

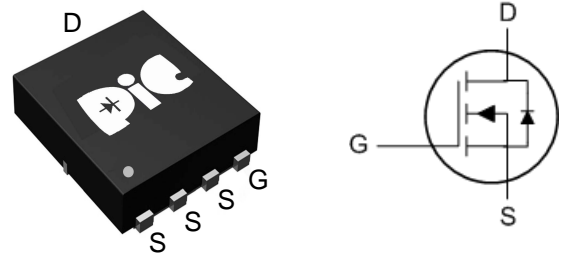
## ➤ General Description

This PAN30TY16Y 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
- 100% EAS Guaranteed
- Green Device Available
- Excellent  $CdV/dt$  effect decline
- Advanced high cell density Trench technology

## ➤ DFN5X6A-EP1



## ➤ Application

- DC/DC Primary Side Switch
- Industrial Synchronous
- Rectification Load Switch
- DC/DC Converters

## ➤ Absolute Maximum Ratings

Parameter	Symbol	Rating		Units
		10s	Steady State	
Drain-Source Voltage	$V_{DS}$	30		V
Gate-Source Voltage	$V_{GS}$	$\pm 20$		V
Continuous Drain Current, $V_{GS}$ @ 10V <sub>1,6</sub>	$I_D@T_C=25^\circ C$	108		A
Continuous Drain Current, $V_{GS}$ @ 10V <sub>1,6</sub>	$I_D@T_C=100^\circ C$	68		A
Continuous Drain Current, $V_{GS}$ @ 10V <sub>1</sub>	$I_D@T_A=25^\circ C$	27.3	17.3	A
Continuous Drain Current, $V_{GS}$ @ 10V <sub>1</sub>	$I_D@T_A=70^\circ C$	21.8	14	A
Pulsed Drain Current <sub>2</sub>	$I_{DM}$	216		A
Single Pulse Avalanche Energy <sub>3</sub>	EAS	144.7		mJ
Avalanche Current	$I_{AS}$	53.8		A
Total Power Dissipation <sub>4</sub>	$P_D@T_C=25^\circ C$	69		W
Total Power Dissipation <sub>4</sub>	$P_D@T_A=25^\circ C$	5	2	W
Storage Temperature Range	$T_{STG}$	-55 to 175		$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 175		$^\circ C$
Thermal Resistance Junction-Ambient <sub>1</sub>	$R_{\theta JA}$	62		$^\circ C/W$
Thermal Resistance Junction-Ambient <sub>1</sub> ( $t \leq 10s$ )	$R_{\theta JA}$	25		$^\circ C/W$
Thermal Resistance Junction-Case <sub>1</sub>	$R_{\theta JC}$	1.8		$^\circ C/W$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	---	---	V
BVDSS Temperature Coefficient	Δ BV <sub>DSS</sub> /Δ T <sub>J</sub>	Reference to 25°C, I <sub>D</sub> =1mA	---	0.0213	---	V/°C
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	---	---	4	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	---	---	6	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	---	2.5	V
V <sub>GS(th)</sub> Temperature Coefficient	Δ V <sub>GS(th)</sub>		---	-5.73	---	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> =30A	---	26.5	---	S
Gate Resistance	R <sub>g</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	1.4	---	Ω
Total Gate Charge (4.5V)	Q <sub>g</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	---	31.6	---	nC
Gate-Source Charge	Q <sub>gs</sub>		---	8.6	---	
Gate-Drain Charge	Q <sub>gd</sub>		---	11.7	---	
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω, I <sub>D</sub> =15A	---	9	---	ns
Rise Time	T <sub>r</sub>		---	19	---	
Turn-Off Delay Time	T <sub>d(off)</sub>		---	58	---	
Fall Time	T <sub>f</sub>		---	15.2	---	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	---	3075	---	pF
Output Capacitance	C <sub>oss</sub>		---	400	---	
Reverse Transfer Capacitance	C <sub>rss</sub>		---	315	---	

### ➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current <sup>1,5</sup>	I <sub>S</sub>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	108	A
Pulsed Source Current <sup>2,5</sup>	I <sub>SM</sub>		---	---	216	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	V

Note :

1. Pulse width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=53.8A
4. Ensure that the channel temperature does not exceed 150°C.
5. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.
6. Package limitation current is 85A.

