

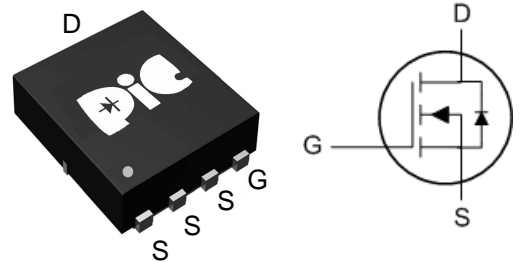
### ➤ General Description

This PAN00SY56Y 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
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current, $V_{GS} @ 10V^1$	$I_D @ T_C=25^\circ C$	32	A
Continuous Drain Current, $V_{GS} @ 10V^1$	$I_D @ T_C=100^\circ C$	20.2	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	90	A
Single Pulse Avalanche Energy <sup>3</sup>	EAS	45	mJ
Avalanche Current	$I_{AS}$	30	A
Total Power Dissipation <sup>4</sup>	$P_D @ T_C=25^\circ C$	37.9	W
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ C$
Operating Junction Temperature Range	$T_J$	-55 to 150	$^\circ C$
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	55	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	3.3	$^\circ C/W$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V$ , $I_D=250\mu A$	100	---	---	V
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	$V_{GS}=10V$ , $I_D=10A$	---	15.5	20	m $\Omega$
		$V_{GS}=4.5V$ , $I_D=10A$	---	21	30	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$ , $I_D=250\mu A$	1.2	1.8	2.2	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=25^\circ C$	---	---	1	uA
		$V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=55^\circ C$	---	---	5	
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA
Gate Resistance	$R_g$	$V_{DS}=0V$ , $V_{GS}=0V$ , $f=1MHz$	---	1	---	$\Omega$
Total Gate Charge	$Q_g$	$V_{DS}=50V$ , $V_{GS}=10V$ , $I_D=10A$	---	17.9	---	nC
Gate-Source Charge	$Q_{gs}$		---	2.8	---	
Gate-Drain Charge	$Q_{gd}$		---	5.2	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=30V$ , $V_{GS}=10V$ , $R_G=6\Omega$ , $I_D=1A$	---	13	---	ns
Rise Time	$T_r$		---	6	---	
Turn-Off Delay Time	$T_{d(off)}$		---	30	---	
Fall Time	$T_f$		---	29	---	
Input Capacitance	$C_{iss}$	$V_{DS}=50V$ , $V_{GS}=0V$ , $f=1MHz$	---	849	---	pF
Output Capacitance	$C_{oss}$		---	185	---	
Reverse Transfer Capacitance	$C_{rss}$		---	8	---	

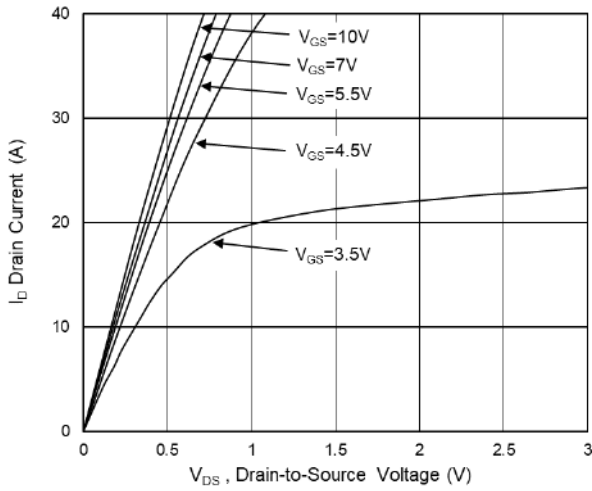
### ➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current <sup>1,6</sup>	$I_S$	$V_G=V_D=0V$ , Force Current	---	---	32	A
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$V_{GS}=0V$ , $I_S=1A$ , $T_J=25^\circ C$	---	---	1.2	V

