Dual N-Ch 20V Fast Switching MOSFET

V_{DS}=20V, I_D=9.5A ,$RDS_{(ON)}$=9.0mΩ

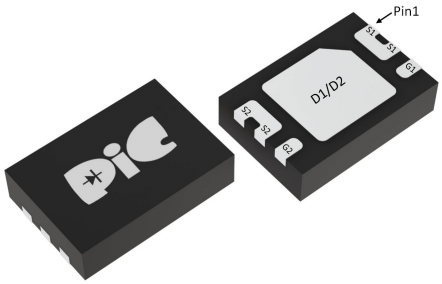
➢ General Description

The PAN82TE04F the low RDSON trenched N-CH MOSFETs with robust ESD protection. This product is suitable for Lithium-ion battery pack applications.The 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

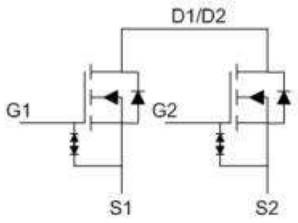
- ●Low drain-source ON resistance
- ●Green Device Available
- ●ESD Protected Embedded
- ●DFN2X3-6L package design

➢ DFN2X3-6L



➢ Application

- ●Load Switch
- ●Portable Equipment
- ●Battery Powered System



➢ Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current, V_{GS} @ 4.5V[1]	I_D@T_A=25°C	9.5	A
Continuous Drain Current, V_{GS} @ 4.5V[1]	I_D@T_A=70°C	7.6	A
Pulsed Drain Current[2]	I_{DM}	60	A
Total Power Dissipation[1]	P_D@T_A=25°C	1.56	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] (t ≤10s)	$R_{\theta JA}$	80	°C/W

➢ Electrical Characteristics (T_J=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=250uA	20	---	---	V
Static Drain-Source On-Resistance2	$R_{DS(ON)}$	V_{GS}=4.5V , I_D=5A	6.3	7.8	9	mΩ
		V_{GS}=4.0V , I_D=5A	6.5	8.0	9.5	
		V_{GS}=3.7V , I_D=5A	6.7	8.2	10	
		V_{GS}=3.1V , I_D=5A	7.0	9.0	11.2	
		V_{GS}=2.5V , I_D=5A	8.0	10.5	13.5	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	0.5	---	1.2	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=16V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=55°C	---	---	5	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±8V , V_{DS}=0V	---	---	±10	uA
Forward Transconductance	gfs	V_{DS}=5V , I_D=5.5A	---	38	---	S
Total Gate Charge (4.5V)	Q_g	V_{DS}=15V , V_{GS}=4.5V , I_D=5.5A	---	22	---	nC
Gate-Source Charge	Q_{gs}		---	3.1	---	
Gate-Drain Charge	Q_{gd}		---	8.2	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=15V , V_{GS}=4.5V , R_G=6ΩI_D=5.5A	---	10	---	ns
Rise Time	T_r		---	39.5	---	
Turn-Off Delay Time	$T_{d(off)}$		---	65	---	
Fall Time	T_f		---	30	---	
Input Capacitance	C_{iss}	V_{DS}=10V , V_{GS}=0V , f=1MHz	---	1647	---	pF
Output Capacitance	C_{oss}		---	170	---	
Reverse Transfer Capacitance	C_{rss}		---	148	---	

➢ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current1	I_S	V_G=V_D=0V , Force Current	---	---	9.5	A
Pulsed Source Current2	I_{SM}		---	---	60	A
Diode Forward Voltage2	V_{SD}	V_{GS}=0V , I_S=9.5A , T_J=25°C	---	---	1.2	V

Note :

1.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, t ≤10s.

