

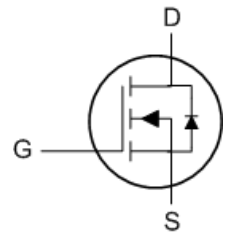
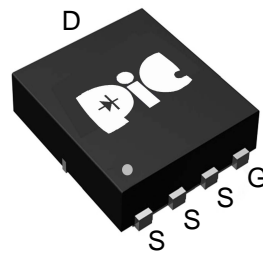
➤ General Description

This PAN20SN15AY 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}	150	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹	$I_D@T_C=25^\circ C$	23	A
Continuous Drain Current ¹	$I_D@T_C=100^\circ C$	16	A
Continuous Drain Current ¹	$I_D@T_A=25^\circ C$	4.5	A
Continuous Drain Current ¹	$I_D@T_A=70^\circ C$	3.8	A
Pulsed Drain Current ²	I_{DM}	60	A
Total Power Dissipation ³	$P_D@T_C=25^\circ C$	75	W
Total Power Dissipation ³	$P_D@T_A=25^\circ C$	2.7	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 ¹	$R_{\theta JA}$	55	$^\circ C/W$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	2.0	$^\circ C/W$

➤ 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}	150	---	---	V
Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=10A$	$R_{DS(ON)}$	---	47	56	$m\Omega$
Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	$V_{GS(th)}$	2	---	4	V
Drain-Source Leakage Current	$V_{DS}=120V$, $V_{GS}=0V$, $T_J=25^\circ C$	I_{DSS}	---	---	1	μA
	$V_{DS}=120V$, $V_{GS}=0V$, $T_J=55^\circ C$		---	---	5	
Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	I_{GSS}	---	---	± 100	nA
Forward Transconductance	$V_{DS}=5V$, $I_D=10A$	g_{fs}	---	25	---	S
Total Gate Charge	$V_{DS}=75V$, $V_{GS}=10V$, $I_D=10A$	Q_g	---	23	---	nC
Gate-Source Charge		Q_{gs}	---	5.8	---	
Gate-Drain Charge		Q_{gd}	---	4.2	---	
Turn-On Delay Time	$V_{DD}=75V$, $V_{GS}=10V$, $R_G=3.3\Omega$ $I_D=10A$	$T_{d(on)}$	---	16.2	---	ns
Rise Time		T_r	---	18.6	---	
Turn-Off Delay Time		$T_{d(off)}$	---	28.5	---	
Fall Time		T_f	---	6.5	---	
Input Capacitance	$V_{DS}=75V$, $V_{GS}=0V$, $f=1MHz$	C_{iss}	---	1190	---	pF
Output Capacitance		C_{oss}	---	73	---	
Reverse Transfer Capacitance		C_{rss}	---	4	---	

➤ Diode Characteristics

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	I_S	---	---	20	A
Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ C$	V_{SD}	---	---	1.2	V
Reverse Recovery Time	$I_F=10A$, $dI/dt=100A/\mu s$, $T_J=25^\circ C$	t_{rr}	---	45	---	nS
Reverse Recovery Charge		Q_{rr}	---	138	---	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. Ensure that the channel temperature does not exceed $150^\circ C$.
4. The data is theoretically the same as ID and IDM, in real applications, should be limited by total power dissipation.

