

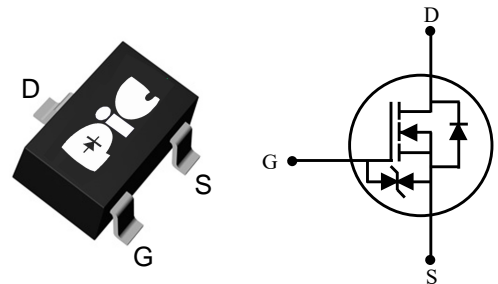
## ➤ General Description

This PAN7002EKN N-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 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	Value	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	300	mA
Pulsed Drain Current (Pulse width $\leq 10\mu s$ )	$I_{DM}$	1.5	A
Power Dissipation (Note 1)	$P_D$	350	mW
Thermal Resistance from Junction to Ambient (Note 1)	$R_{\theta JA}$	357	$^{\circ}C/W$
Operating and Storage Temperature Range	$T_J, T_{stg}$	- 55 to + 150	$^{\circ}C$

Note :

1. Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain Source Breakdown Voltage	$I_D=10\mu A$	$V_{(BR)DSS}$	60	-	-	V
Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu A$	$V_{GS(th)}$	1.0	-	2.5	V
Zero Gate Voltage Drain Current	$V_{DS}=60V$	$I_{DSS}$	-	-	1	$\mu A$
Gate-Body Leakage Current	$V_{GS}=\pm 20V$	$I_{GSS}$	-	-	$\pm 10$	$\mu A$
Drain-Source On-State Resistance	$V_{GS}=10V$ , $I_D=500mA$	$R_{DS(on)}$	-	-	3	$\Omega$
	$V_{GS}=4.5V$ , $I_D=200mA$		-	-	4	
Forward Transfer Admittance	$V_{DS}=10V$ , $I_D=200mA$	$g_{FS}$	80	-	-	mS
<b>Dynamic</b>						
Gate resistance	$V_{GS}=0V$ , $V_{DS}=0V$ , $f=1MHz$	$R_g$	-	200	-	$\Omega$
Total Gate Charge	$V_{DS}=10V$ , $I_D=0.5A$ , $V_{GS}=4.5V$	$Q_g$	-	0.44	-	nC
Gate-Source Charge		$Q_{gs}$	-	0.20	-	
Gate-Drain Charge		$Q_{gd}$	-	0.10	-	
Input Capacitance	$V_{DS}=25V$ , $V_{GS}=0V$ , $f=1MHz$	$C_{iss}$	-	22.5	50.0	pF
Output Capacitance		$C_{oss}$	-	12.0	25.0	
Reverse Transfer Capacitance		$C_{rss}$	-	0.5	10.0	
Turn-On Delay Time	$V_{GS}=10V$ , $V_{DS}=30V$ , $R_g=25\Omega$ , $I_D=0.5A$	$t_{d(on)}$	-	2.7	-	ns
Turn-On Rise Time		$t_r$	-	2.5	-	
Turn-Off Delay Time		$t_{d(off)}$	-	13.0	-	
Turn-Off Fall Time		$t_f$	-	8.0	-	
<b>Drain-Source Body Diode</b>						
Drain-Source Diode Forward Voltage	$V_{GS}=0V$ , $I_S=0.5A$	$V_{SD}$	-	0.85	-	V
Diode Continuous Forward Current	-	$I_S$	-	-	300	mA
Reverse Recovery Time	$I_S=0.5A$ , $di/dt=100A/\mu s$	$t_{rr}$	-	30	-	ns
Reverse Recovery Charge		$Q_{rr}$	-	29	-	nC