2.The data tested by pulsed , pulse width ≦ 10us , duty cycle ≦ 1%

➢ Typical Characteristics

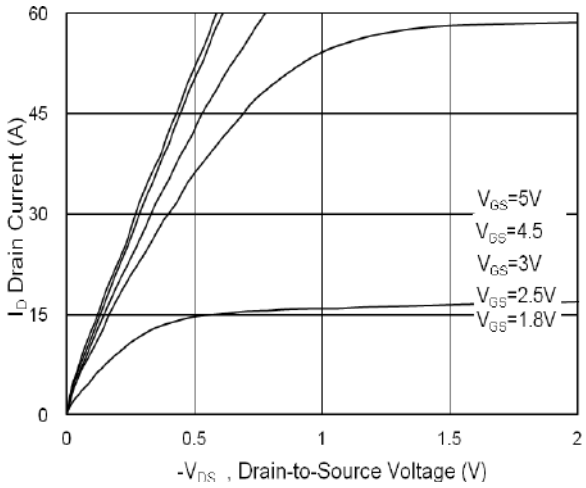


Fig.1 Typical Output Characteristics

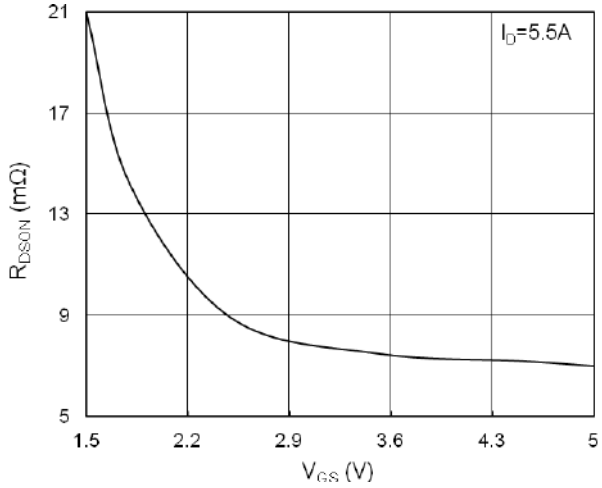


Fig.2 On-Resistance vs. G-S Voltage