➤ Typical Characteristics

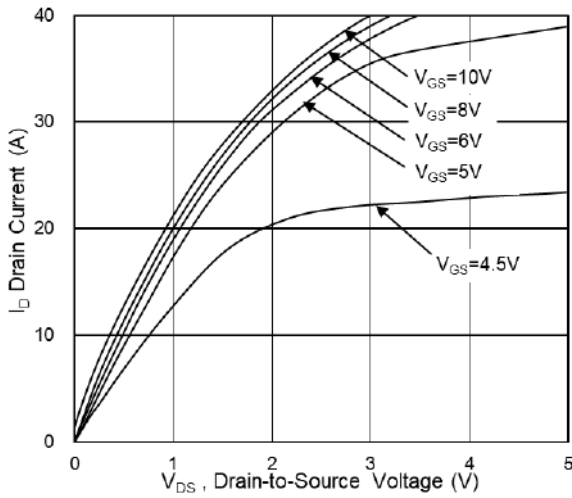


Fig.1 Typical Output Characteristics

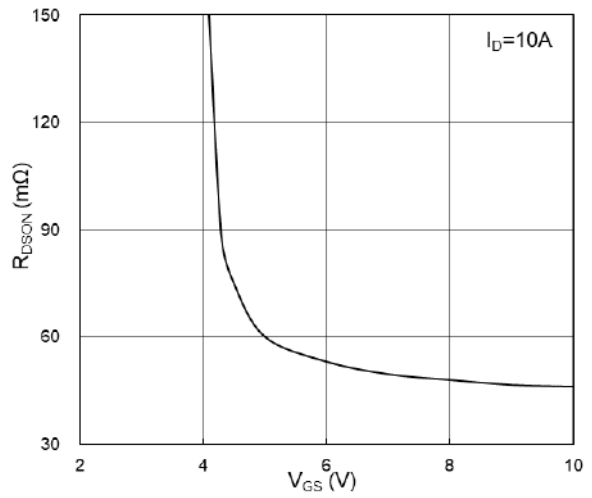


Fig.2 On-Resistance vs G-S Voltage

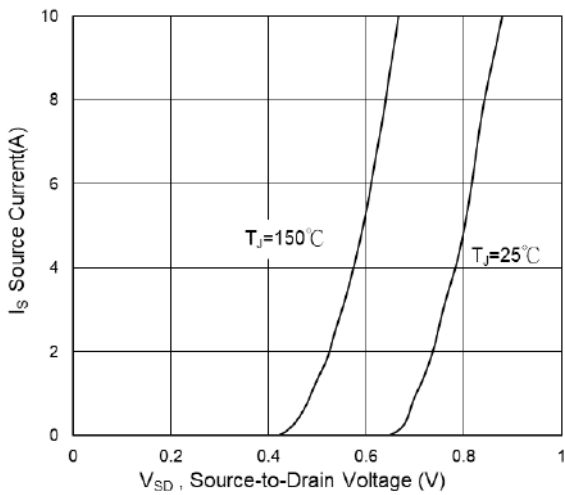


Fig.3 Source Drain Forward Characteristics

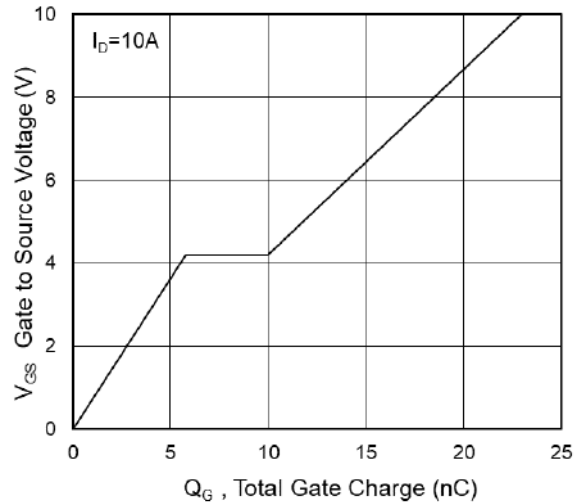


Fig.4 Gate-Charge Characteristics

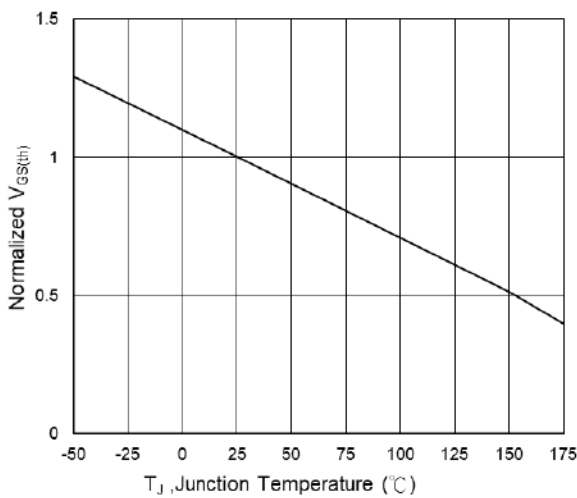


Fig.5 Normalized $V_{GS(th)}$ vs T_J

