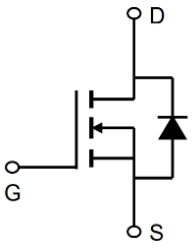
AP60N02BD

20V N-Channel Enhancement Mode MOSFET

Description

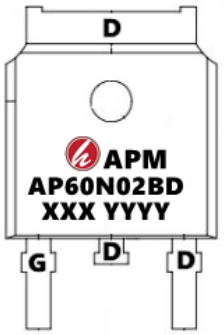
The AP60N02BD uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS}=20V I_D=60A

$R_{DS(ON)}$ < 6.5mΩ @ V_{GS}=4.5V （Type：4.8mΩ）

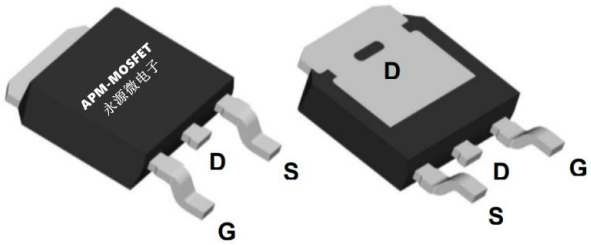


Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP60N02BD	TO-252-3L	AP60N02BD XXX YYYY	2500

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

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	20	V
VGSS	Gate-Source Voltage	±12	V
ID@TA=25℃	Continuous Drain Current, VGS @ 4.5V	60	A
ID@TA=70℃	Continuous Drain Current, VGS @ 4.5V	39	A
IDM	Pulsed Drain Current note1	200	A
EAS	Single Pulsed Avalanche Energy note2	47.6	mJ
PD@TA=25℃	Power Dissipation	37	W
RθJC	Thermal Resistance, Junction to Case	4	℃/W
TJ, TSTG	Operating and Storage Temperature Range	-55 to +175	℃

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	20	24	-	V
IDSS	Zero Gate Voltage Drain Current	VDS=20V, VGS=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	VDS=0V, VGS=±12V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	0.5	0.7	1.2	V
RDS(on)	Static Drain-Source on-Resistance note3	VGS=4.5V, ID=30A	-	4.8	6.5	mΩ
		VGS=2.5V, ID=20A	-	8.2	10	
Ciss	Input Capacitance	VDS=10V, VGS=0V, f = 1.0MHz	-	1832	-	pF
Coss	Output Capacitance		-	289	-	pF
Crss	Reverse Transfer Capacitance		-	271	-	pF
Qg	Total Gate Charge	VDS=10V, ID=30A, VGS=4.5V	-	23	-	nC
Qgs	Gate-Source Charge		-	4.5	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	7.3	-	nC
td(on)	Turn-on Delay Time	VDS=10V, ID=30A, RGEN=3Ω, VGS =4.5V	-	15	-	ns
tr	Turn-on Rise Time		-	37	-	ns
td(off)	Turn-off Delay Time		-	52	-	ns
tf	Turn-off Fall Time		-	21	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	60	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	210	A
VSD	Drain to Source Diode Forward Voltage	VGS = 0V, IS=25A	-	-	1.2	V

Notes:

1、Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2、The test condition is, VDD=10V, VG=4.5V, L=0.5mH, RG=25Ω, IAS=13.8A

