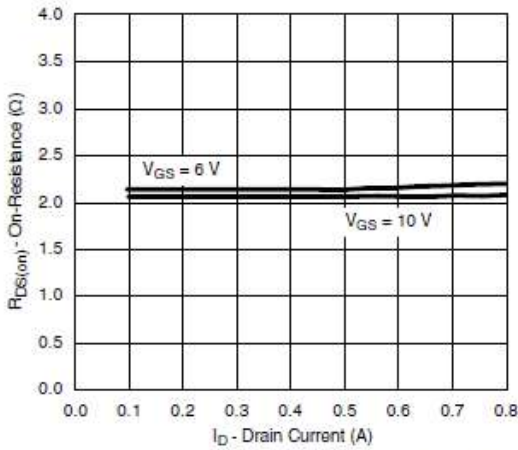
## ➤ Typical Characteristics



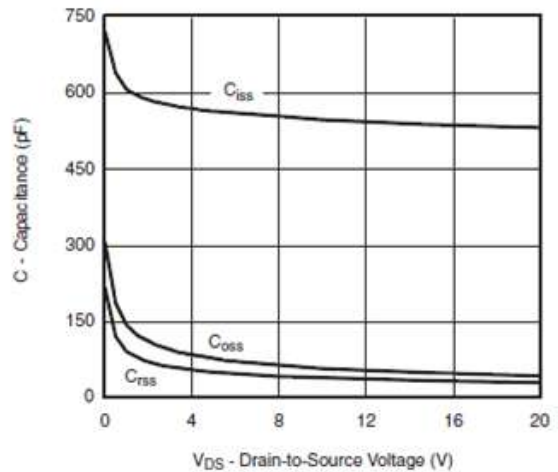
**Output Characteristics**



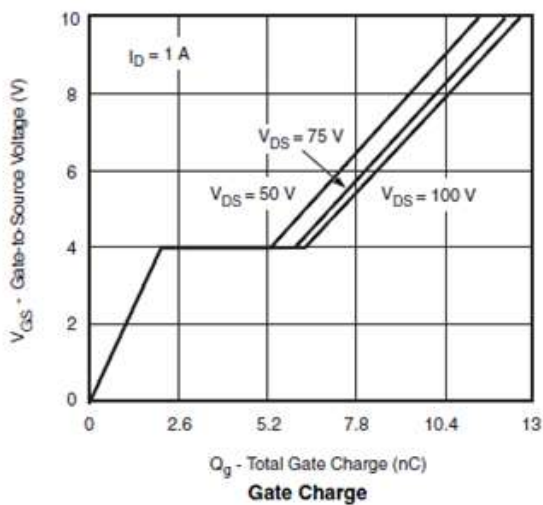
**Transfer Characteristics**



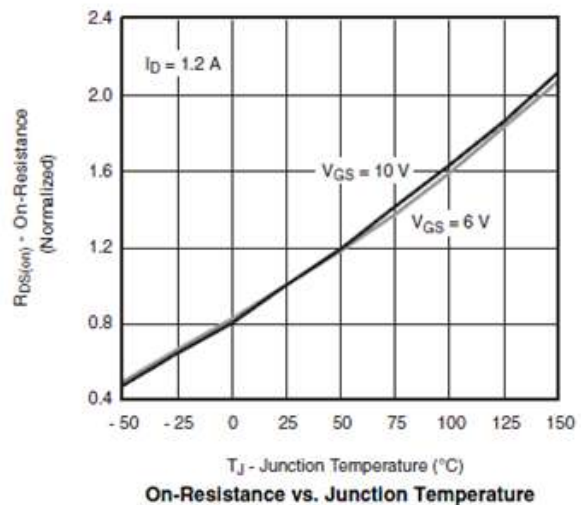
**On-Resistance vs. Drain Current and Gate Voltage**



