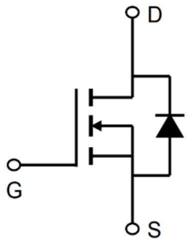
AP65N06D

60V N-Channel Enhancement Mode MOSFET

Description

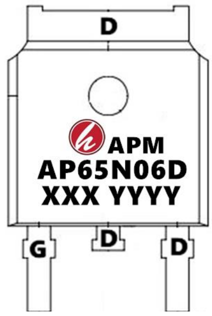
The AP65N06D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 60V I_D =65A

$R_{DS(ON)}$ < 13mΩ @ V_{GS}=10V (Type：9.0mΩ)

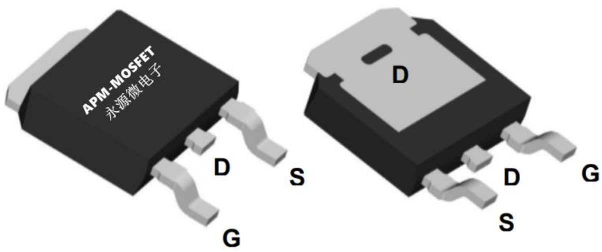


Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP65N06D	TO-252-3L	AP65N06D XXX YYYY	2500

Absolute Maximum Ratings@T_j=25ºC(unless otherwise specified)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	60	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	65	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	54	A
IDM	Pulsed Drain Current[2]	190	A
EAS	Single Pulse Avalanche Energy[3]	195	mJ
IAS	Avalanche Current	38	A
P_D@T_C=25℃	Total Power Dissipation[4]	52	W
P_D@T_A=25℃	Total Power Dissipation[4]	1.1	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	62	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	2.4	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60	65	---	V
△BVDSS/△TJ	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.052	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	9.0	13	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=20A	---	12	15	mΩ
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	2.0	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.76	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=60V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=60V , 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=30A	---	42	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	3.6	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=48V , V_{GS}=10V , I_D=30A	---	28.7	---	nC
Qgs	Gate-Source Charge		---	10.5	---	
Qgd	Gate-Drain Charge		---	9.9	---	
Td(on)	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=4.7Ω, I_D=15A	---	10.4	---	ns
T_r	Rise Time		---	9.2	---	
Td(off)	Turn-Off Delay Time		---	63	---	
T_f	Fall Time		---	4.8	---	
Ciss	Input Capacitance	V_{DS}=30V , V_{GS}=0V , f=1MHz	---	2603	---	pF
Coss	Output Capacitance		---	189	---	
Crss	Reverse Transfer Capacitance		---	173	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	80	A
ISM	Pulsed Source Current[2,5]		---	---	320	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=30A , T_J=25℃	---	---	1.4	V
trr	Reverse Recovery Time	IF=30A , dI/dt=100A/μs , T_J=25℃	---	18	---	nS
Q_{rr}	Reverse Recovery Charge		---	14	---	nC

Note :

1、The data tested by surface mounted on a 1 inch 2 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 VDD =48V,VGS =10V,L=0.1mH,IAS =27.9A

4、The power dissipation is limited by 150℃ 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.

