

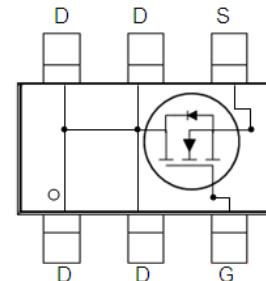
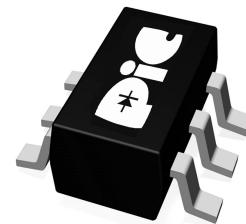
## ➤ General Description

This PAN3050C N-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
- TSOP-6 package design

## ➤ TSOP-6



## ➤ Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> @ 10V <sub>1</sub>	I <sub>D</sub> @T <sub>A</sub> =25°C	5	A
Continuous Drain Current, V <sub>GS</sub> @ 10V <sub>1</sub>	I <sub>D</sub> @T <sub>A</sub> =70°C	4	A
Pulsed Drain Current <sub>2</sub>	I <sub>DM</sub>	10	A
Total Power Dissipation <sub>3</sub>	P <sub>D</sub> @T <sub>A</sub> =25°C	1.1	W
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C
Operating Junction Temperature Range	T <sub>J</sub>	-55 to 150	°C
Thermal Resistance Junction-ambient <sub>1</sub>	R <sub>θJA</sub>	110	°C/W
Thermal Resistance Junction-Case <sub>1</sub>	R <sub>θJC</sub>	70	°C/W

➤ **Electrical Characteristics (T<sub>J</sub>=25°C Unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BVDSS	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	---	---	V
BVDSS Temperature Coefficient	△ BVDSS/△ T <sub>J</sub>	Reference to 25°C, I <sub>D</sub> =1mA	---	0.02	---	V/°C
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5A	---	---	28	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	---	---	40	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.0	---	2.5	V
V <sub>GS(th)</sub> Temperature Coefficient	△ V <sub>GS(th)</sub>		---	-4.6	---	mV/°C
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	5	
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =5A	---	6.3	---	S
Gate Resistance	R <sub>g</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	2.5	5	Ω
Total Gate Charge (4.5V)	Q <sub>g</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	---	7.2	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	1.4	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	2.2	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> =12V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω I <sub>D</sub> =5A	---	4.1	---	ns
Rise Time	T <sub>r</sub>		---	9.8	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	15.5	---	
Fall Time	T <sub>f</sub>		---	6.0	---	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	---	572	---	pF
Output Capacitance	C <sub>oss</sub>		---	81	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	65	---	

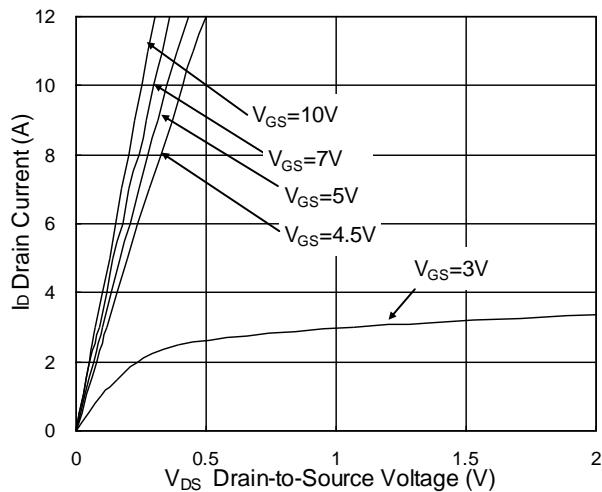
➤ **Diode Characteristics**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current <sup>1,4</sup>	I <sub>s</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	5	A
Pulsed Source Current <sup>2,4</sup>	I <sub>SM</sub>		---	---	10	A
Diode Forward Voltage <sup>2</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>s</sub> =1A, T <sub>J</sub> =25°C	---	---	1.2	V

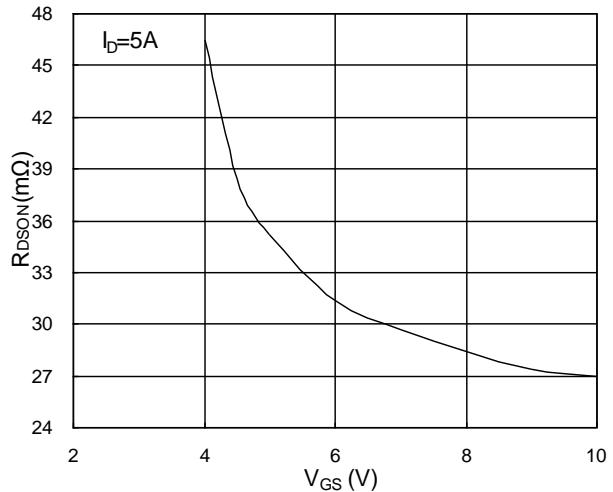
Note :

