AP24N15D

150V N-Channel Enhancement Mode MOSFET

Description

The AP24N15D uses advanced trenh technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 150V I_D =24A

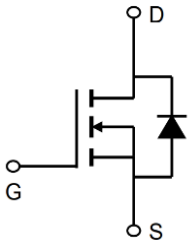
$R_{DS(ON)}$ < 88mΩ @ V_{GS}=10V **(Type：62mΩ)**

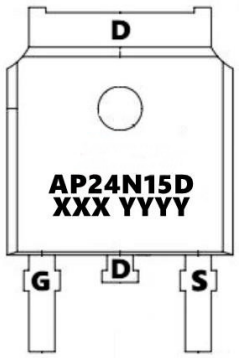
Application

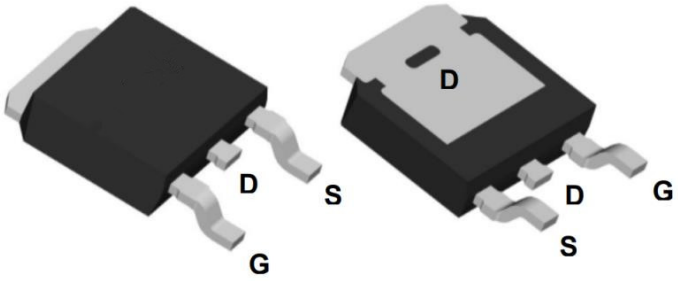
DC/DC Converter

LED Backlighting

Power Management Switches







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP24N15D	TO-252-3L	AP24N15D XXX YYYY	1000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	150	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	24	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	18	A
IDM	Pulsed Drain Current	40	A
EAS	Single Pulse Avalanche Energy	116	mJ
IAS	Avalanche Current	18	A
P_D@T_C=25℃	Total Power Dissipation[4]	72.6	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
RθJA	Thermal Resistance Junction-Ambient	1.72	℃/W
RθJC	Thermal Resistance Junction-Case	62.5	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	150	---	---	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=10A	---	62	88	mΩ
	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=10A	---	78	100	mΩ
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	2.0	2.5	V
IDSS	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=10A	---	33	---	S
Q_g	Total Gate Charge	V_{DS}=75V , V_{GS}=4.5V , I_D=10A	---	25.1	---	nC
Qgs	Gate-Source Charge		---	6.8	---	
Qgd	Gate-Drain Charge		---	12.6	---	
Td(on)	Turn-On Delay Time	V_{DD}=75V , V_{GS}=10V , R_G=3.3Ω I_D=10A	---	13	---	ns
T_r	Rise Time		---	8.2	---	
Td(off)	Turn-Off Delay Time		---	25	---	
T_f	Fall Time		---	11	---	
Ciss	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	2285	---	pF
Coss	Output Capacitance		---	110	---	
Crss	Reverse Transfer Capacitance		---	83	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	20	A
ISM	Pulsed Source Current[2,5]		---	---	40	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
trr	Reverse Recovery Time	IF=10A , dI/dt=100A/μs , T_J=25℃	---	37	---	nS
Q_{rr}	Reverse Recovery Charge		---	263	---	nC

Notes:

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%

3、The EAS data shows Max. rating . The test condition is V_{DD}=50V, V_{GS}=10V, L=0.3mH, I_{AS}=18A