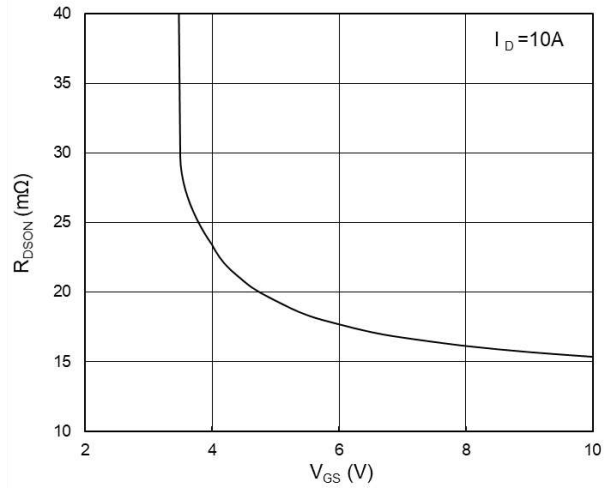
Note :

1. Pulse width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1mH$ ,  $I_{AS}=30A$
4. Ensure that the channel temperature does not exceed  $150^\circ C$ .
5. The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

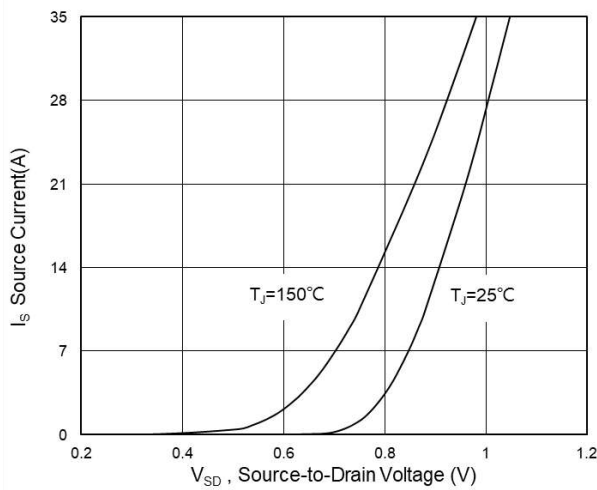
### ➤ Typical Characteristics



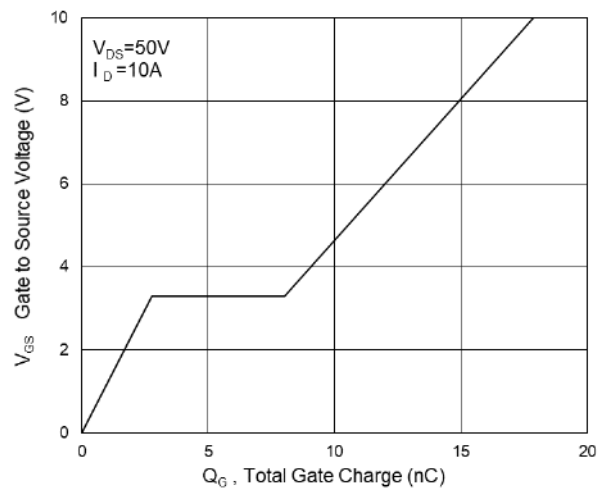
**Fig.1 Typical Output Characteristics**