**Capacitance**



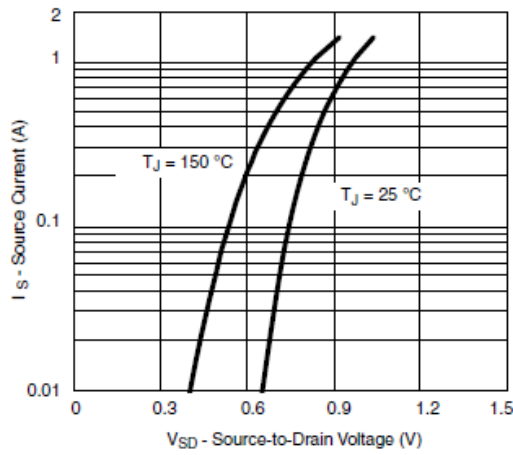
**Gate Charge**



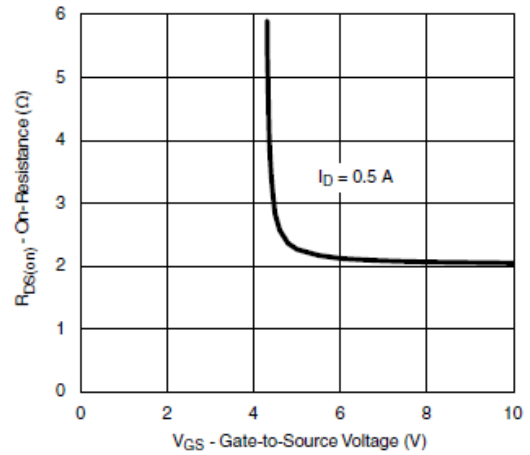
**On-Resistance vs. Junction Temperature**

## P-Ch -200V Fast Switching MOSFET

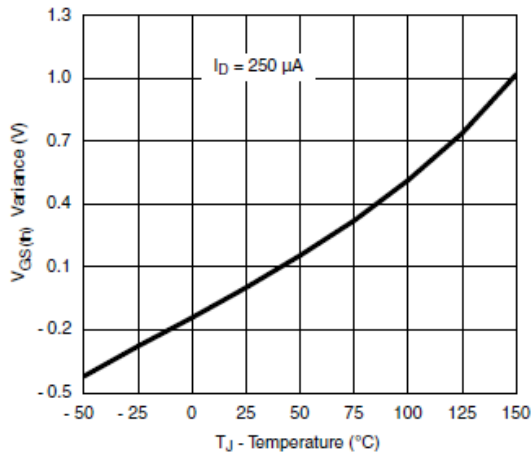
$V_{DS} = -200V$ ,  $I_D = -0.5A$ ,  $R_{DS(on)} = 2400m\Omega$