## ➤ Typical Characteristics

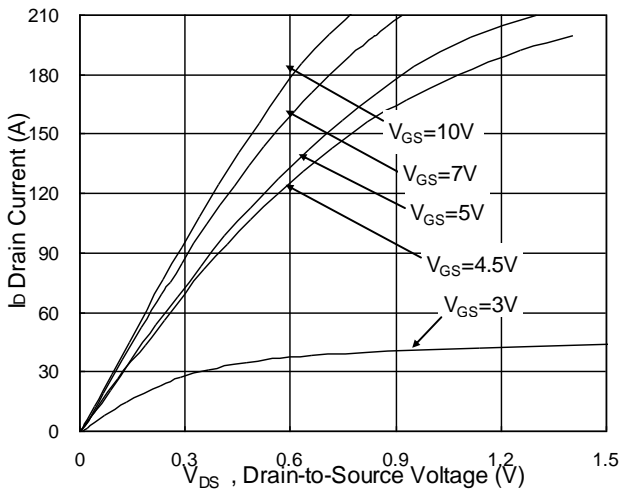


Fig.1 Typical Output Characteristics

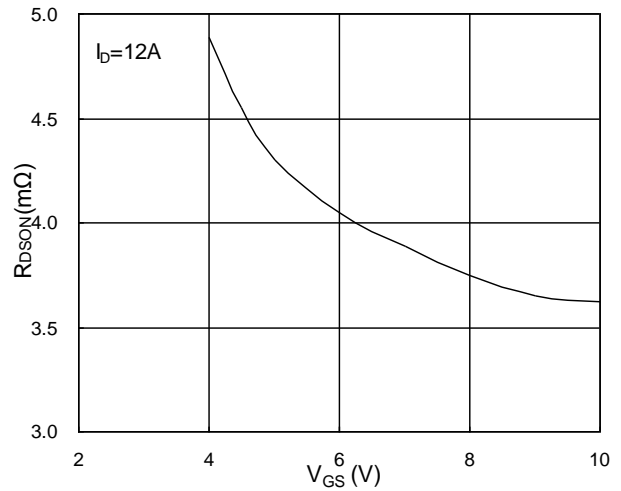


Fig.2 On-Resistance vs. G-S Voltage

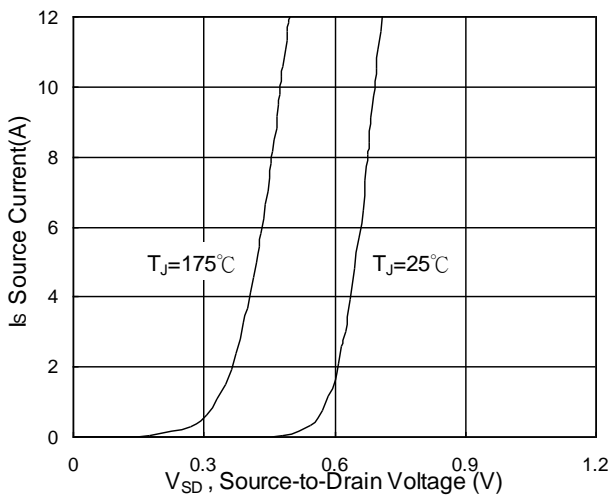


Fig.3 Forward Characteristics of Reverse