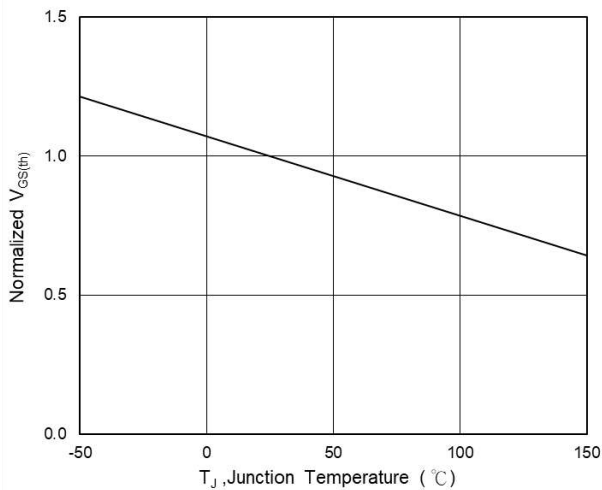
**Fig.2 On-Resistance vs G-S Voltage**



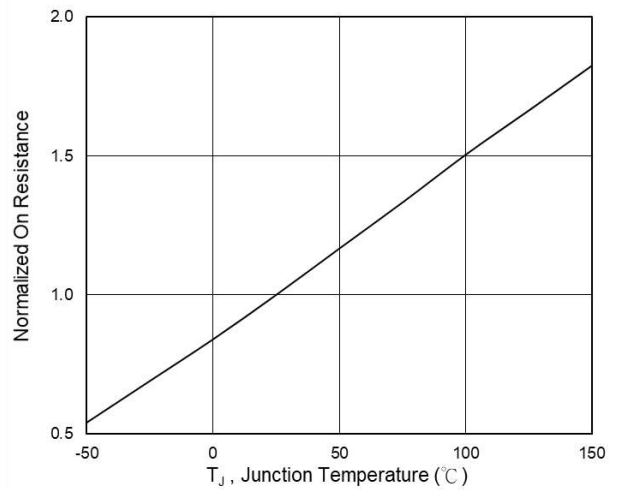
**Fig.3 Source Drain Forward Characteristics**



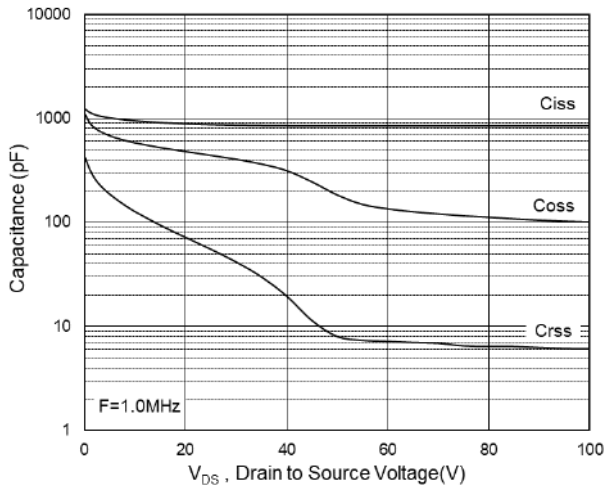
**Fig.4 Gate-Charge Characteristics**



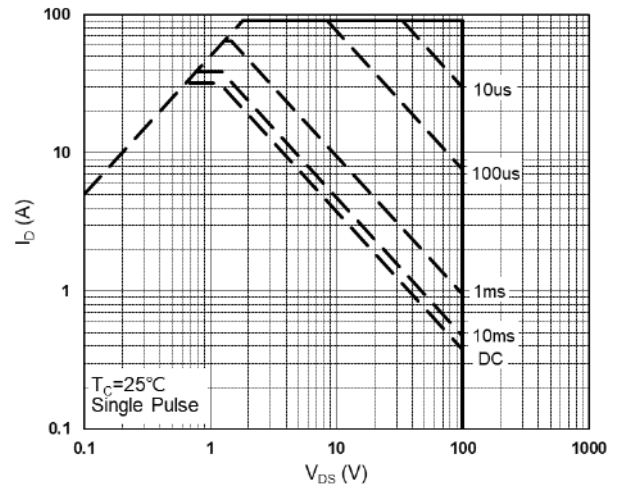
**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**