- 1.Pulse width limited by maximum junction temperature.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.Ensure that the channel temperature does not exceed 150°C.
- 4.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

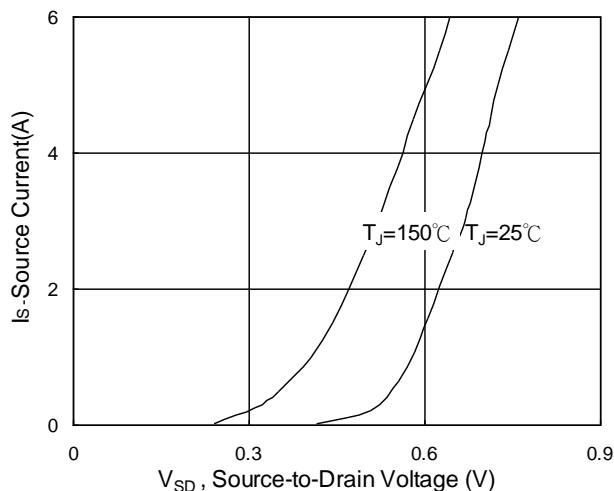
## ➤ Typical Characteristics



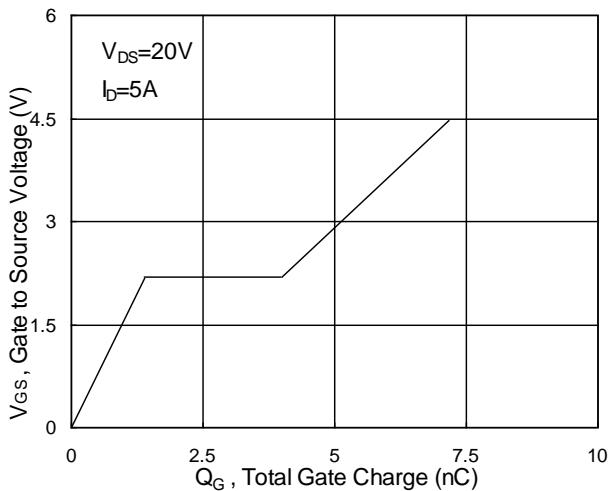
**Fig.1 Typical Output Characteristics**



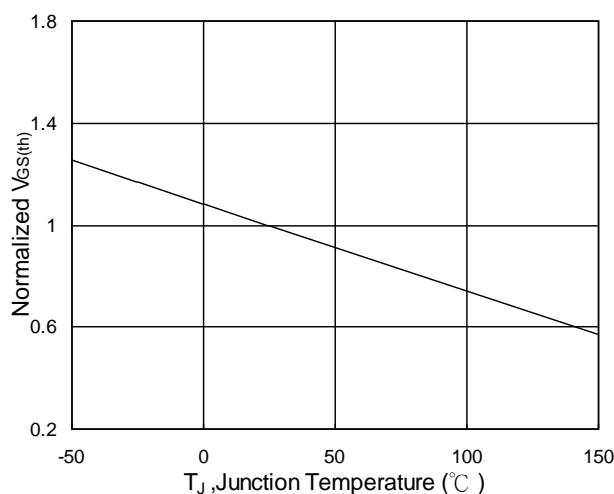
**Fig.2 On-Resistance vs. Gate-Source**



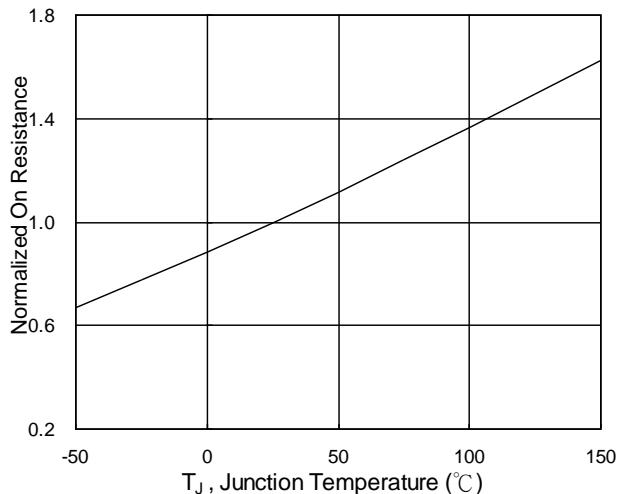
**Fig.3 Forward Characteristics Of Reverse**