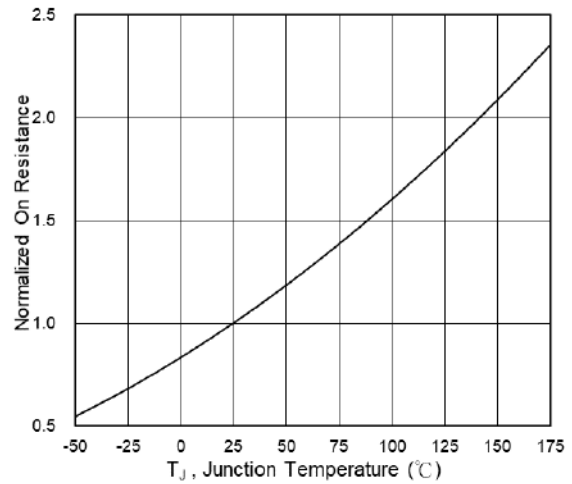


Fig.6 Normalized $R_{DS(on)}$ vs T_J

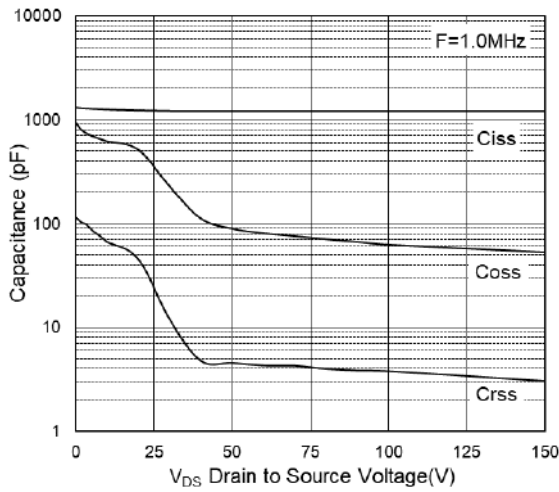


Fig.7 Capacitance

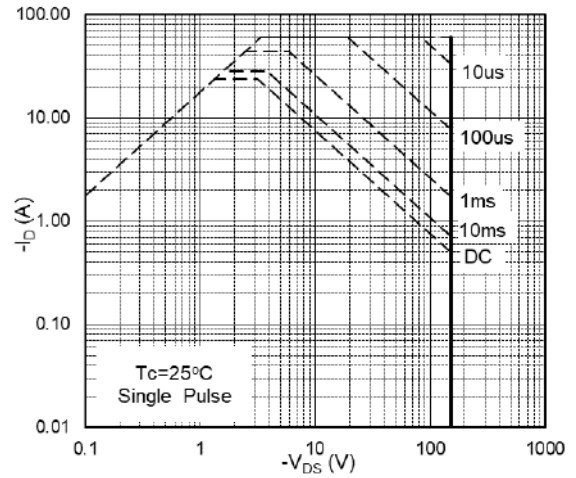


Fig.8 Safe Operating Area

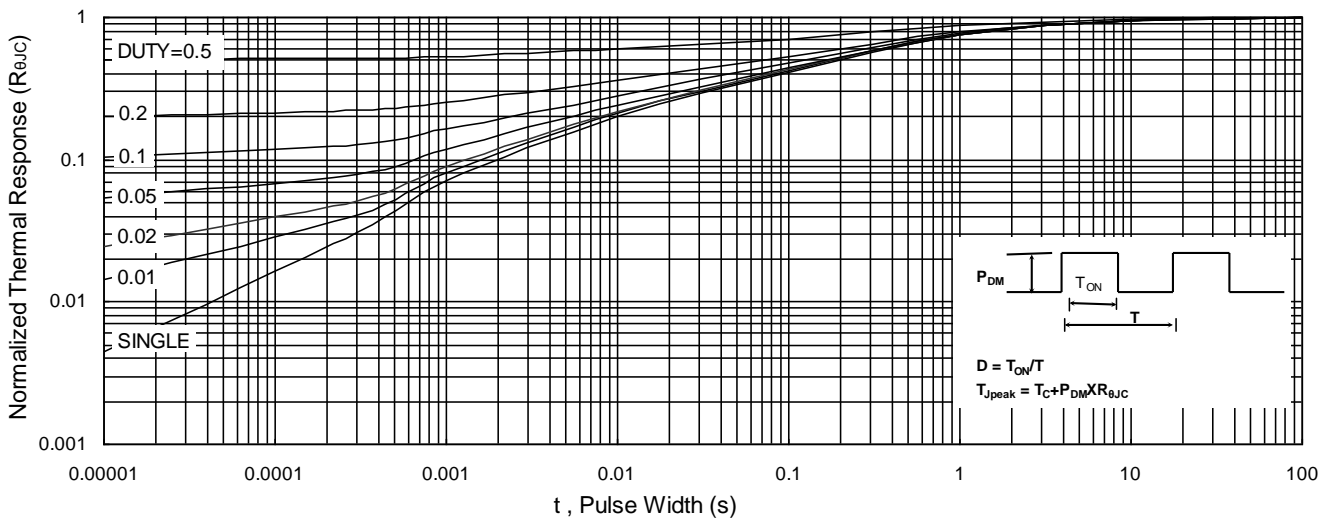


Fig.9 Normalized Maximum Transient Thermal Impedance

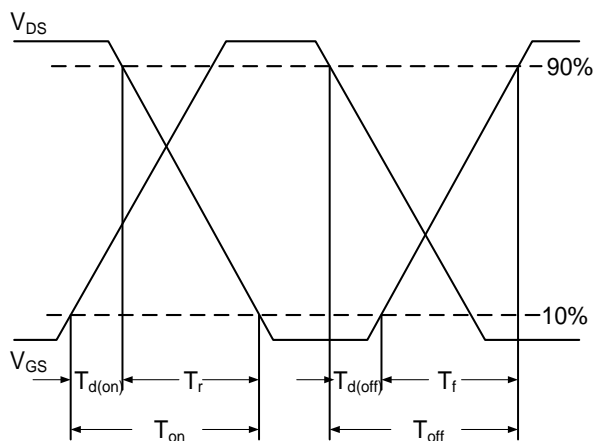


Fig.10 Switching Time Waveform

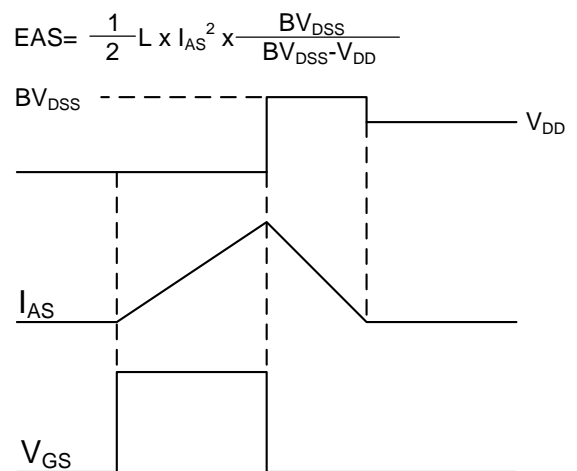