60V N-Channel Enhancement Mode MOSFET

Typical Characteristics

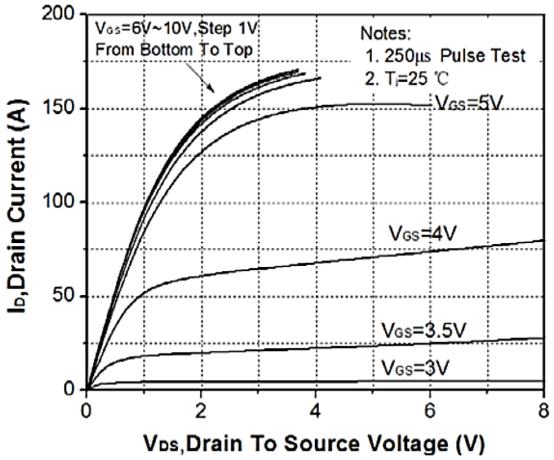


Figure1. On-state characteristics

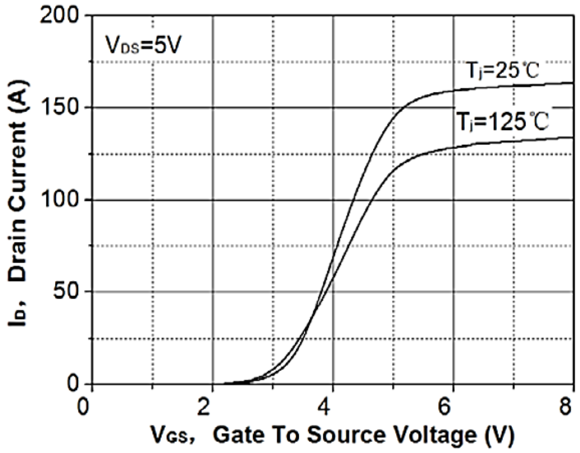


Figure2. Transfer Characteristics

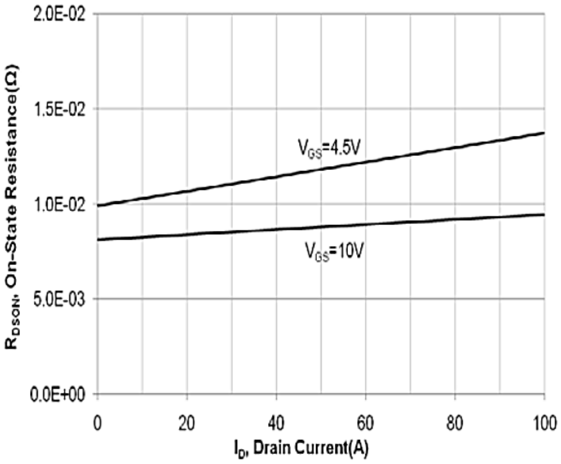


Figure3. On-resistance variation vs. drain current and gate voltage

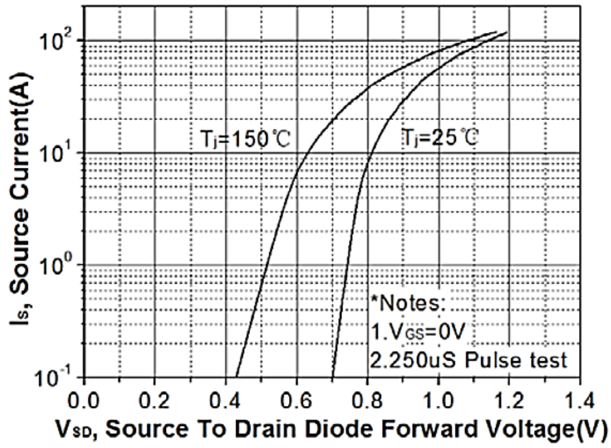


Figure4. On-state current vs. diode forward voltage

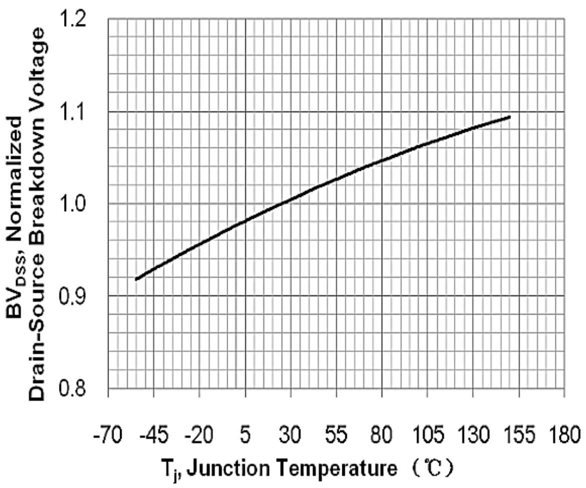


