

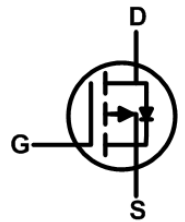
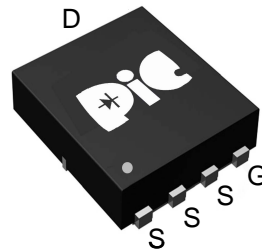
➤ General Description

This PAP01TV15V 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

➤ DFN3X3A-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}	± 20	V
Continuous Drain Current, V_{GS} @ -10V ¹	$I_D@T_C=25^\circ C$	-14	A
Continuous Drain Current, V_{GS} @ -10V ¹	$I_D@T_C=100^\circ C$	-8.7	A
Continuous Drain Current, V_{GS} @ -10V ¹	$I_D@T_A=25^\circ C$	-3.7	A
Continuous Drain Current, V_{GS} @ -10V ¹	$I_D@T_A=70^\circ C$	-3.0	A
Pulsed Drain Current ²	I_{DM}	-56	A
Single Pulse Avalanche Energy ³	EAS	157.2	mJ
Avalanche Current	I_{AS}	18.9	A
Total Power Dissipation ⁴	$P_D@T_C=25^\circ C$	31	W
Total Power Dissipation ⁴	$P_D@T_A=25^\circ C$	2.3	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	$R_{\theta JA}$	55	$^\circ C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	4	$^\circ C/W$

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	BV_{DSS}	-100	---	---	V
Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-10A$	$R_{DS(ON)}$	---	---	95	m Ω
	$V_{GS}=-4.5V$, $I_D=-8A$		---	---	110	
Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	$V_{GS(th)}$	-1.2	-1.7	-2.5	V
Drain-Source Leakage Current	$V_{DS}=-100V$, $V_{GS}=0V$, $T_J=25^\circ C$	I_{DSS}	---	---	-50	μA
Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	I_{GSS}	---	---	± 100	nA
Forward Transconductance	$V_{DS}=-10V$, $I_D=-10A$	g_{fs}	---	24	---	S
Total Gate Charge	$V_{DS}=-50V$, $V_{GS}=-10V$, $I_D=-10A$	Q_g	---	44.5	---	nC
Gate-Source Charge		Q_{gs}	---	9.13	---	
Gate-Drain Charge		Q_{gd}	---	5.93	---	
Turn-On Delay Time	$V_{DD}=-50V$, $V_{GS}=-10V$, $R_G=3.3\Omega$, $I_D=-10A$	$T_{d(on)}$	---	12	---	ns
Rise Time		T_r	---	27.4	---	
Turn-Off Delay Time		$T_{d(off)}$	---	79	---	
Fall Time		T_f	---	53.6	---	
Input Capacitance	$V_{DS}=-20V$, $V_{GS}=0V$, $f=1MHz$	C_{iss}	---	3029	---	pF
Output Capacitance		C_{oss}	---	129	---	
Reverse Transfer Capacitance		C_{rss}	---	76	---	

➤ Diode Characteristics

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	I_S	---	---	-14	A
Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ C$	V_{SD}	---	---	-1.2	V
Reverse Recovery Time	$I_F=-8A$, $di/dt=-100A/\mu s$,	t_{rr}	---	38.7	---	nS
Reverse Recovery Charge	$T_J=25^\circ C$	Q_{rr}	---	22.4	---	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 $V_{DD}=-25V$, $V_{GS}=-10V$, $L=0.88mH$, $I_{AS}=-18.9A$
- 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

