

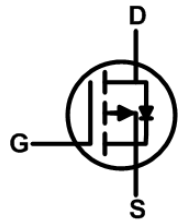
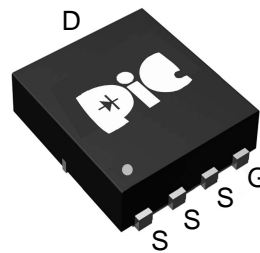
➤ General Description

This PAP01TY39Y P-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	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_A = 25^\circ C$	-8	A
Continuous Drain Current, $V_{GS} @ -10V^1$	$I_D @ T_A = 100^\circ C$	-6.5	A
Pulsed Drain Current ²	I_{DM}	-45	A
Single Pulse Avalanche Energy ³	EAS	345	mJ
Avalanche Current	I_{AS}	28	A
Total Power Dissipation ⁴	$P_D @ T_A = 25^\circ C$	5.5	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 ¹	$R_{\theta JA}$	62	$^\circ C/W$
Thermal Resistance Junction-Ambient ¹ , $t \leq 10s$	$R_{\theta JA}$	22	$^\circ C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	1.22	$^\circ C/W$

➤ 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 ²	$R_{DS(ON)}$	$V_{GS} = -10V$, $I_D = -8A$	---	42	50	m Ω
		$V_{GS} = -4.5V$, $I_D = -6A$	---	46	55	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$, $I_D = -250\mu A$	-1.2	-1.8	-2.5	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = -100V$, $V_{GS} = 0V$, $T_J = 25^\circ C$	---	---	-1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$	---	---	± 100	nA
Forward Transconductance	g_{fs}	$V_{DS} = -10V$, $I_D = -10A$	---	32	---	S
Total Gate Charge	Q_g	$V_{DS} = -80V$, $V_{GS} = -10V$, $I_D = -8A$	---	92	---	nC
Gate-Source Charge	Q_{gs}		---	17.5	---	
Gate-Drain Charge	Q_{gd}		---	14	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD} = -50V$, $V_{GS} = -10V$, $R_G = 3.3\Omega$, $I_D = -1A$	---	20.5	---	ns
Rise Time	T_r		---	32.2	---	
Turn-Off Delay Time	$T_{d(off)}$		---	123	---	
Fall Time	T_f		---	63.7	---	
Input Capacitance	C_{iss}	$V_{DS} = -25V$, $V_{GS} = 0V$, $f = 1MHz$	---	6516	---	pF
Output Capacitance	C_{oss}		---	223	---	
Reverse Transfer Capacitance	C_{rss}		---	125	---	

➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current ^{1,5}	I_S	$V_G = V_D = 0V$, Force Current	---	---	-30	A
Diode Forward Voltage ²	V_{SD}	$V_{GS} = 0V$, $I_S = -1A$, $T_J = 25^\circ C$	---	---	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = -14A$, $di/dt = -100A/\mu s$, $T_J = 25^\circ C$	---	31.2	---	nS
Reverse Recovery Charge	Q_{rr}		---	31.97	---	nC

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 $V_{DD} = -25V$, $V_{GS} = -10V$, $L = 0.88mH$, $I_{AS} = -28A$
4. Ensure that the channel temperature does not exceed $150^\circ C$.
5. The data is theoretically the same as I_D and IDM , in real applications, should be limited by total power dissipation.