Figure5 . Breakdown voltage variation vs. junction temperature

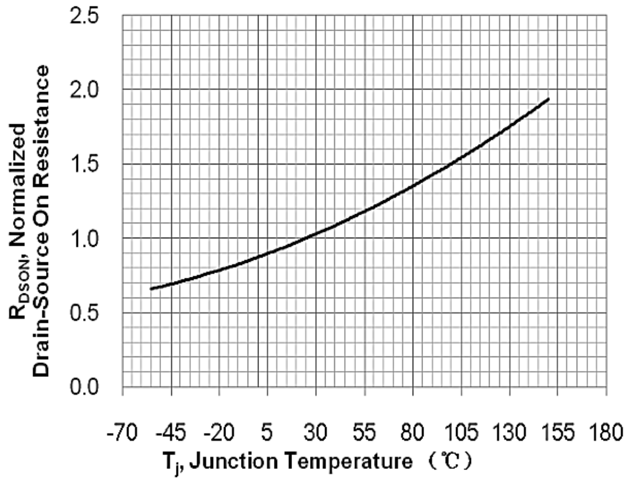


Figure 6. On-resistance variation vs. junction temperature

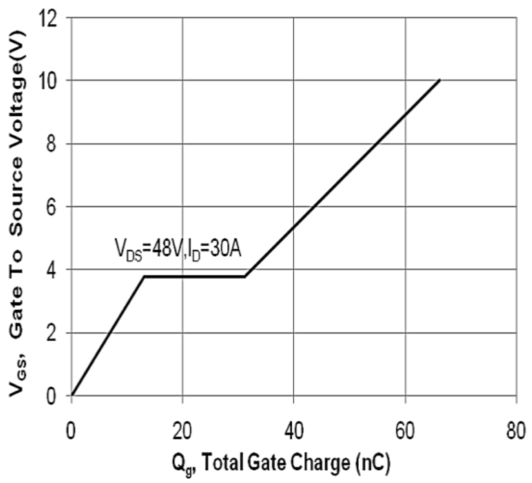


Figure7. Gate charge characteristics

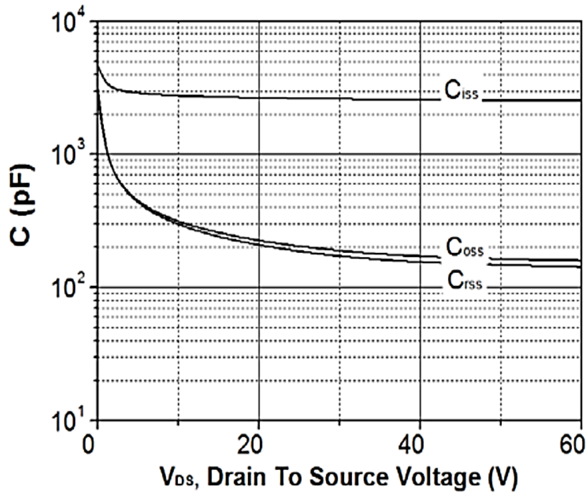


Figure8. Capacitance Characteristics

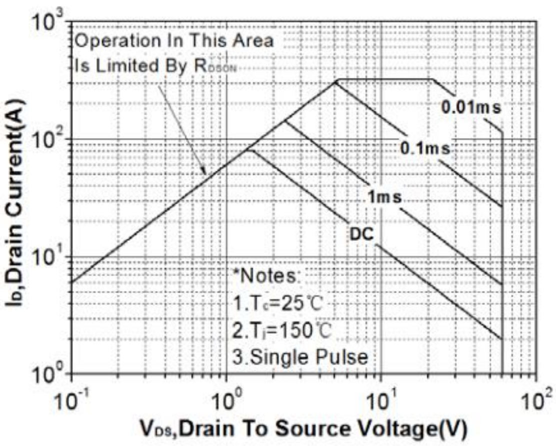


Figure9. Maximum safe operating area

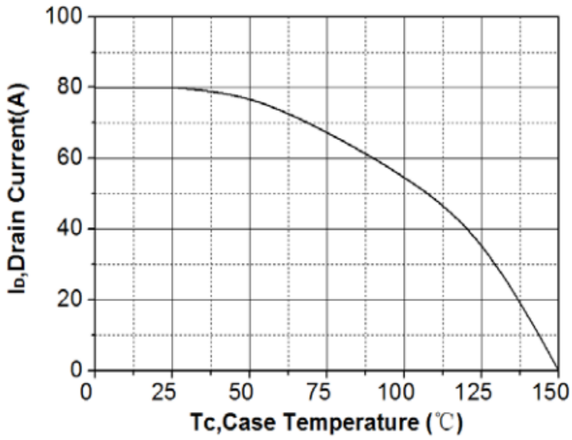


Figure10. Maximum drain current

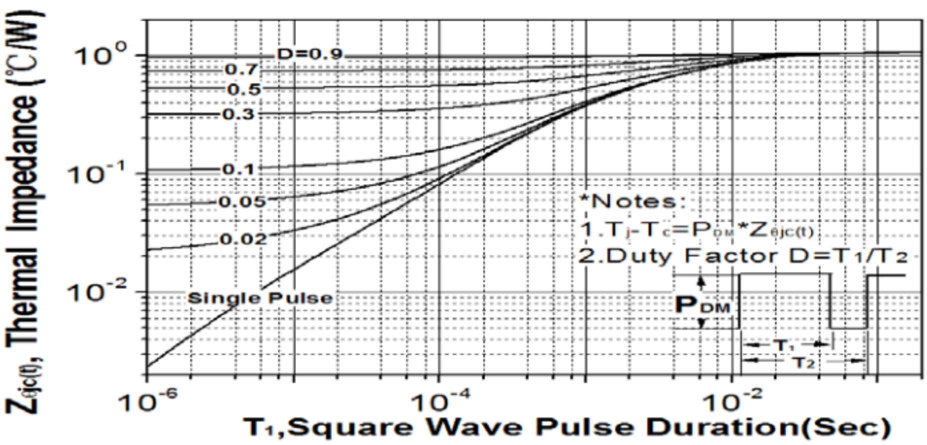