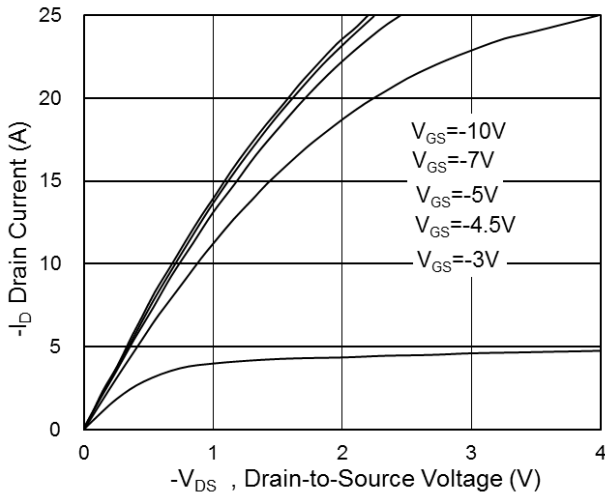


Fig.1 Typical Output Characteristics

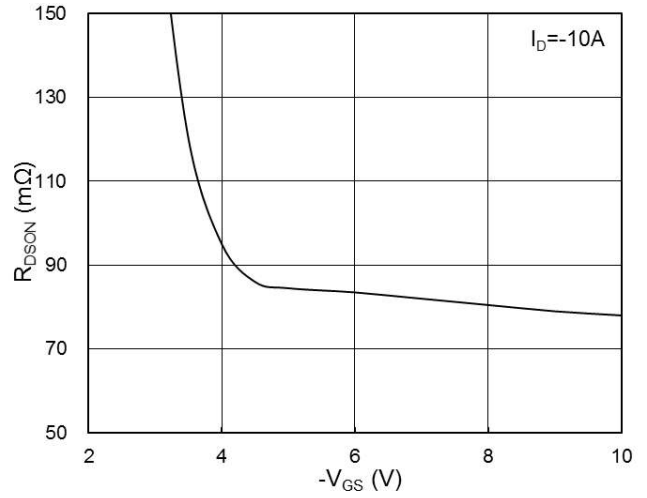


Fig.2 On-Resistance vs. G-S Voltage

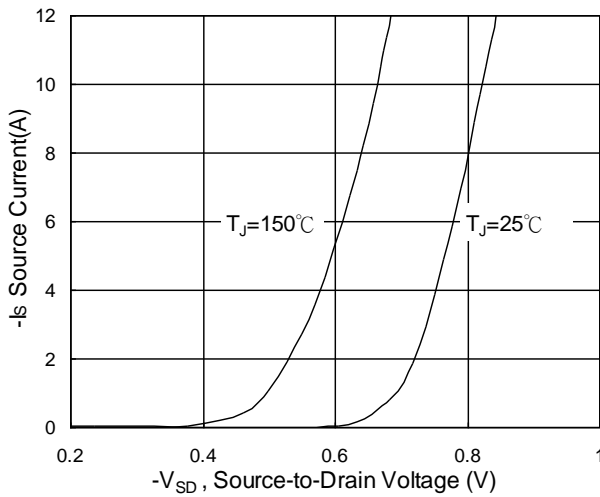


Fig.3 Typical S-D Diode Forward Voltage

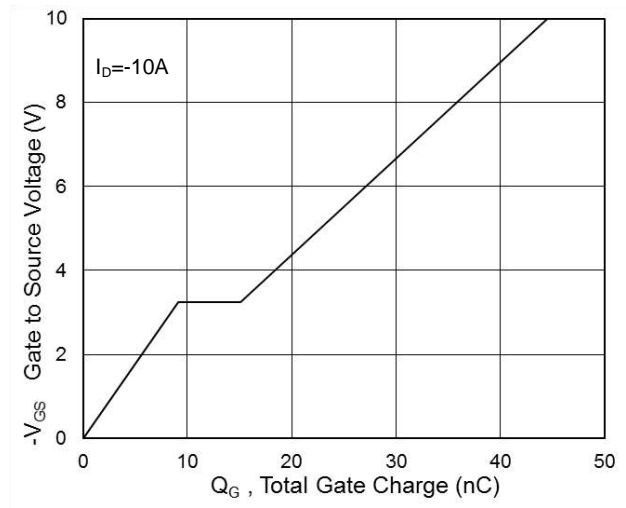


Fig.4 Gate-Charge Characteristics

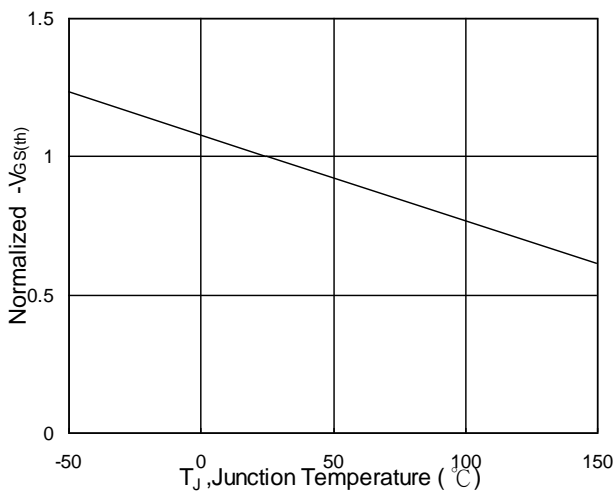


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