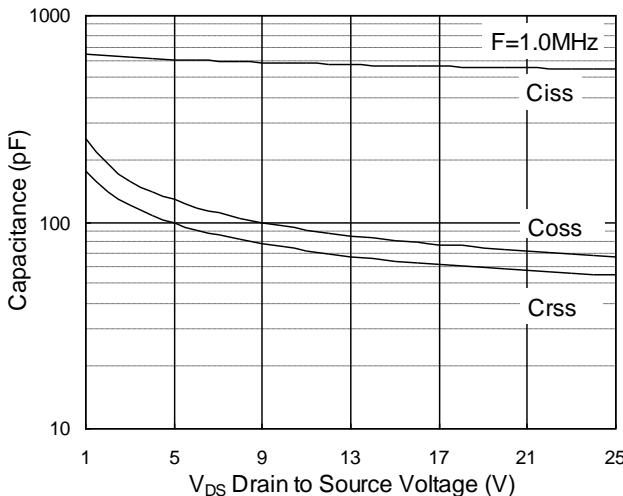
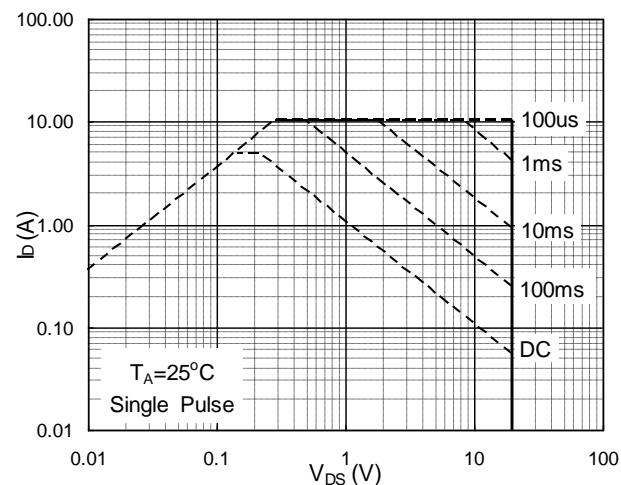
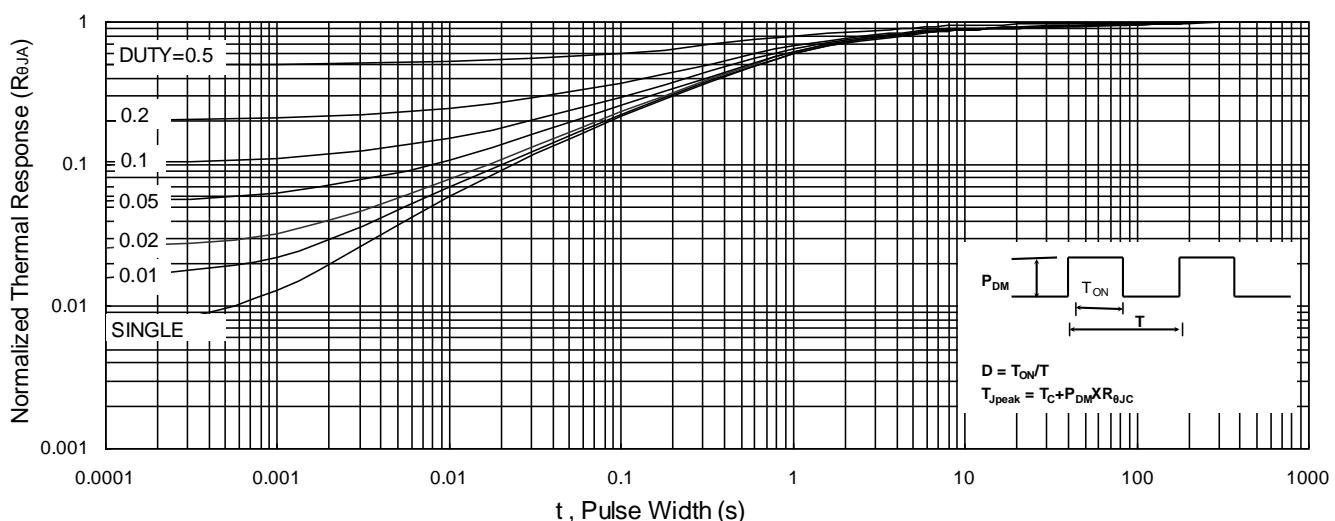
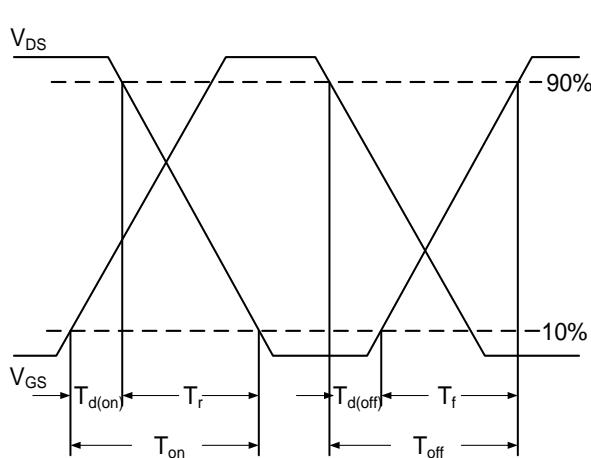
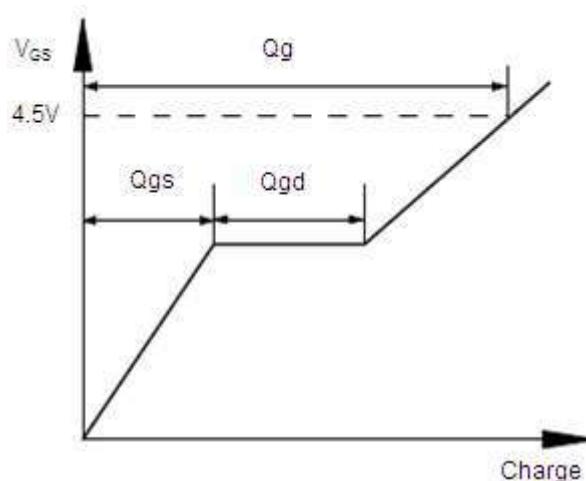
**Fig.4 Gate-Charge Characteristics**