4、The power dissipation is limited by 150°C junction temperature

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

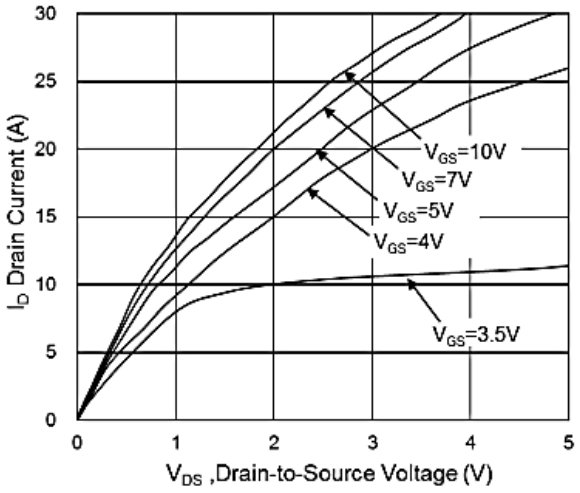


Fig.1 Typical Output Characteristics

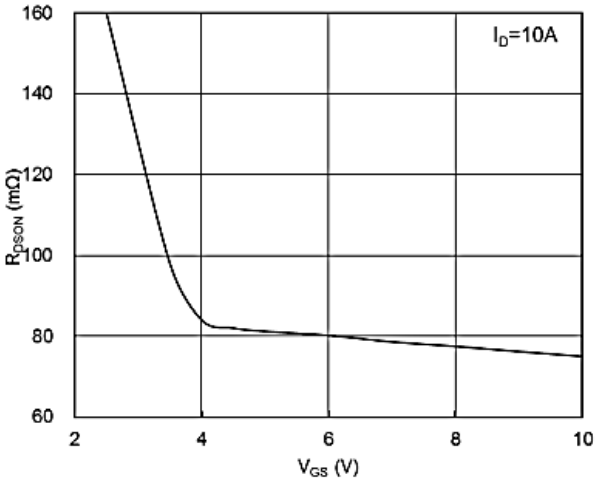


Fig.2 On-Resistance vs. Gate-Source Voltage

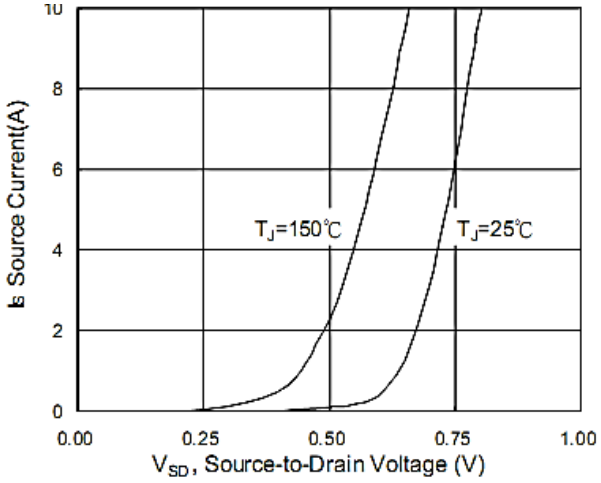


Fig.3 Forward Characteristics of Reverse

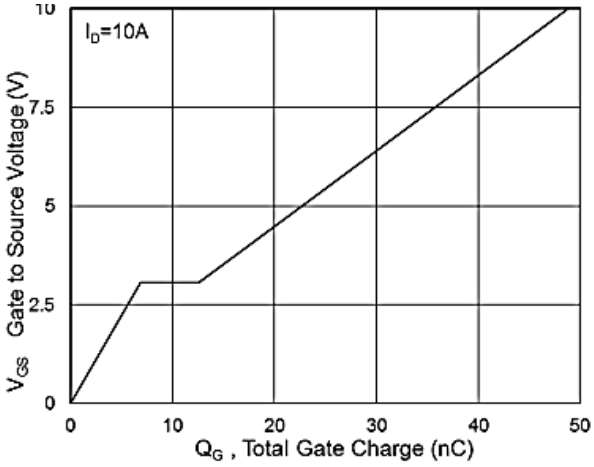


Fig.4 Gate-Charge Characteristics

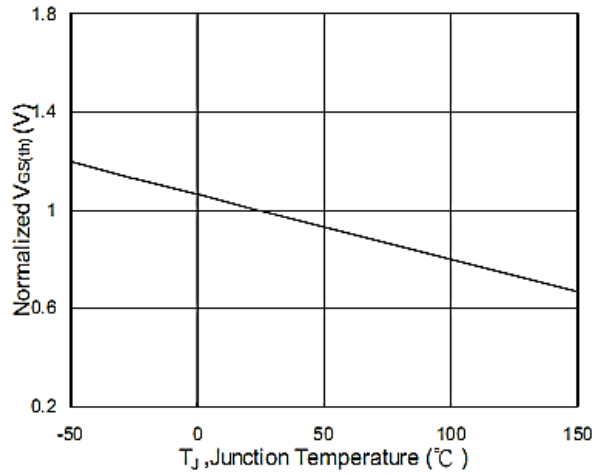


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

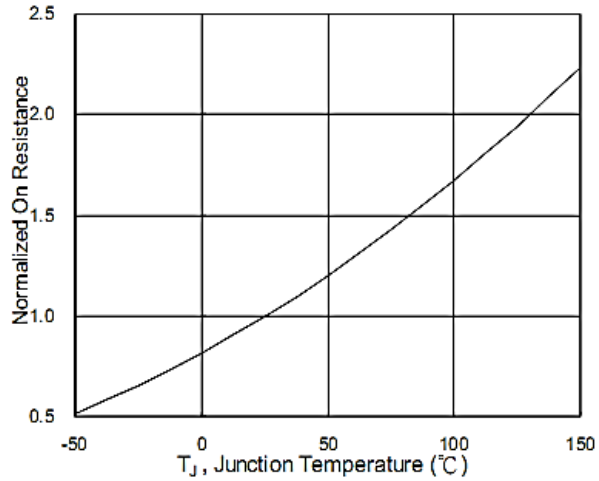


Fig.6 Normalized R_{DSON} vs. T_J

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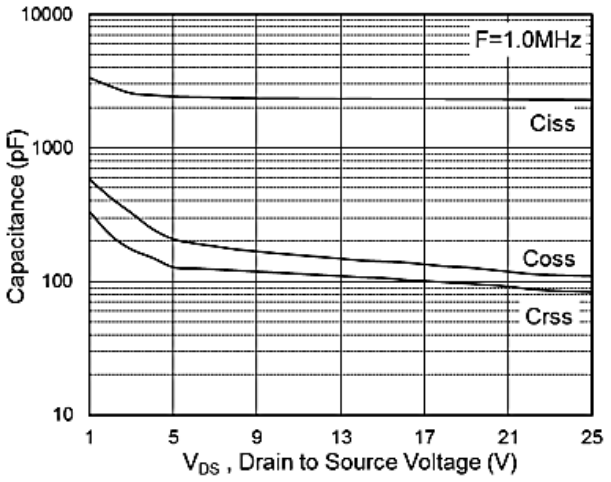