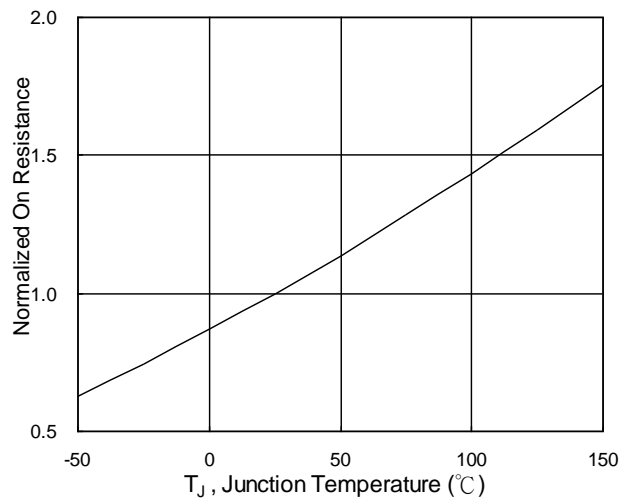


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

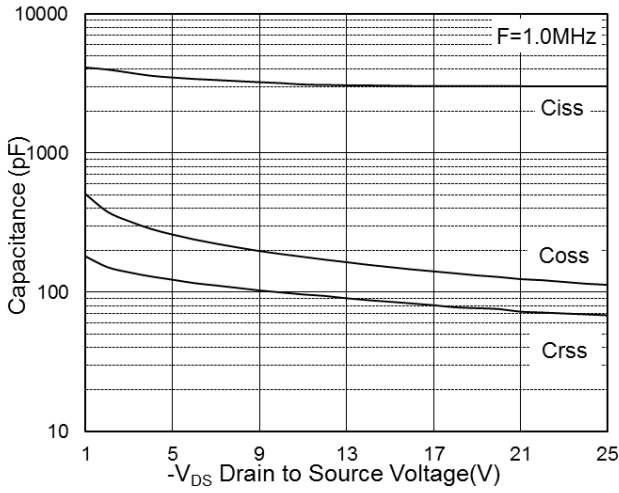


Fig.7 Capacitance

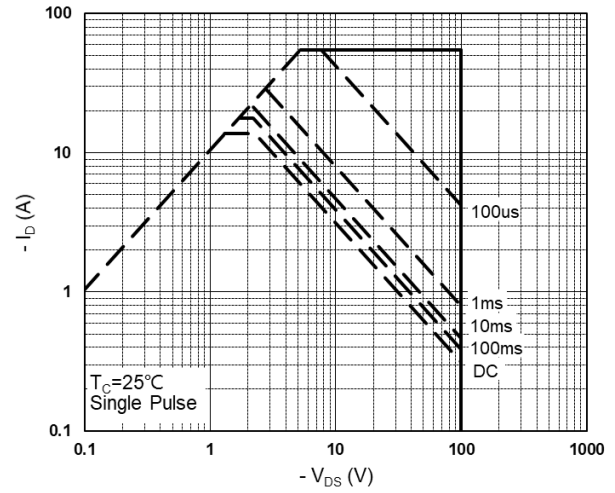


Fig.8 Safe Operating Area

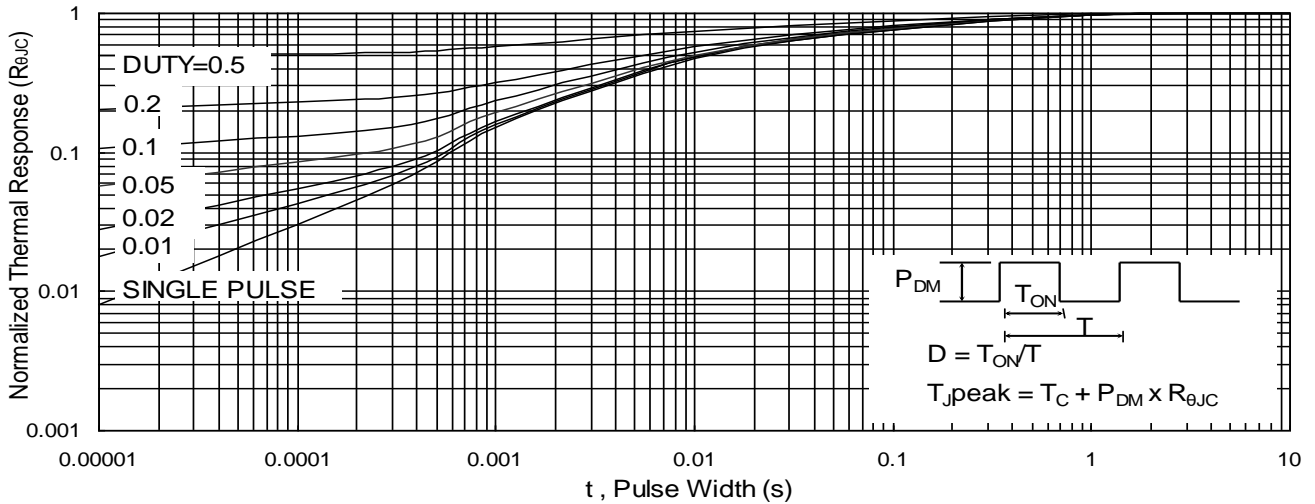


Fig.9 Normalized Maximum Transient Thermal Impedance

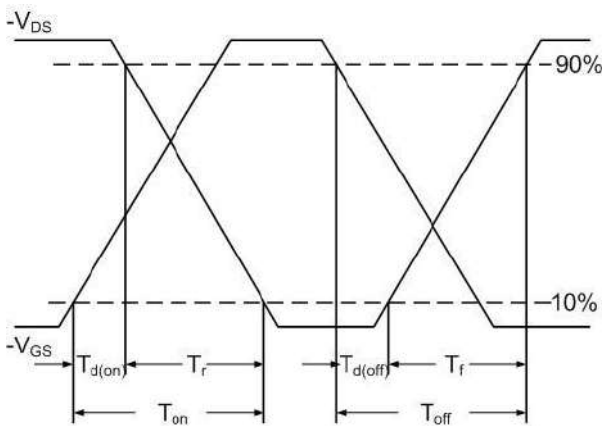


Fig.10 Switching Time Waveform

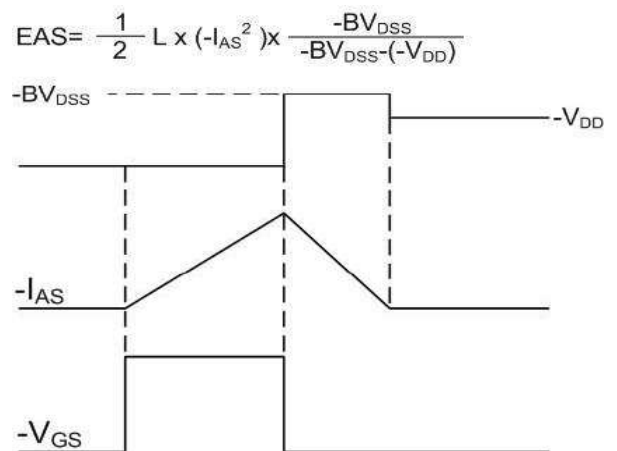