## ➤ Typical Characteristics

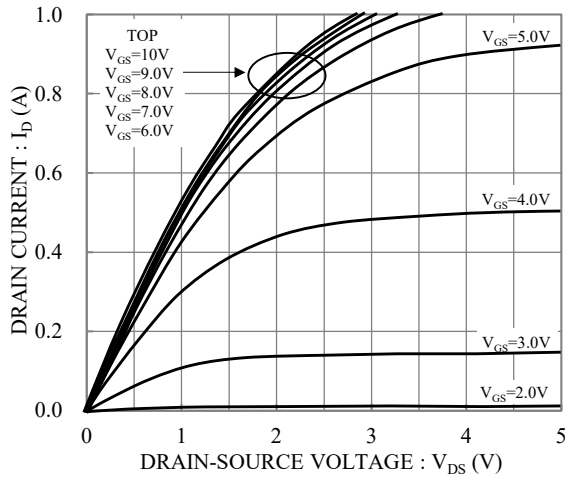


Fig.1 Typical Output Characteristics

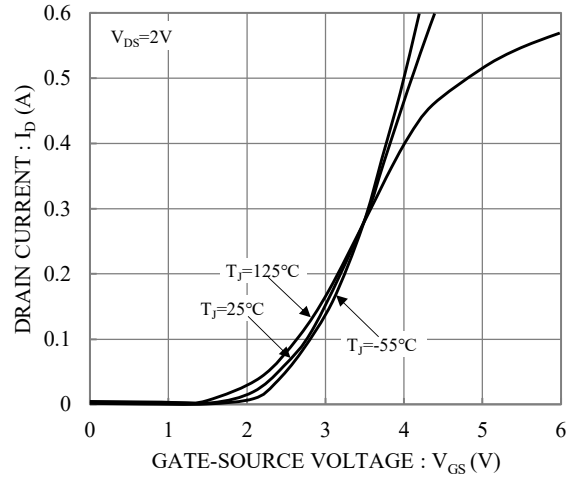


Fig.2 Typical Transfer Characteristics

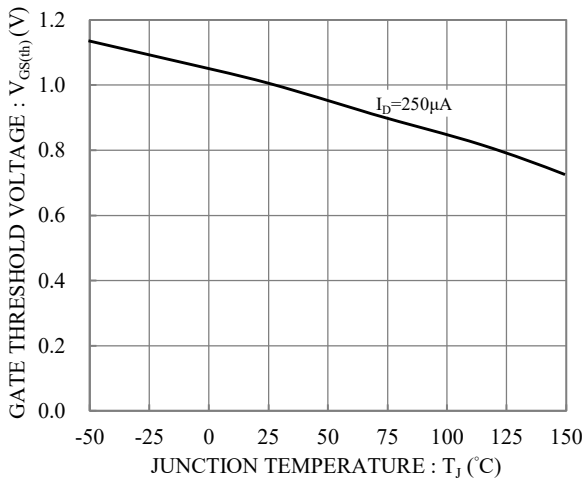


Fig.3 Gate Threshold Voltage vs. Junction Temperature

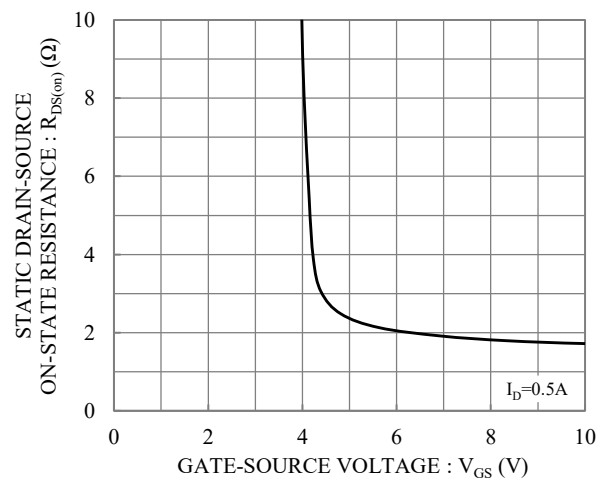