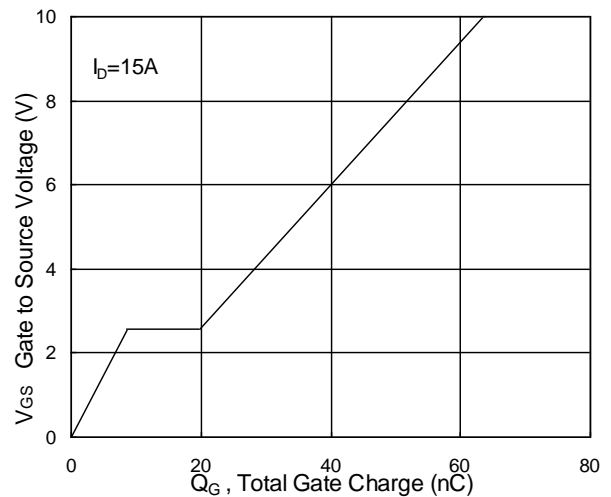


Fig.4 Gate-charge Characteristics

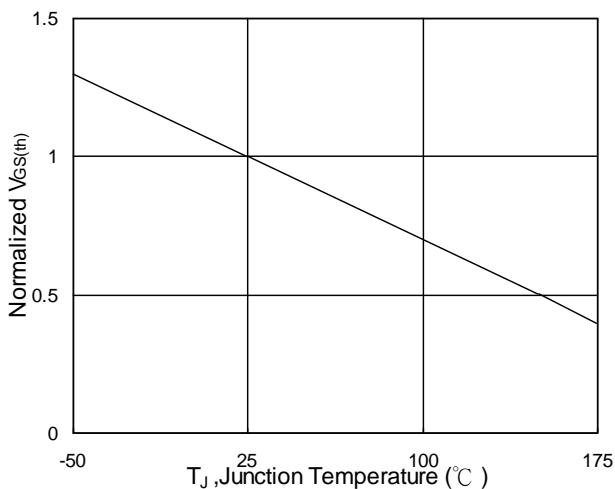


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

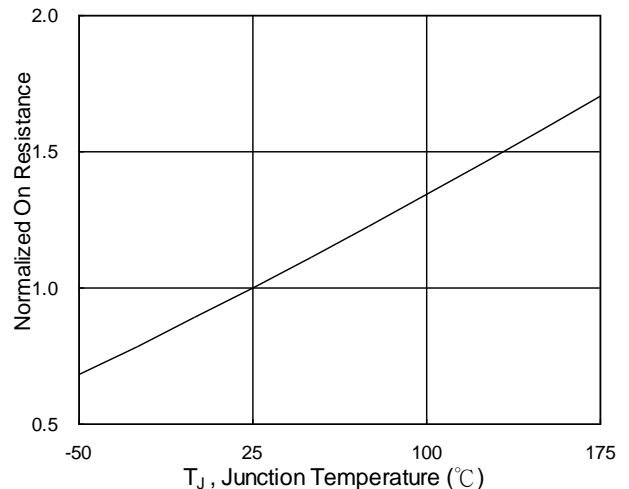
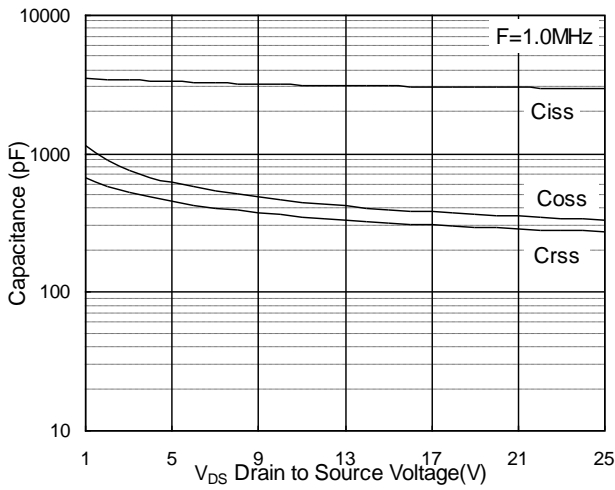
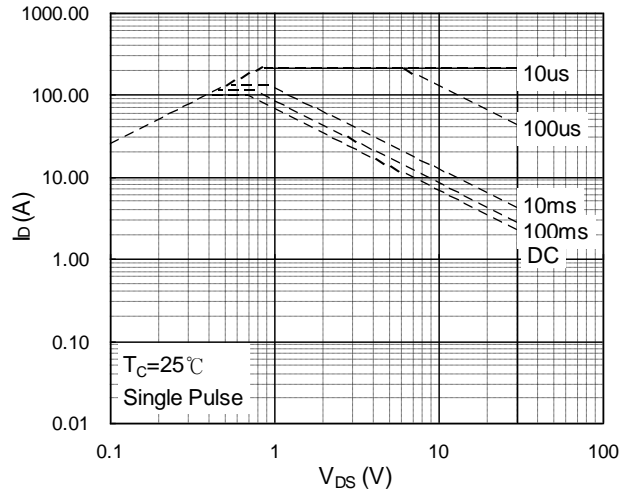