➤ Typical Characteristics

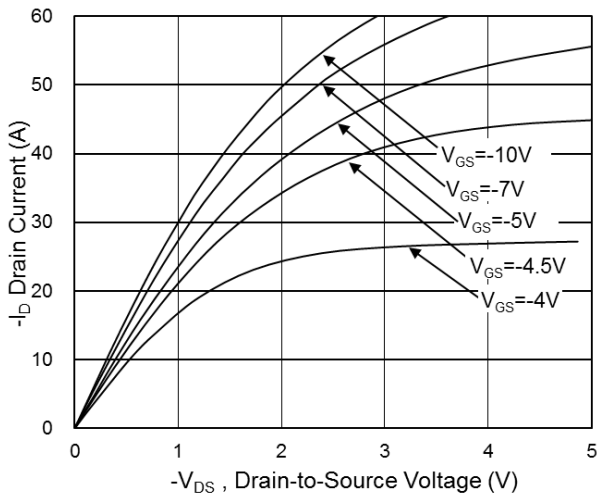


Fig.1 Typical Output Characteristics

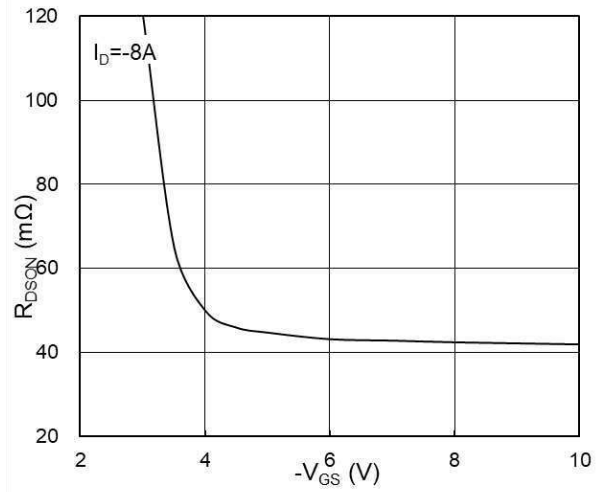


Fig.2 On-Resistance vs G-S Voltage

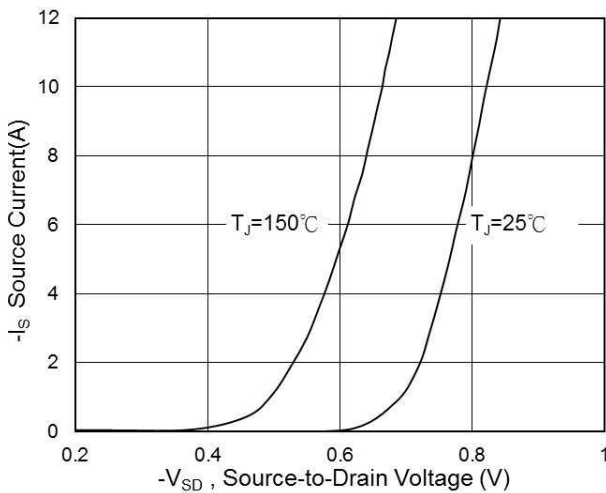


Fig.3 Typical S-D Diode Forward Voltage

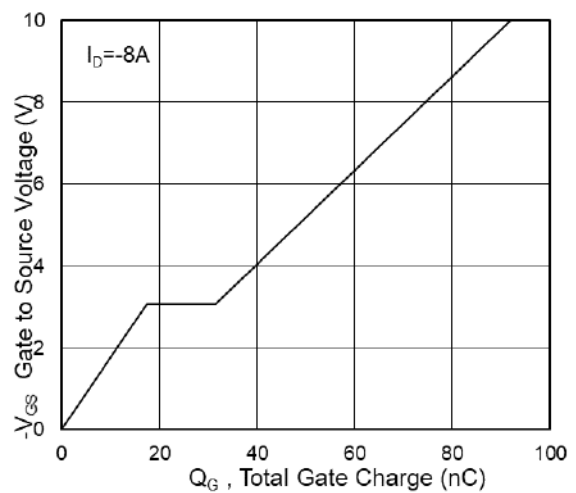


Fig.4 Gate-Charge Characteristics

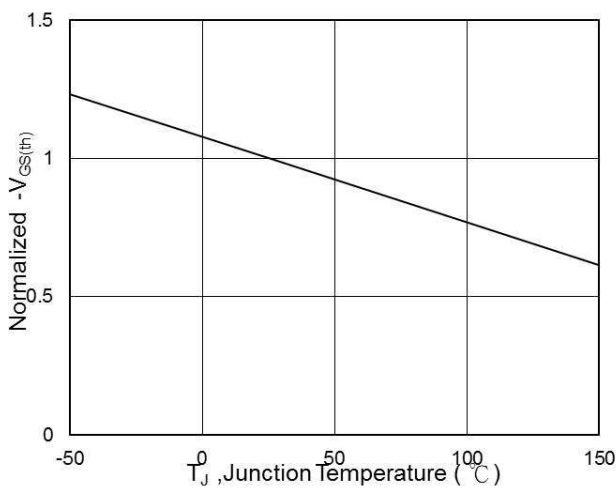


Fig.5 Normalized $V_{GS(th)}$ vs T_J

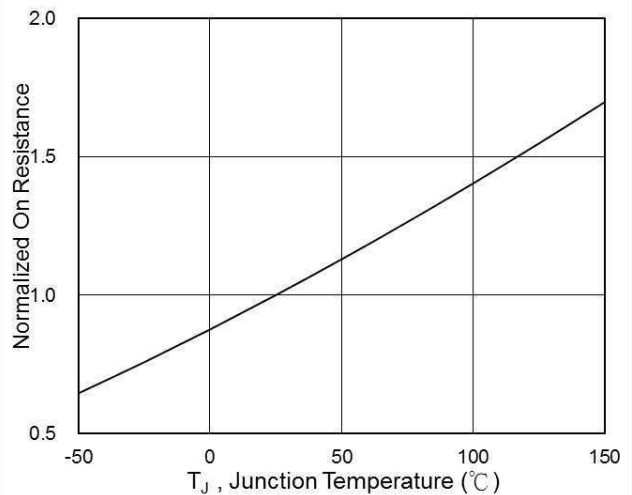