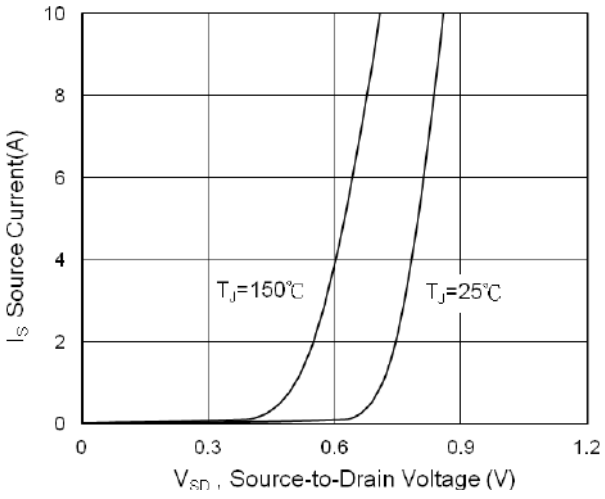


Fig.3 Forward Characteristics of Reverse

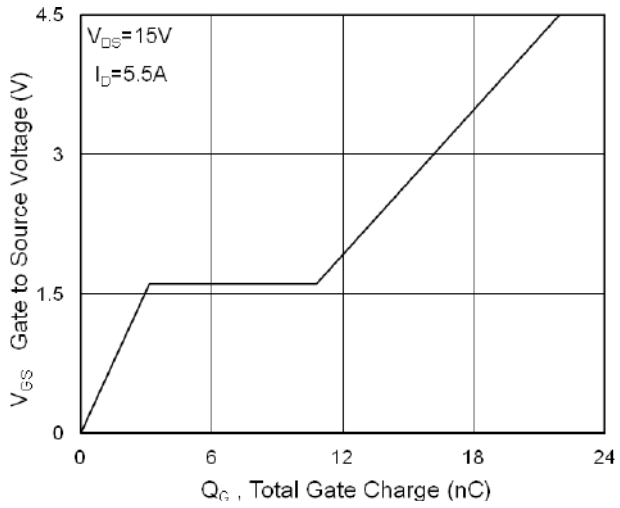


Fig.4 Gate-Charge Characteristics

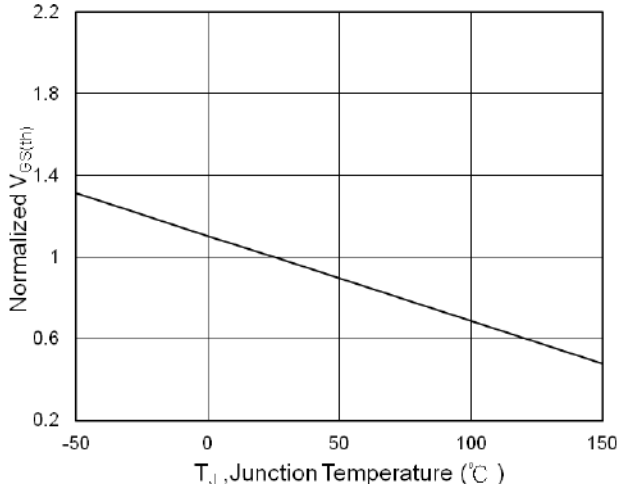


Fig.5 $V_{GS(th)}$ vs. T_J