Fig.11 Unclamped Inductive Switching Waveform

➤ Recommend IR Reflow Soldering Thermal Profile

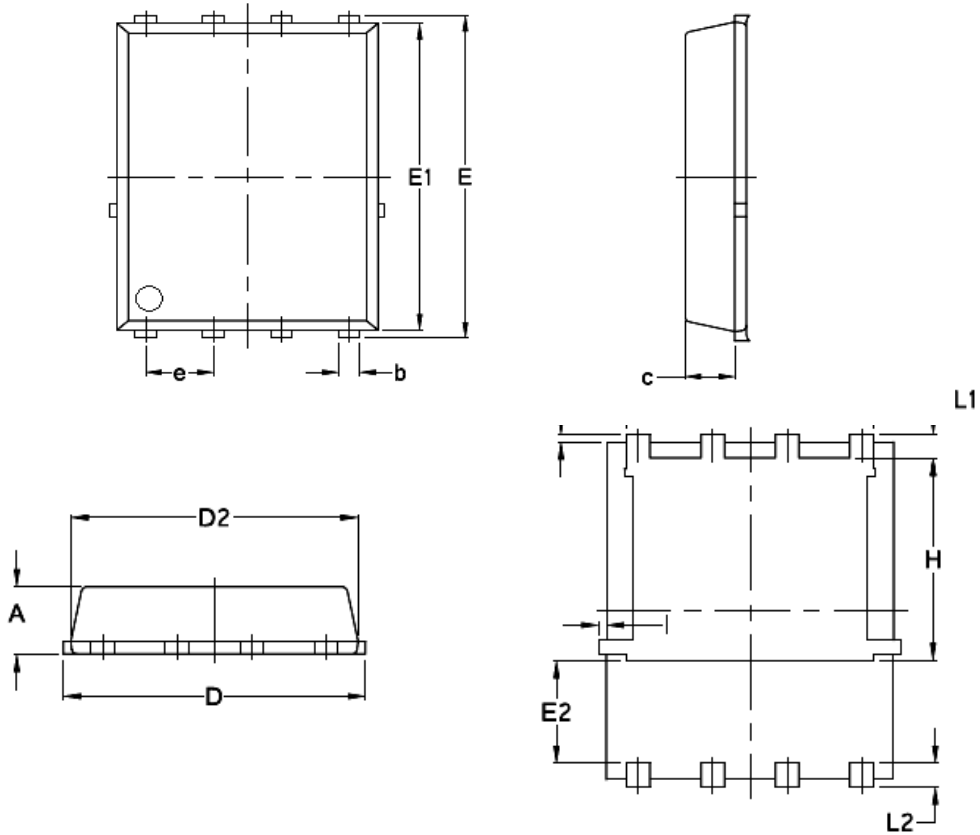


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Average Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
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
PAN20SN15AY	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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