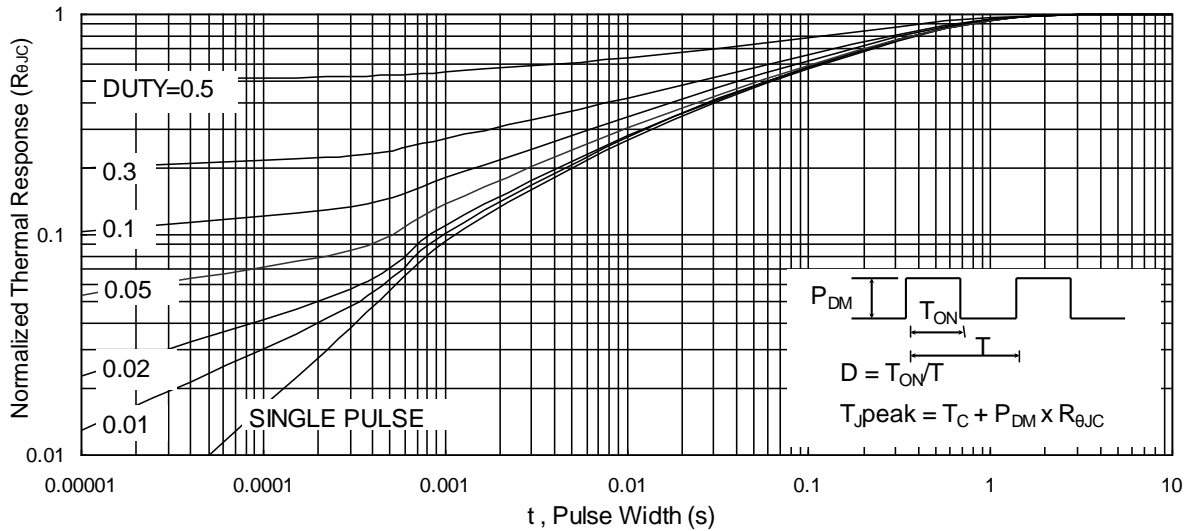
Fig.6 Normalized  $R_{DS(ON)}$  vs.  $T_J$