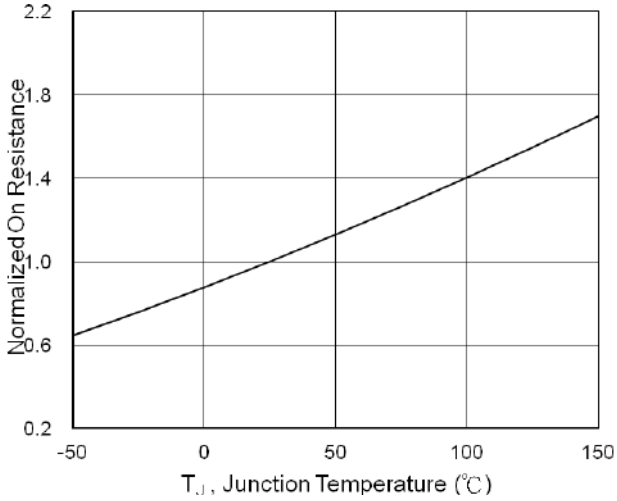


Fig.6 Normalized R_{DSON} vs. T_J

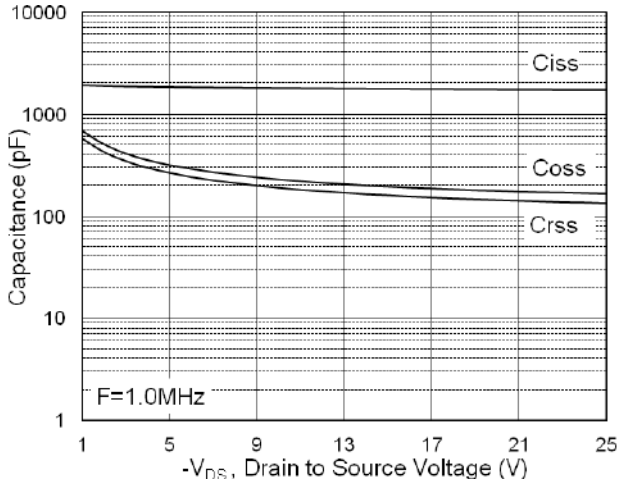


Fig.7 Capacitance

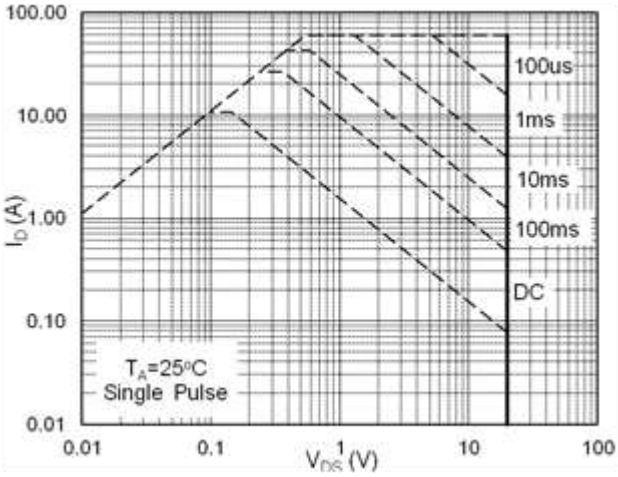


Fig.8 Safe Operating Area