Fig.11 Unclamped Inductive Waveform

➤ Recommend IR Reflow Soldering Thermal Profile

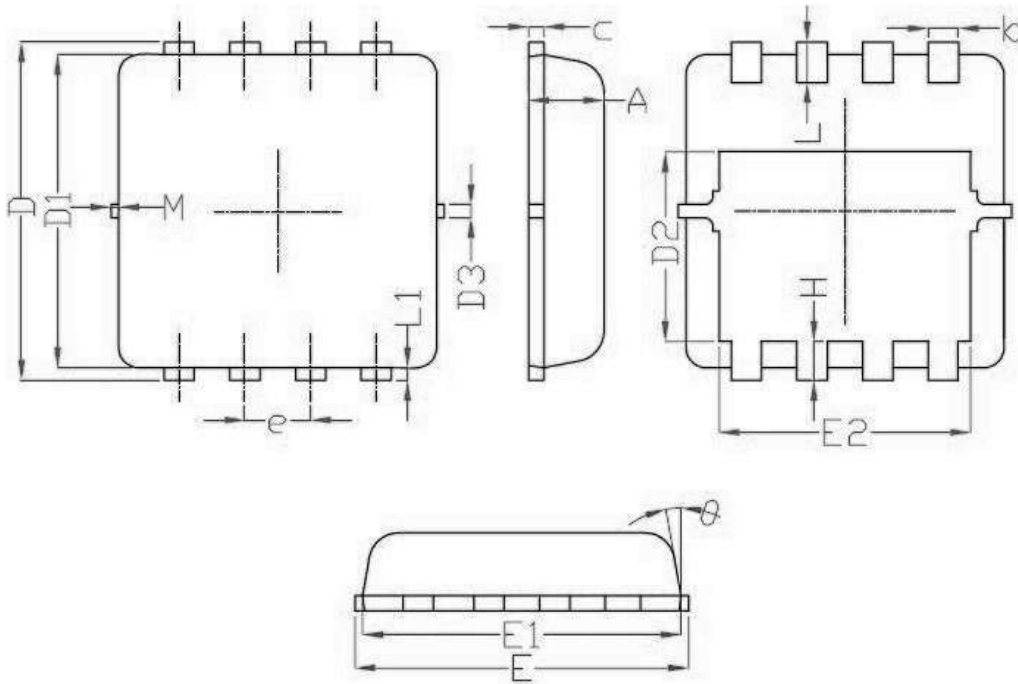


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Average Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
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
PAP01TV15V	DFN3X3A-EP1 Reel	3000 pcs

➤ Package Information (DFN3X3A-EP1)



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.85	0.027	0.034
b	0.20	0.40	0.007	0.016
c	0.10	0.25	0.004	0.010
D	3.15	3.45	0.124	0.136
D1	2.90	3.20	0.114	0.126
D2	1.54	1.98	0.060	0.080
D3	0.10	0.30	0.004	0.012
E	3.15	3.45	0.124	0.136
E1	3.00	3.25	0.118	0.128
E2	2.29	2.65	0.090	0.104
e	0.65 BSC		0.025 BSC	
H	0.28	0.65	0.011	0.026
Θ	0°	14°	0°	14°
L	0.30	0.50	0.012	0.020
L1	0.13		0.005	
M	---	0.15	---	0.006

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