3、The data tested by pulsed Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

4、The power dissipation is limited by 150℃ junction temperature

Typical Characteristics

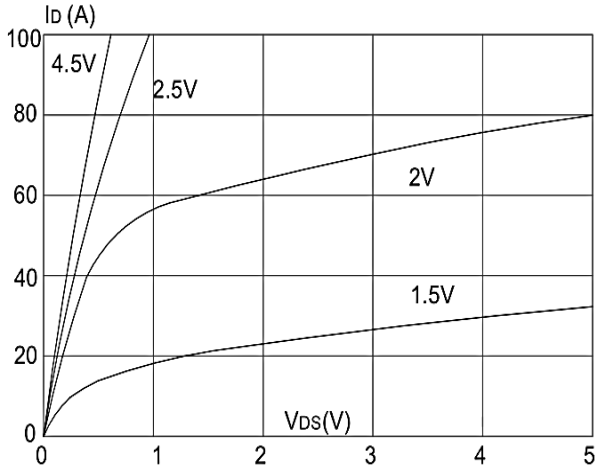


Figure1: Output Characteristics

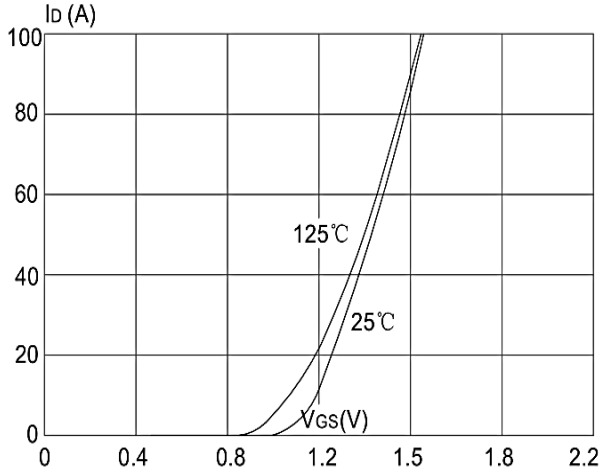


Figure 2: Typical Transfer Characteristics

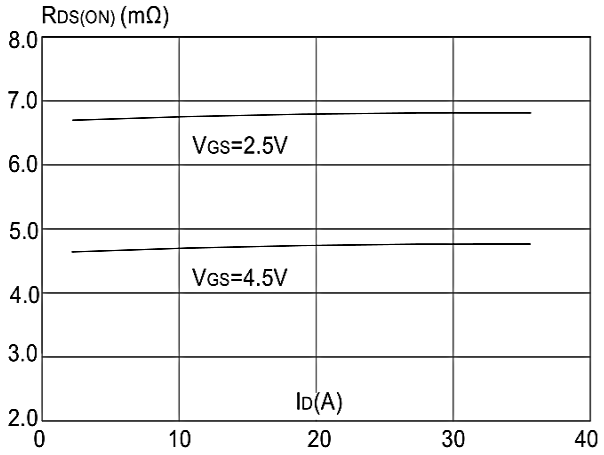


Figure 3:On-resistance vs. Drain Current

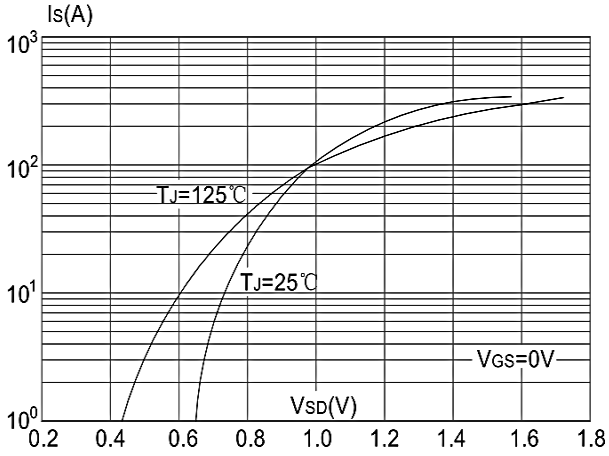


Figure 4: Body Diode Characteristics

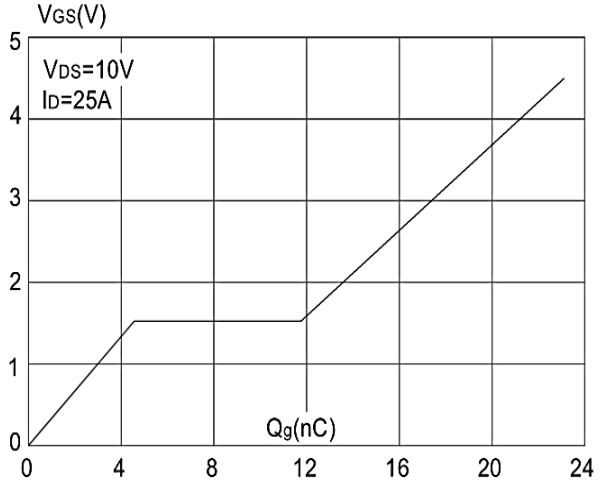