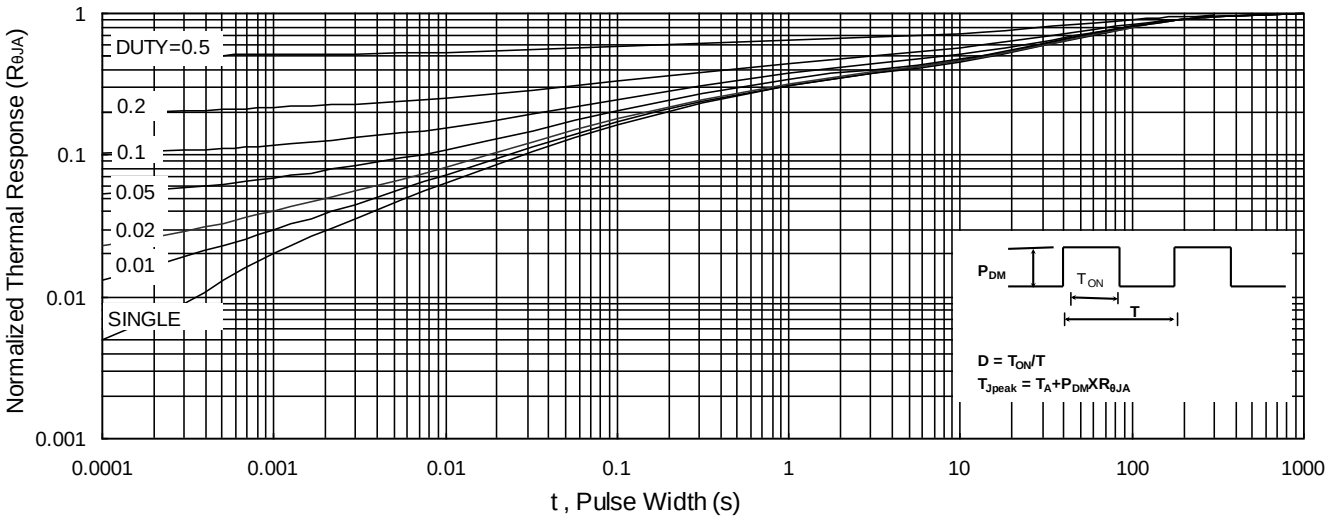


Fig.9 Normalized Maximum Transient Thermal Impedance

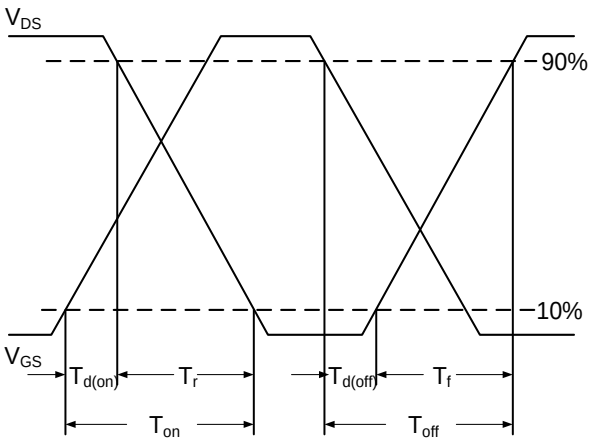


Fig.10 Switching Time Waveform

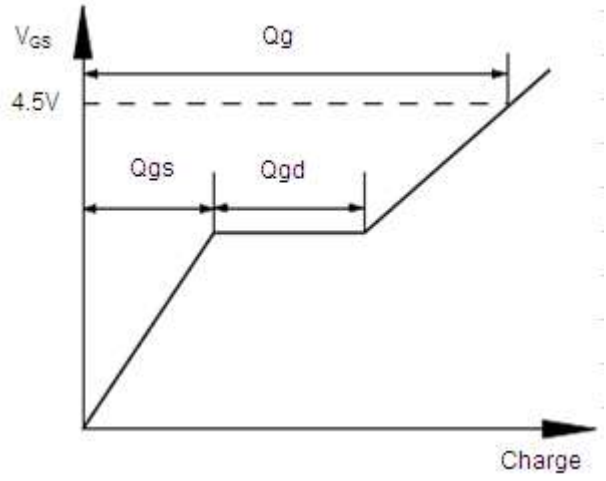
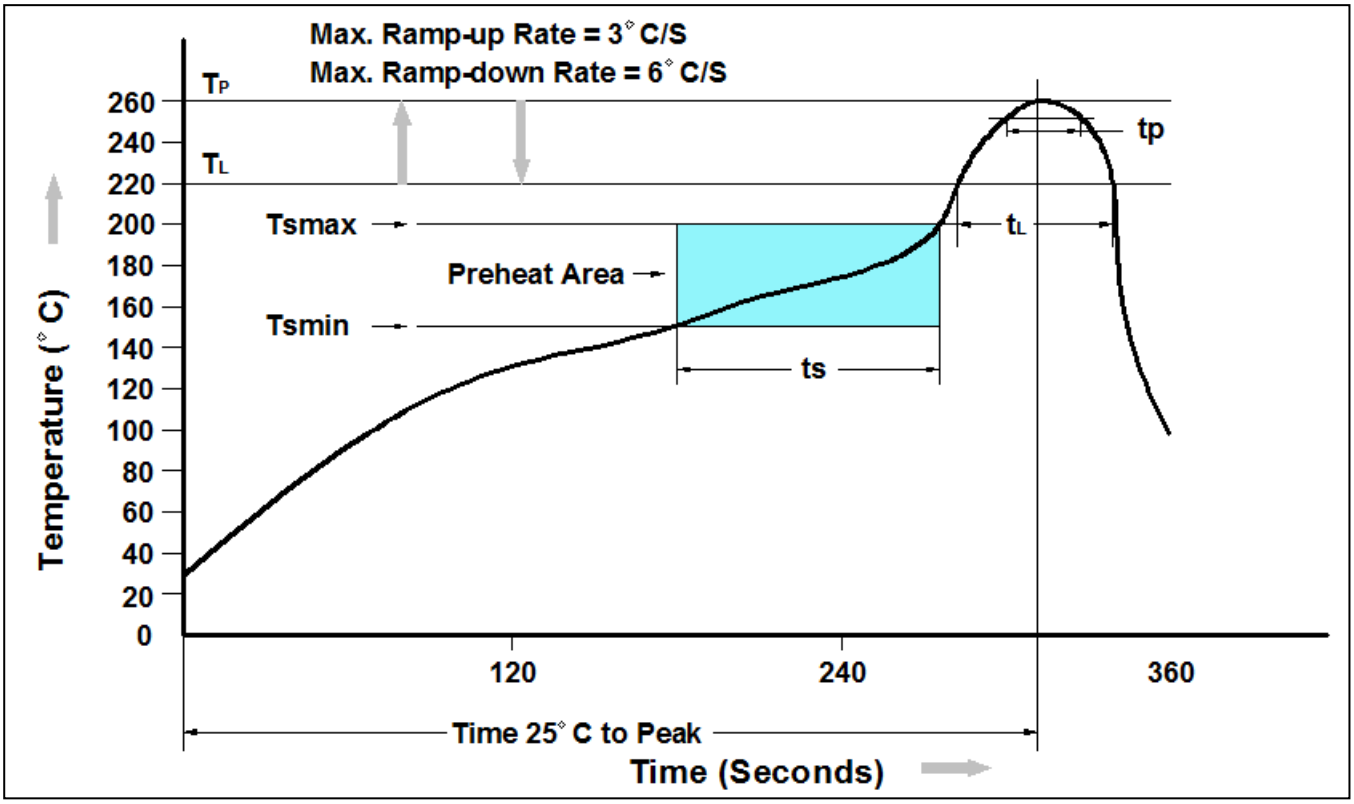