Fig.4 Static Drain-Source On-State Resistance vs. Gate-Source Voltage

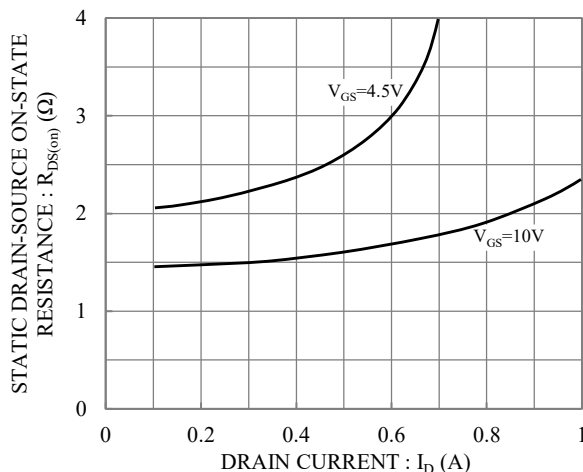


Fig.5 Static Drain-Source On-State Resistance vs. Drain Current

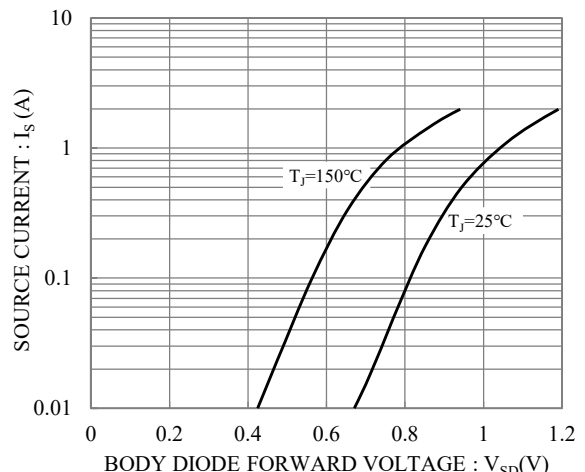
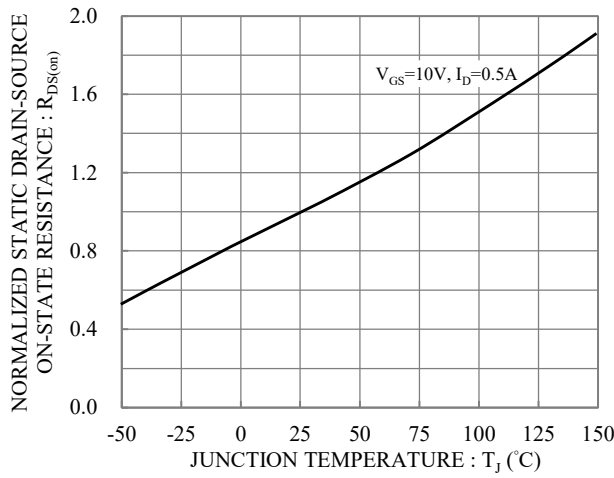
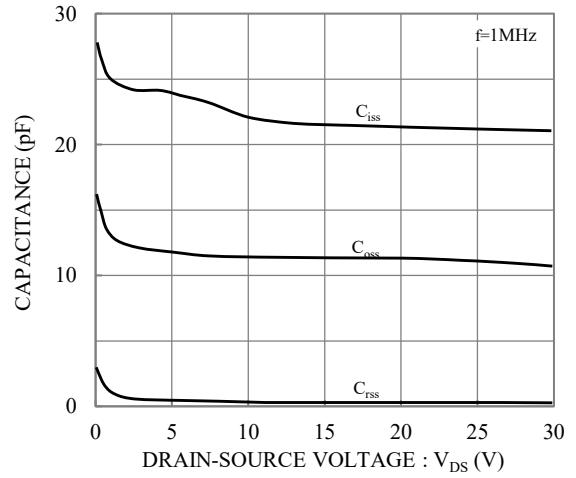


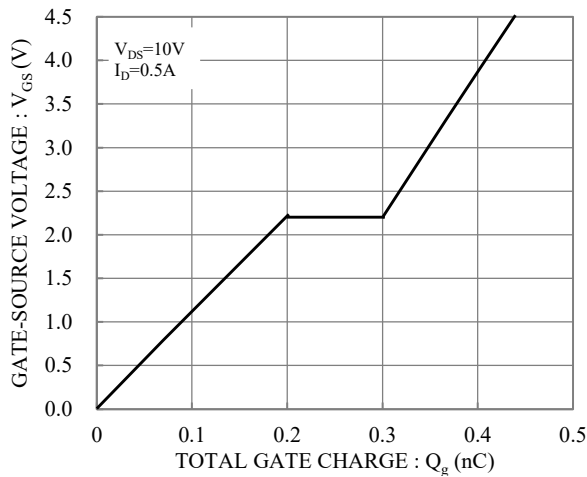
Fig.6 Body Diode Forward Voltage vs. Source Current