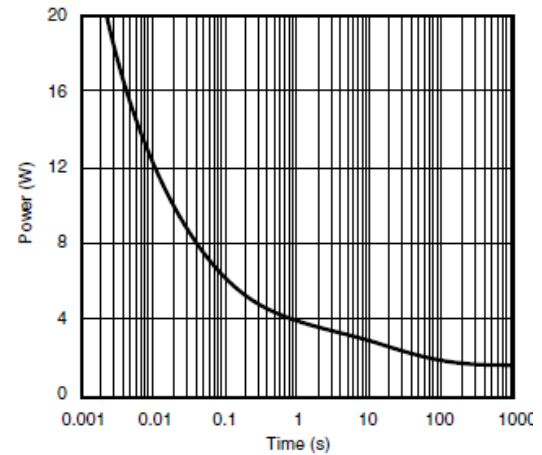
Source-Drain Diode Forward Voltage



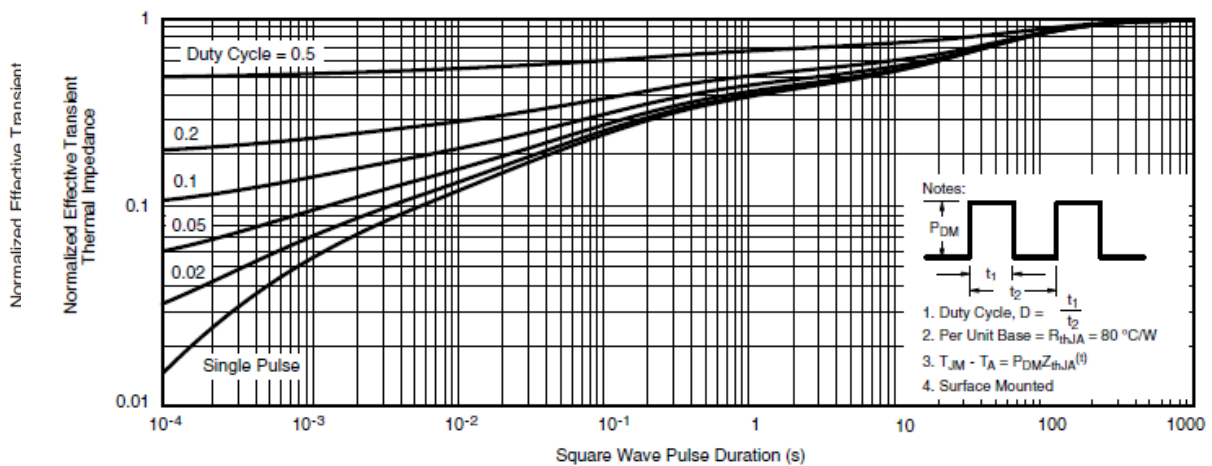
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient

## ➤ Recommand IR Reflow Soldering Thermal Profile

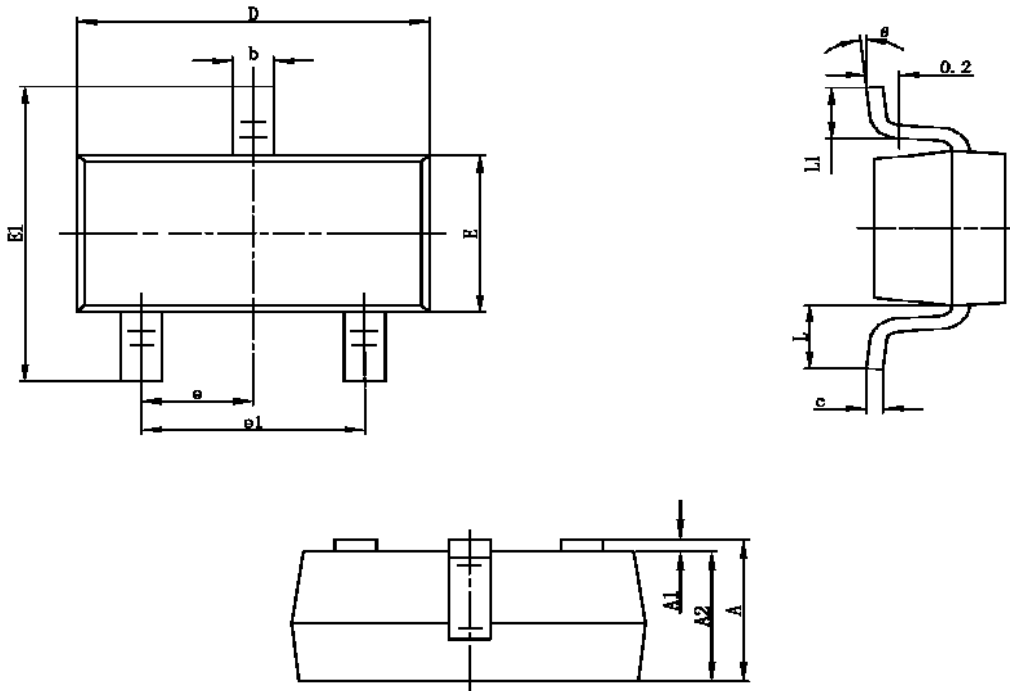


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Average Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (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
PAP0021SN	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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