Fig.11 Gate Charge Waveform

➢ Recommand IR Reflow Soldering Thermal Profile

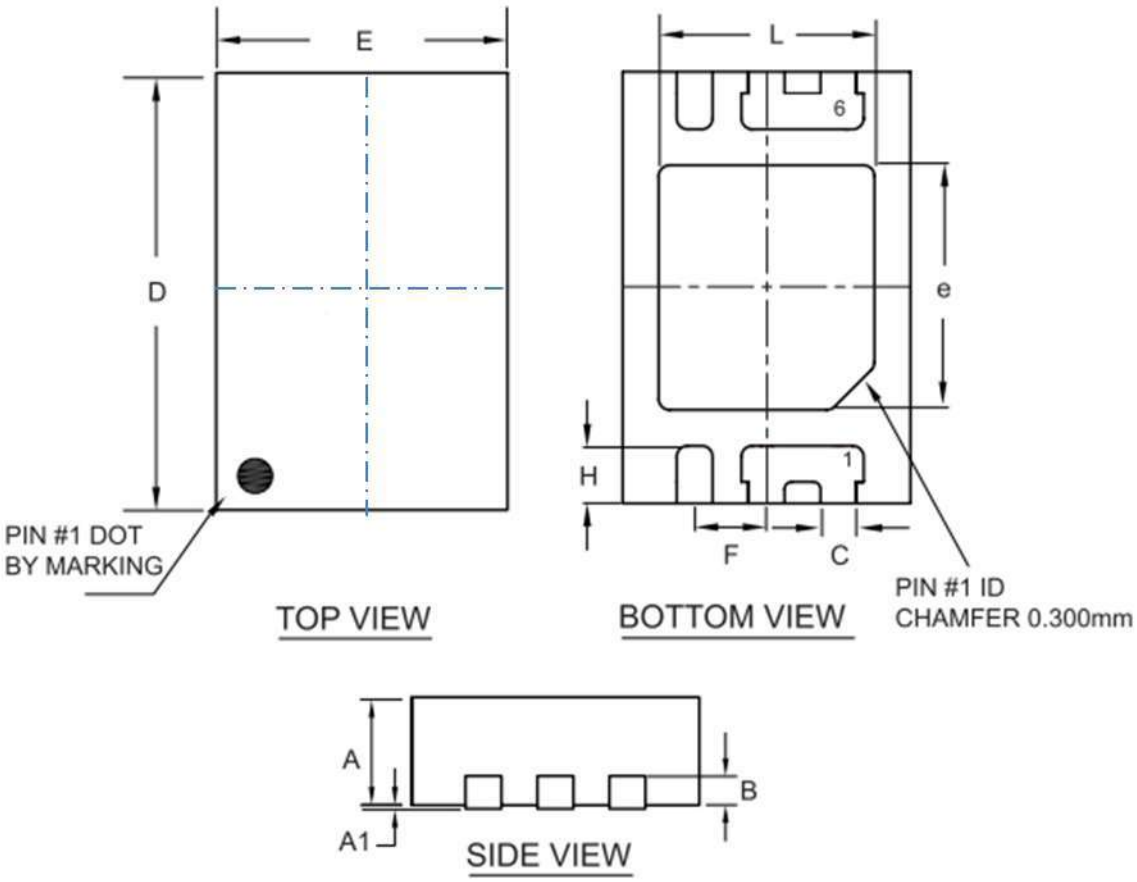


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Average Ramp-up Rate (tL to tP)	3°C/second max.
Liquidous Temperature (TL)	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (tP) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

➢ Ordering Information

Part Number	Description	Quantity
PAN82TE04F	DFN2X3-6L Reel	3000 pcs

➢ Package Information (DFN2X3-6L)



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
D	2.950	3.050	0.116	0.120
E	1.950	2.050	0.077	0.081
H	0.350	0.450	0.014	0.018
L	1.450	1.550	0.057	0.061
e	1.650	1.750	0.065	0.069
B	0.195	0.211	0.0076	0.008
C	0.200	0.300	0.008	0.012
F	0.500 BSC		0.020 BSC	

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