**Fig.7 Drain-Source On-State Resistance vs. Junction Temperature**

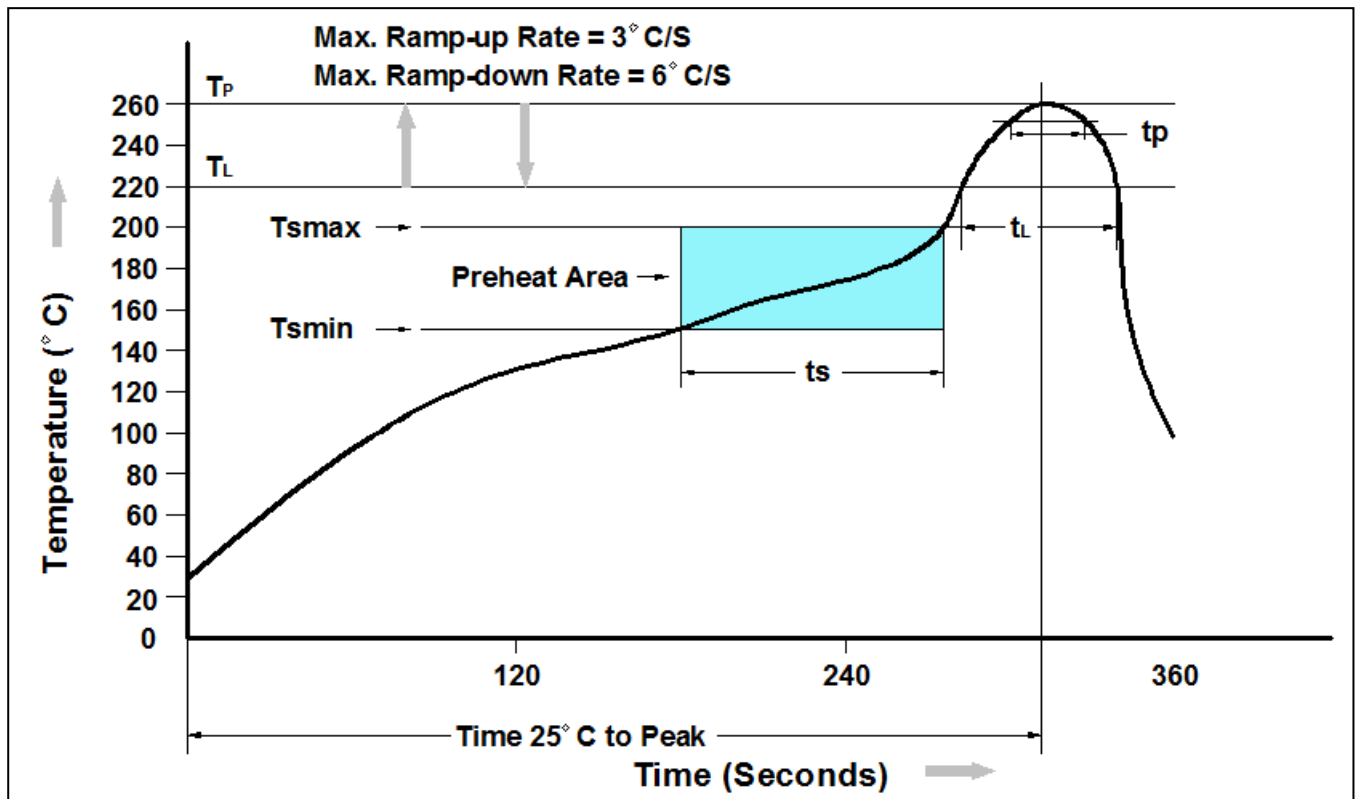


**Fig.8 Capacitance vs. Drain-Source Voltage**



**Fig.9 Gate Charge**

## ➤ Recommand IR Reflow Soldering Thermal Profile

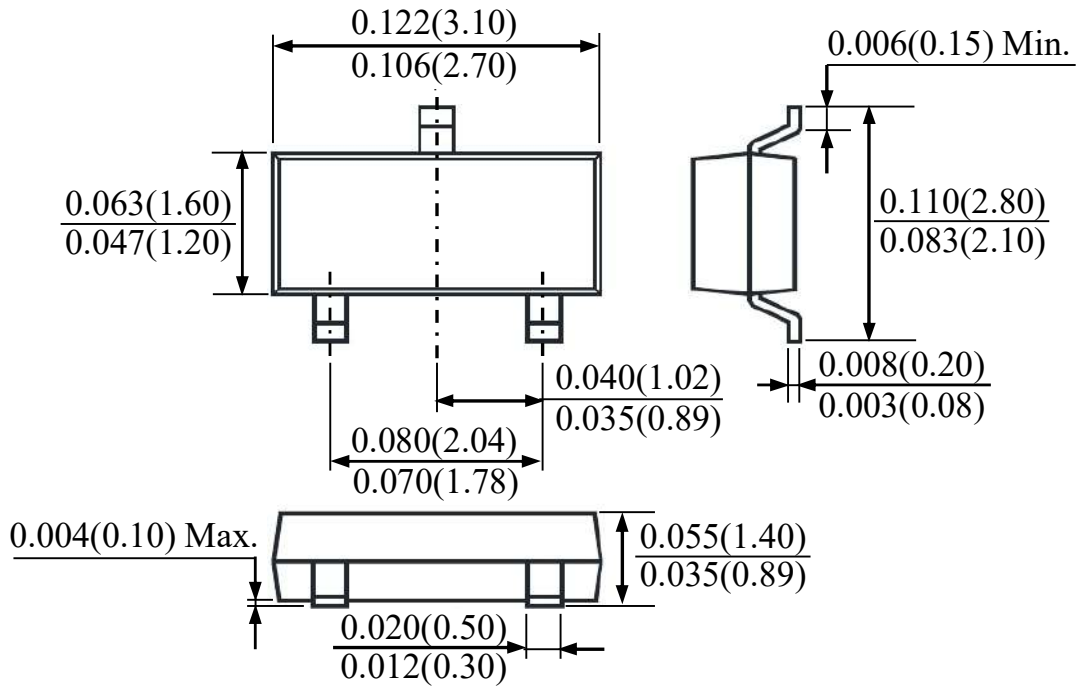


Profile Feature	Pb-Free Assembly Profile
Temperature Min. ( $T_{smin}$ )	150°C
Temperature Max. ( $T_{smax}$ )	200°C
Time ( $t_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60-120 seconds
Average Ramp-up Rate ( $t_L$ to $t_P$ )	3°C/second max.
Liquidous Temperature ( $T_L$ )	217°C
Time ( $t_L$ ) Maintained 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

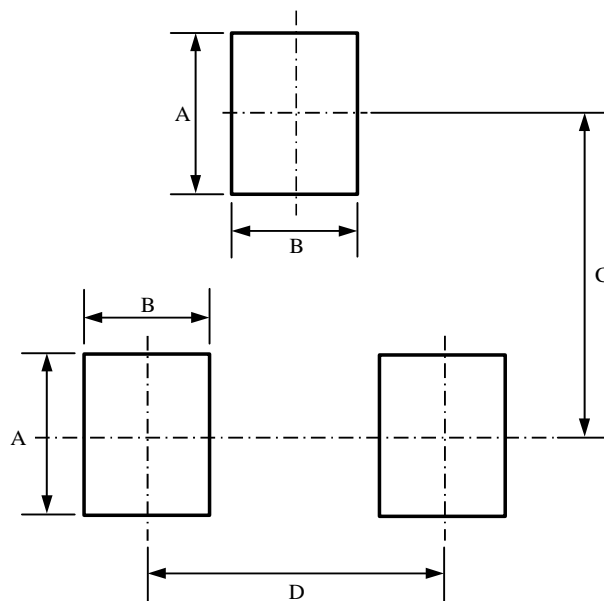
Part Number	Description	Quantity
PAN7002EKN	SOT-23 Reel	3000 pcs

➤ Package Information ( SOT-23 )



Dimensions in inch and (millimeter)

➤ SUGGESTED SOLDER PAD LAYOUT



Unit :mm

PACKAGE	A	B	C	D
SOT-23	1.00	0.80	2.00	1.90

## DISCLAIMER

- The information in this document and any product described herein are subject to change without notice and should not be construed as a commitment by Paceleader, Paceleader reserve the right to make changes to the information in this document.
- Though Paceleader make effort to improve product quality and reliability, Product can malfunction and fail due to their inherent electrical sensitivity and vulnerability to physical stress, it is the responsibility of the customer, when utilizing Paceleader products, to comply with the standards of safety in making a safe design for entire system and to avoid situation in which a malfunction or failure., In developing a new designs, customer should ensure that the device which shown in this documents are used within specified operating ranges.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by Paceleader for any infringements of patents or other rights of the third parties which may result from its use.