Figure11. Transient thermal response curve
vs. case temperature

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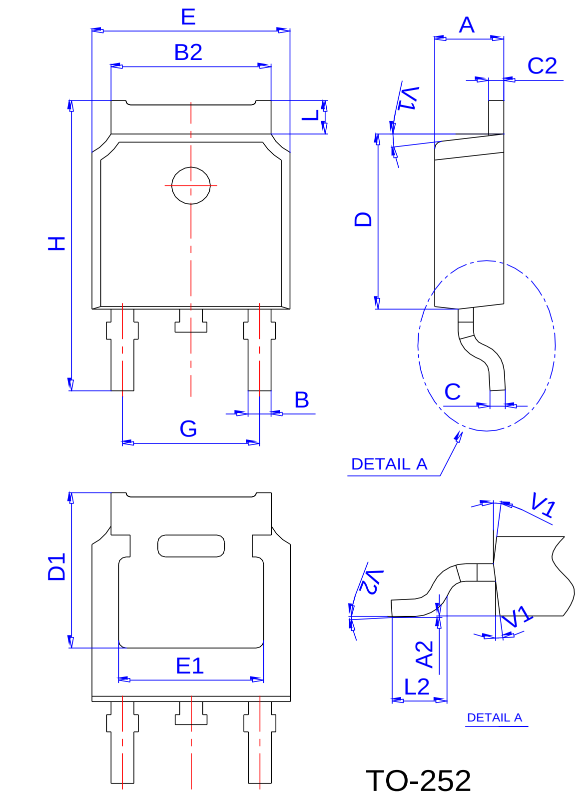
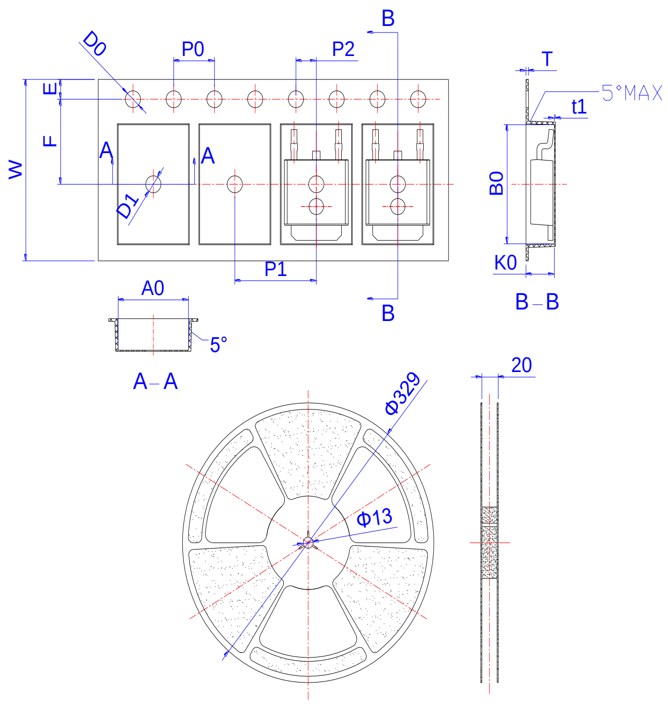
Package Mechanical Data：TO-252-3L



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 Spectification-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

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60V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2021/1/31	Initial release