Fig.7 Capacitance

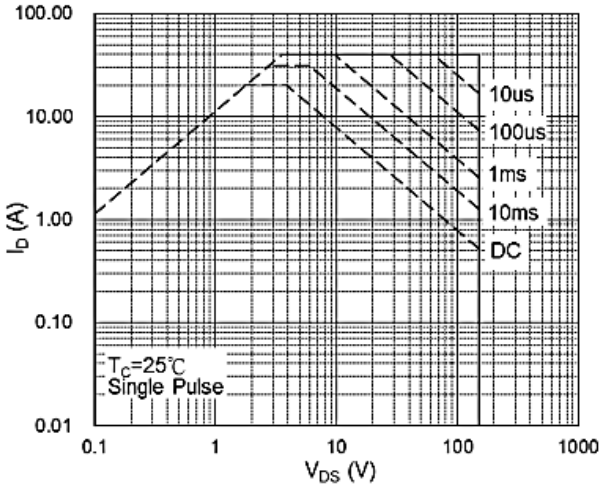


Fig.8 Safe Operating Area

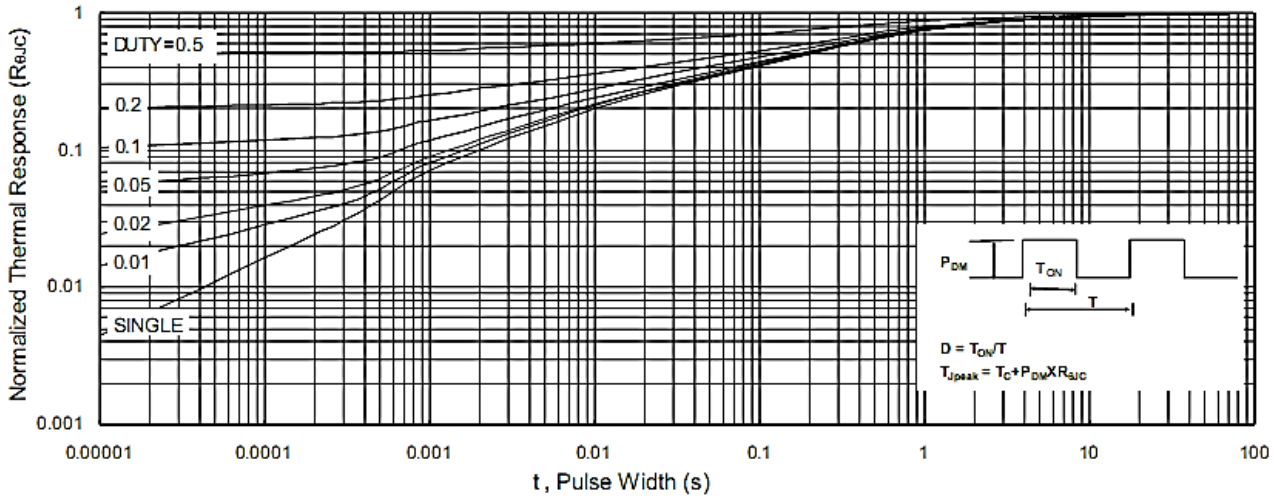


Fig.9 Normalized Maximum Transient Thermal Impedance

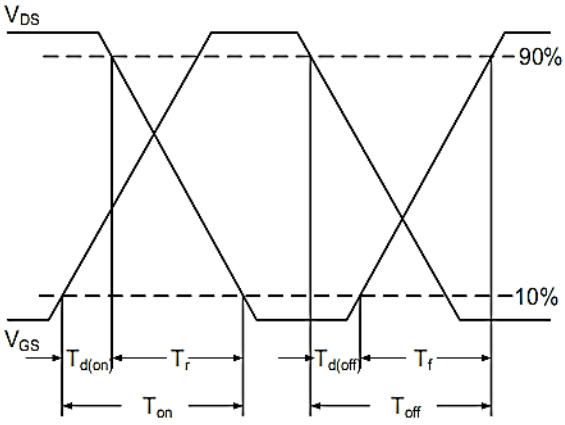


Fig.10 Switching Time Waveform