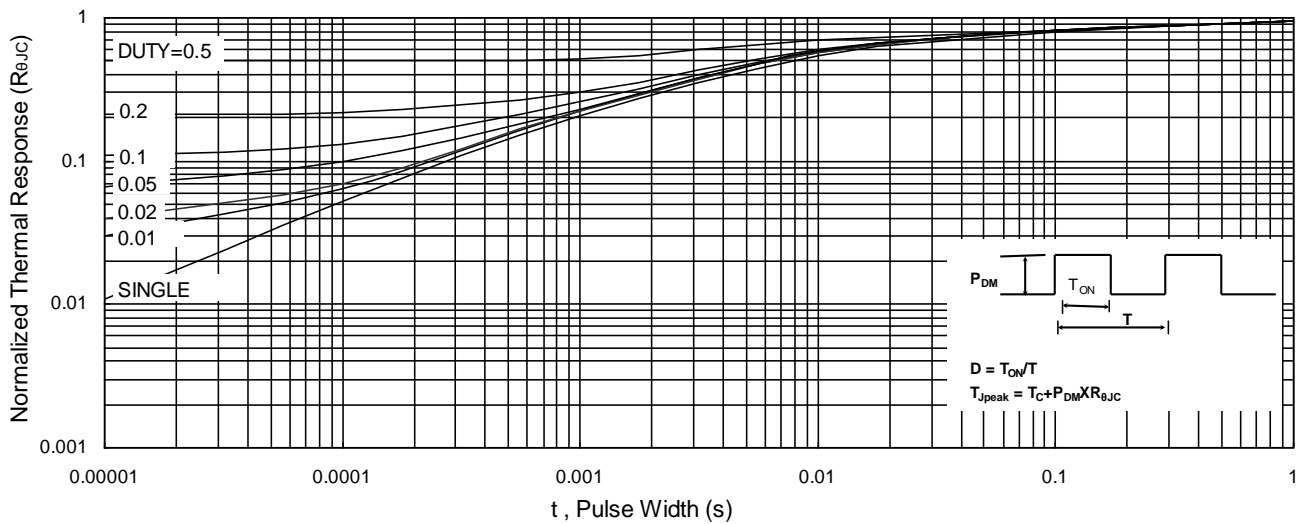
**Fig.6 Normalized  $R_{DS(ON)}$  vs  $T_J$**