Fig.6 Normalized $R_{DS(ON)}$ vs T_J

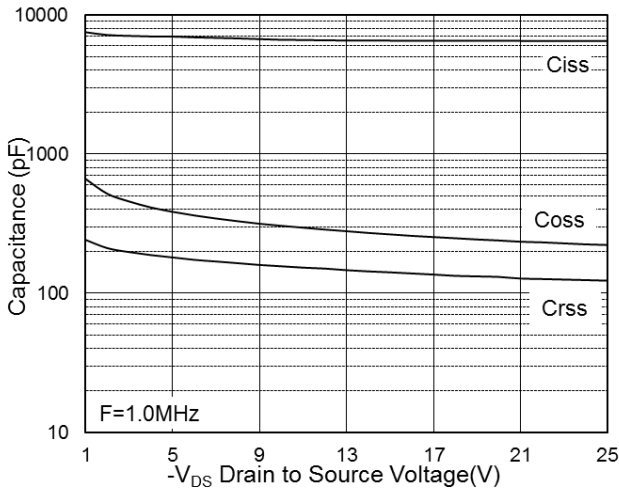


Fig.7 Capacitance

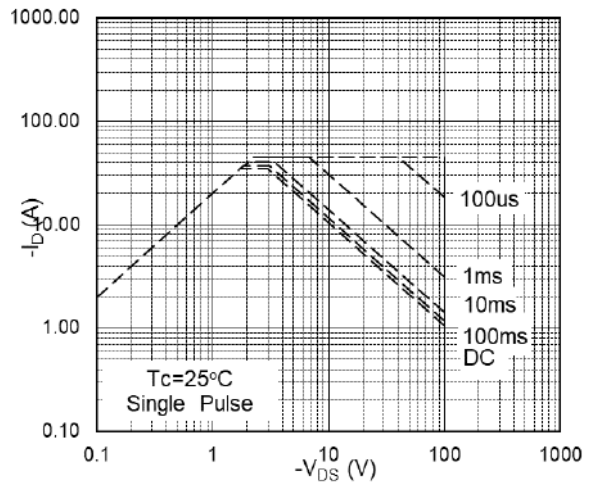


Fig.8 Safe Operating Area

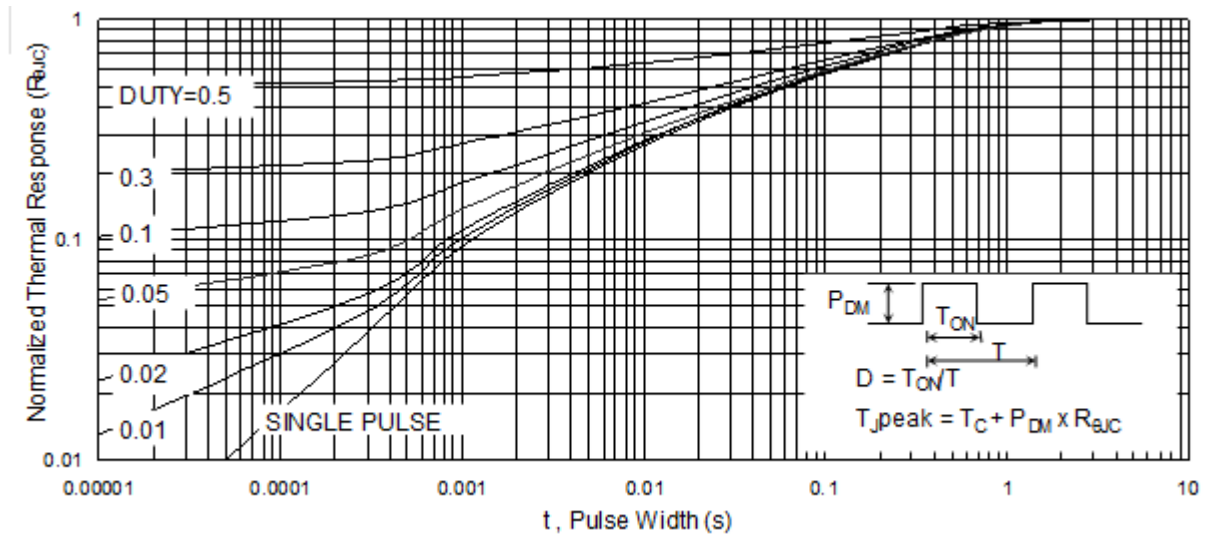


Fig.9 Normalized Maximum Transient Thermal Impedance

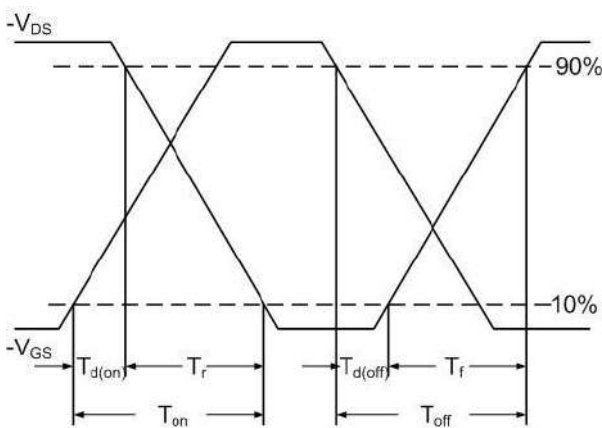


Fig.10 Switching Time Waveform

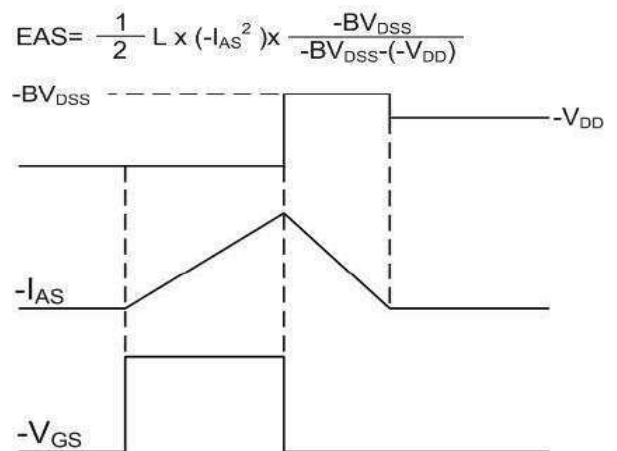


Fig.11 Unclamped Inductive Waveform

➤ Recommend IR Reflow Soldering Thermal Profile

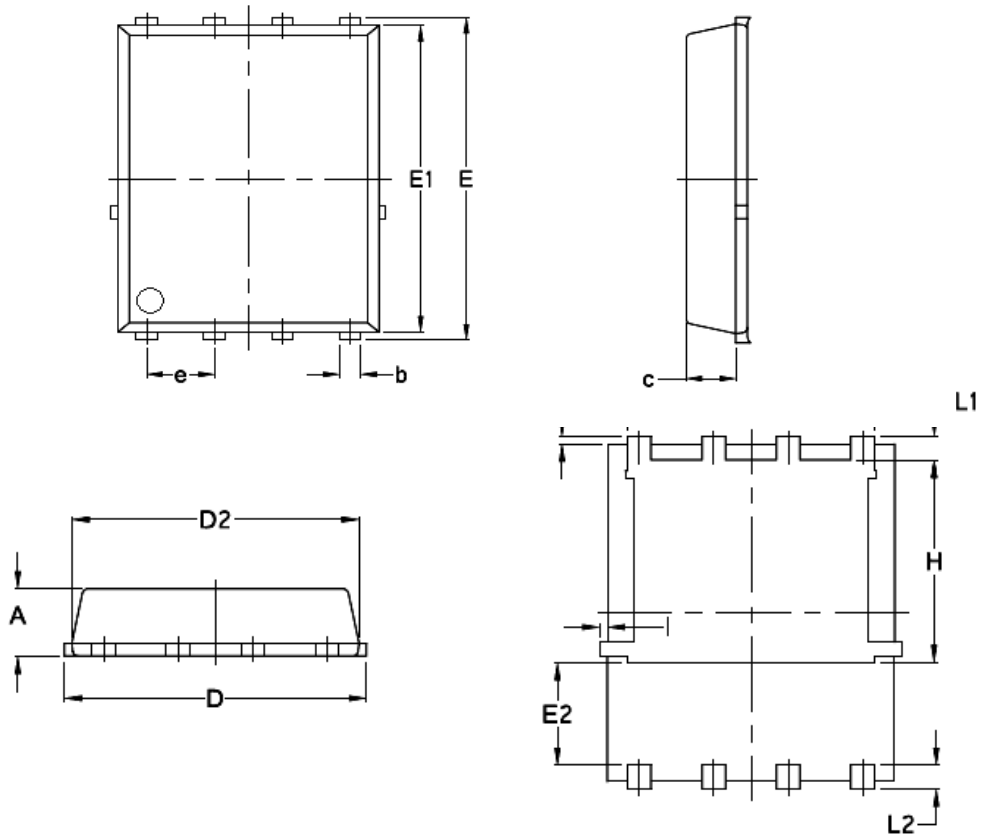


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T_{smin})	150°C
Temperature Max. (T_{smax})	200°C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds
Average Ramp-up Rate (t_L to t_P)	3°C/second max.
Liquidous Temperature (T_L)	217°C
Time (t_L) Maintained Above (T_L)	60 – 150 seconds
Peak 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
PAP01TY39Y	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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