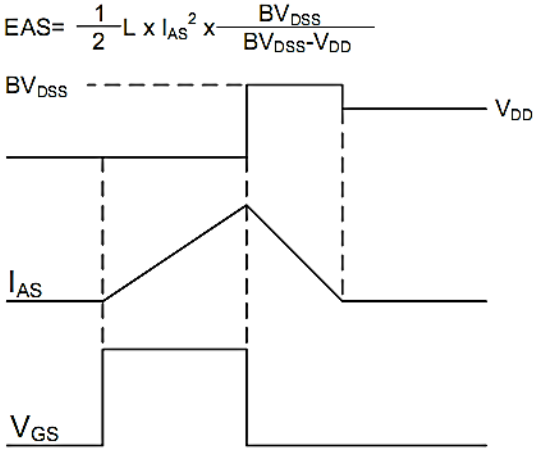
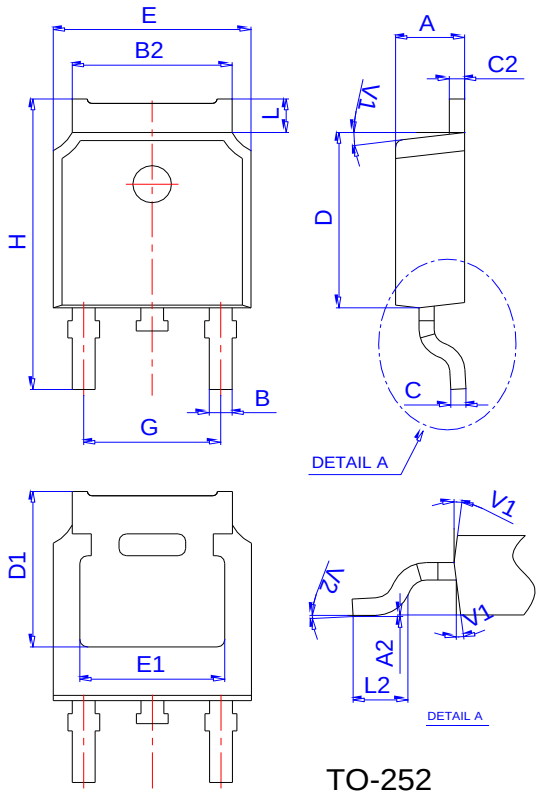


Fig.11 Unclamped Inductive Switching Waveform

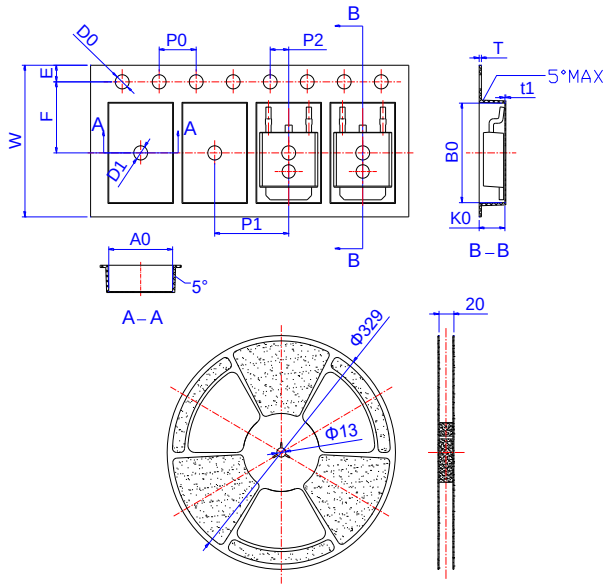
Package Mechanical Data: TO-252-3L



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583