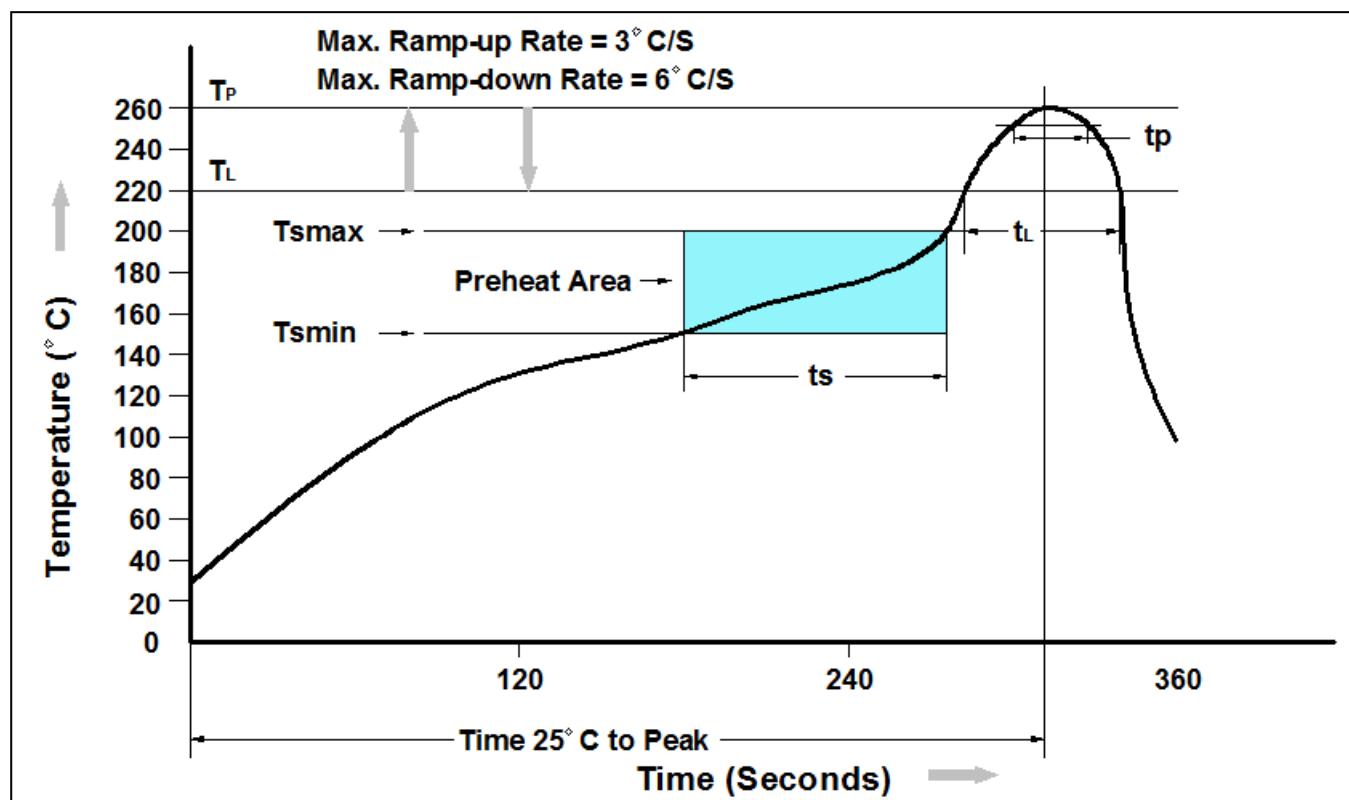
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