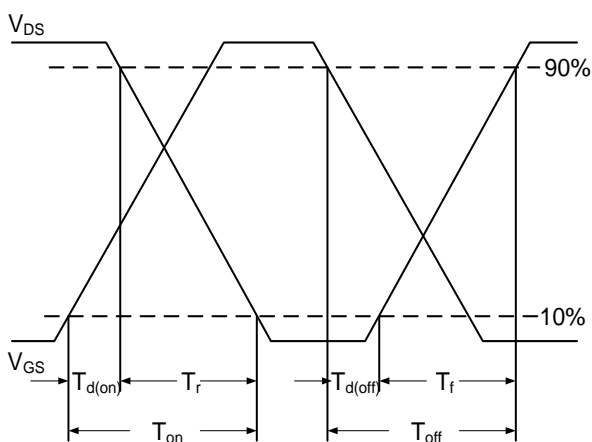
**Fig.7 Capacitance**



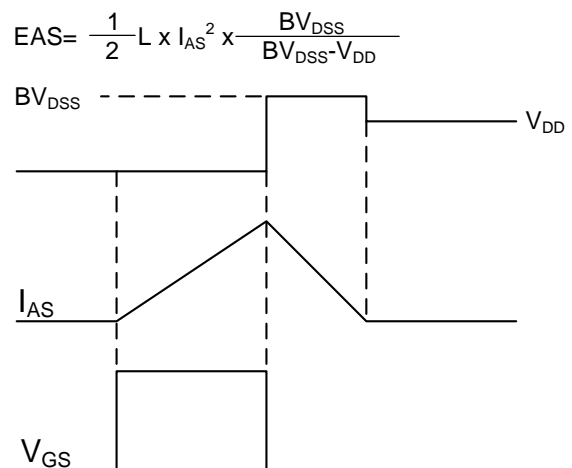
**Fig.8 Safe Operating Area**



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



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

### ➤ Recommend IR Reflow Soldering Thermal Profile

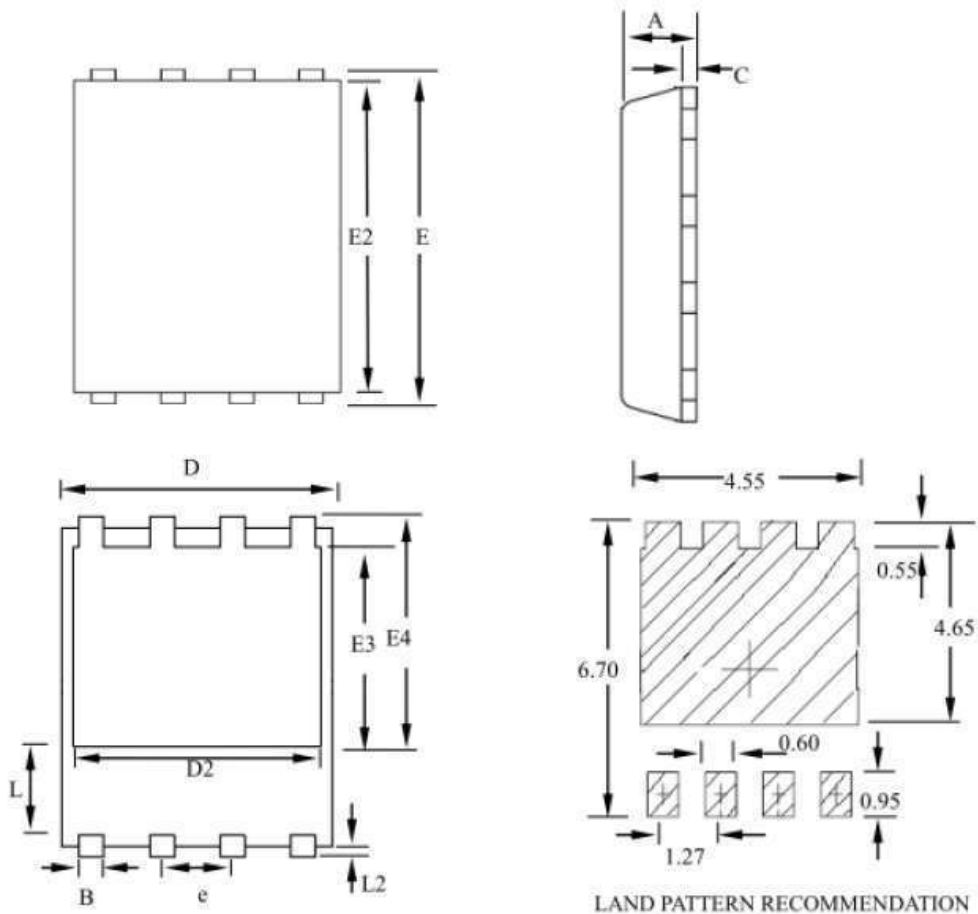


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	150°C
Temperature Max. (T <sub>smax</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds
Average Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.
Liquidous Temperature (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
PAN00SY56Y	DFN5X6A-EP1 Reel	3000 pcs

### ➤ Package Information ( DFN5X6A-EP1 )



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	--	1.20	0.031	--	0.047
B	0.30	--	0.51	0.012	--	0.020
C	0.15	--	0.35	0.006	--	0.014
D	4.80	--	5.30	0.189	--	0.209
D2	3.61	--	4.35	0.142	--	0.171
E	5.90	--	6.35	0.232	--	0.250
E2	5.42	--	5.90	0.213	--	0.232
E3	3.23	--	3.90	0.127	--	0.154
E4	3.69	--	4.55	0.145	--	0.179
L	0.61	--	1.80	0.024	--	0.071
L2	0.05	--	0.36	0.002	--	0.014
e	--	1.27	--	--	0.050	--

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