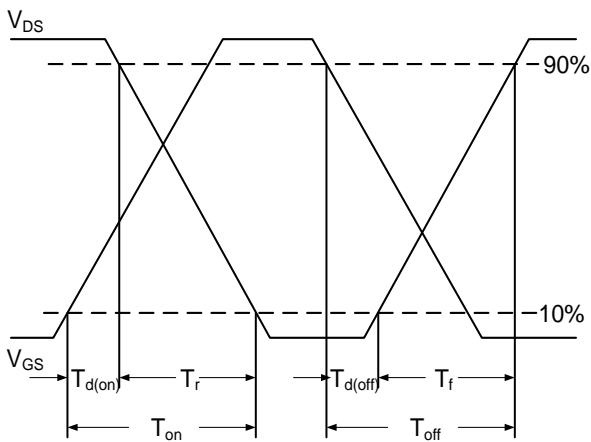
**Fig.7 Capacitance**



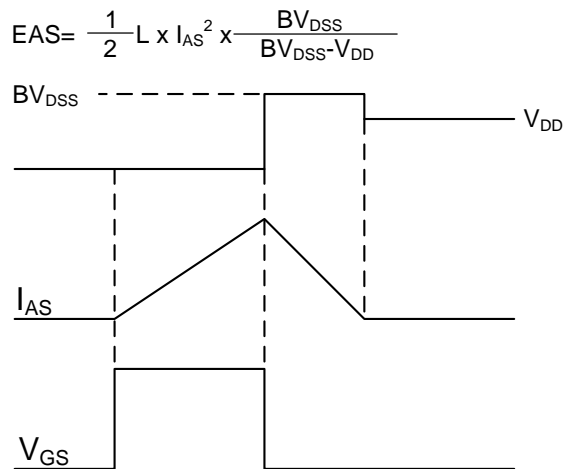
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

➤ Recommend IR Reflow Soldering Thermal Profile

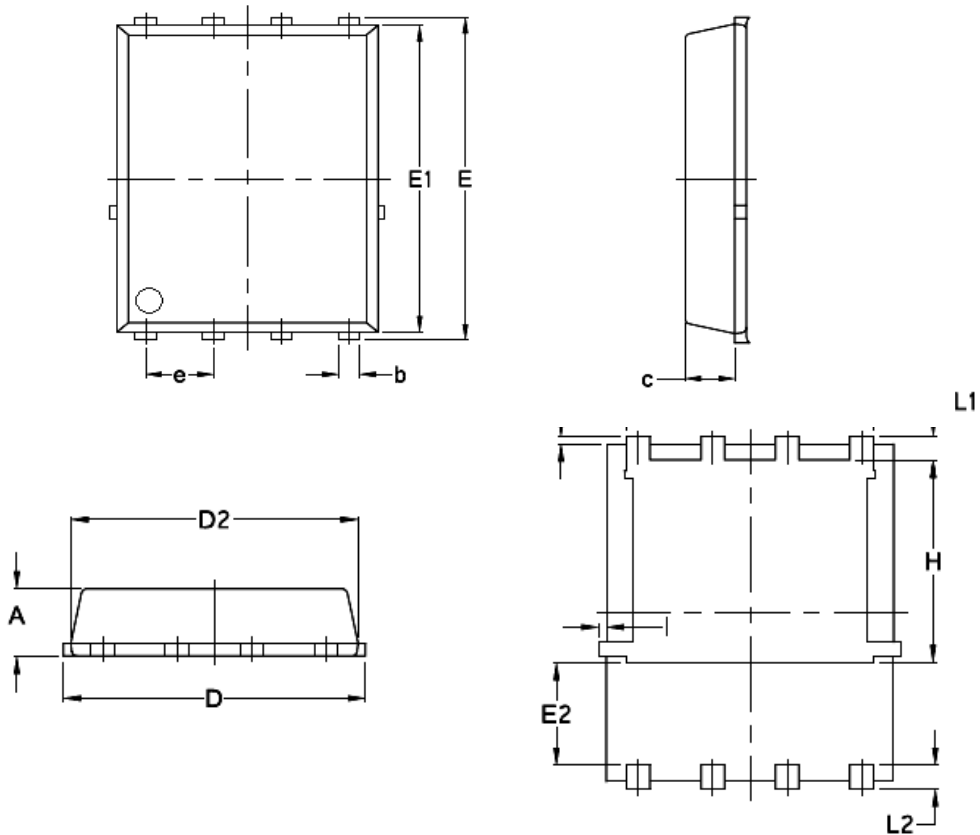


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Average Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (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
PAN30TY16Y	DFN5X6A-EP1 Reel	3000 pcs

➤ Package Information ( DFN5X6A-EP1 )



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
I	---	0.18	---	0.0070
E	5.90	6.15	0.2323	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.10	---	0.0433	---
e	1.27 BSC		0.05 BSC	
H	3.30	3.78	0.1299	0.1488
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.61	0.0150	0.0240
L2	0.38	0.71	0.0150	0.0279

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