**Fig.6 Normalized  $R_{DS(on)}$  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**

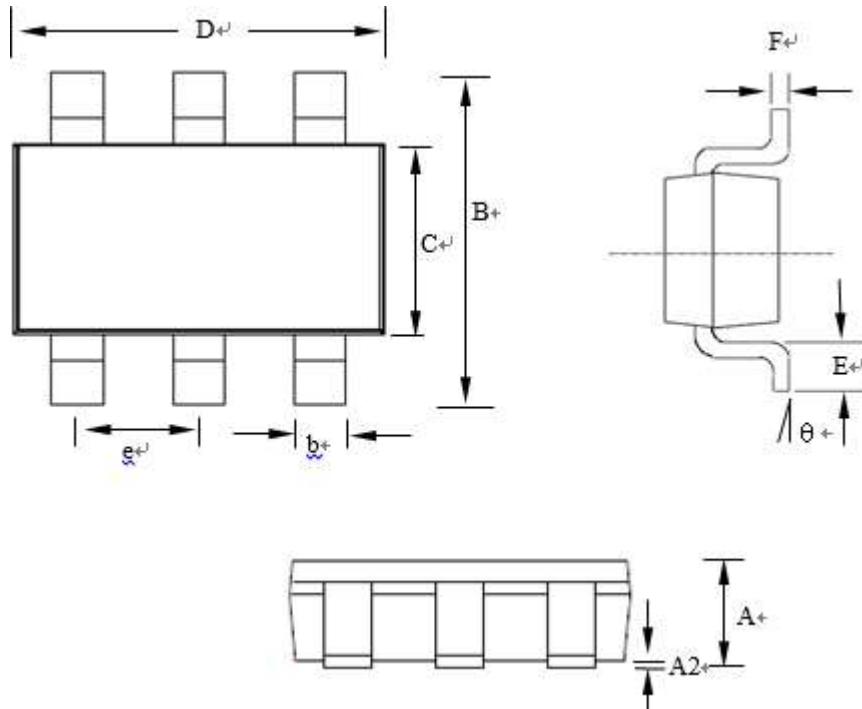


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	150°C
Temperature Max. (Tsmax)	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds
Average Ramp-up Rate (tL to tP)	3°C/second max.
Liquidous Temperature (TL)	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds
Peak Temperature	260°C +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
PAN3050C	TSOP-6 Reel	3000 pcs

➤ **Package Information (TSOP-6)**



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	--	0.9	0.028	--	0.035
A2	0.00	--	0.10	0.000	--	0.004
B	2.60	2.80	3.00	0.102	0.110	0.118
C	1.40	1.60	1.80	0.055	0.063	0.071
D	2.70	2.90	3.10	0.106	0.114	0.122
E	0.30	0.40	0.60	0.012	0.016	0.024
F	0.07	0.127	0.20	0.003	0.005	0.008
b	0.30	0.40	0.50	0.012	0.016	0.020
e	--	0.95	--	--	0.037	--
θ	0°	5°	10°	0°	5°	10°

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