Figure 5: Gate Charge Characteristics

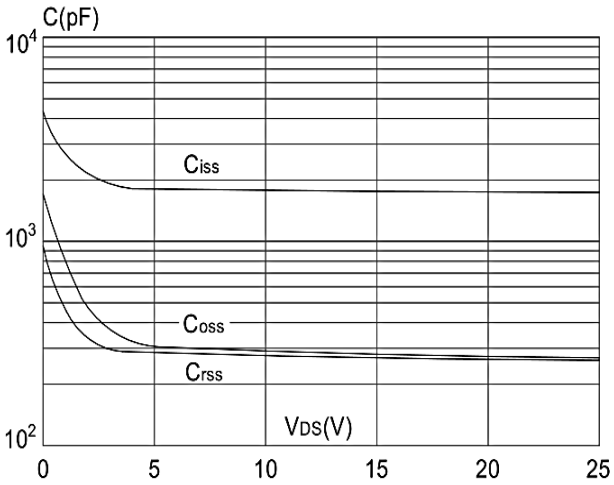


Figure 6: Capacitance Characteristics

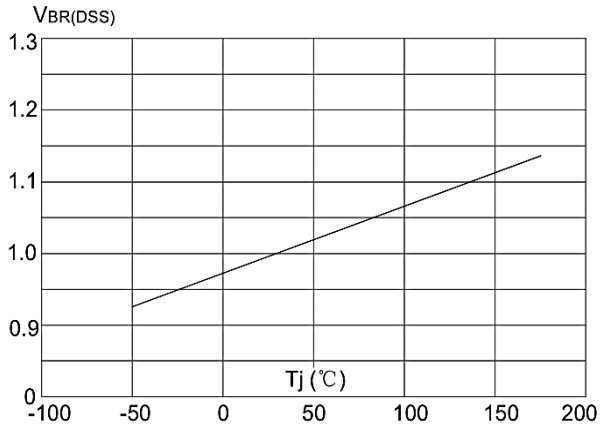


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

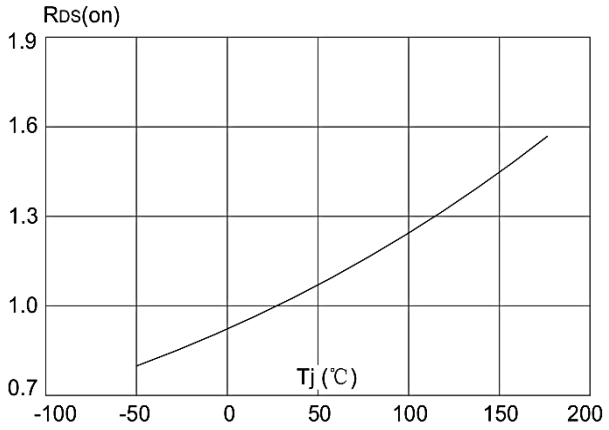


Figure 8: Normalized on Resistance vs Junction Temperature

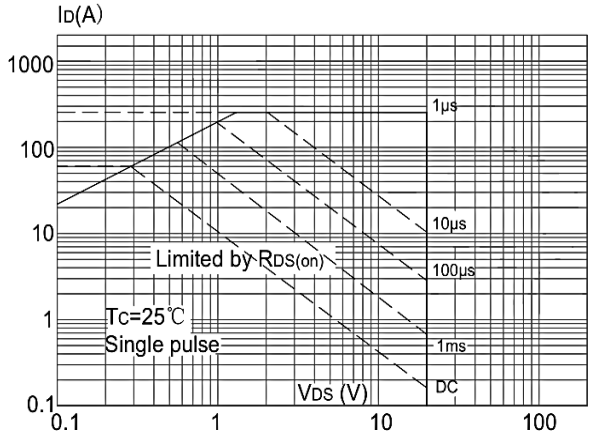


Figure 9: Maximum Safe Operating Area Current Temperature

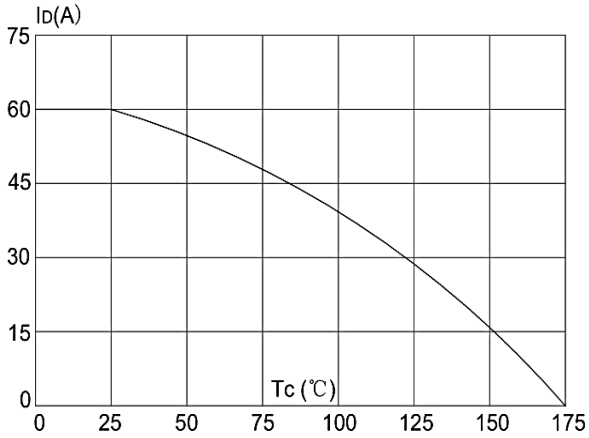


Figure 10: Maximum Continuous Drain vs. Case

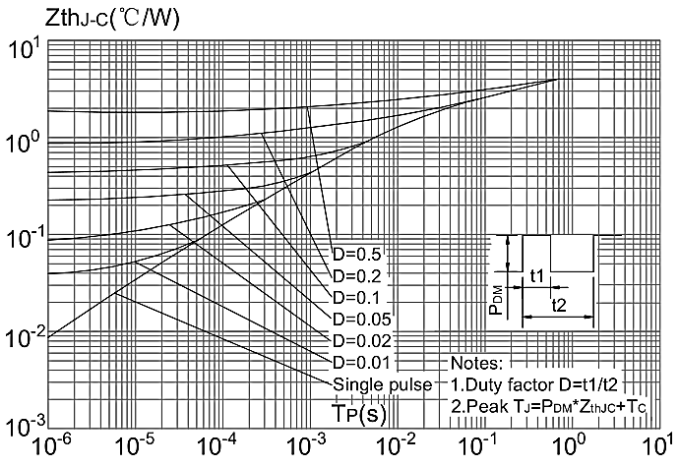
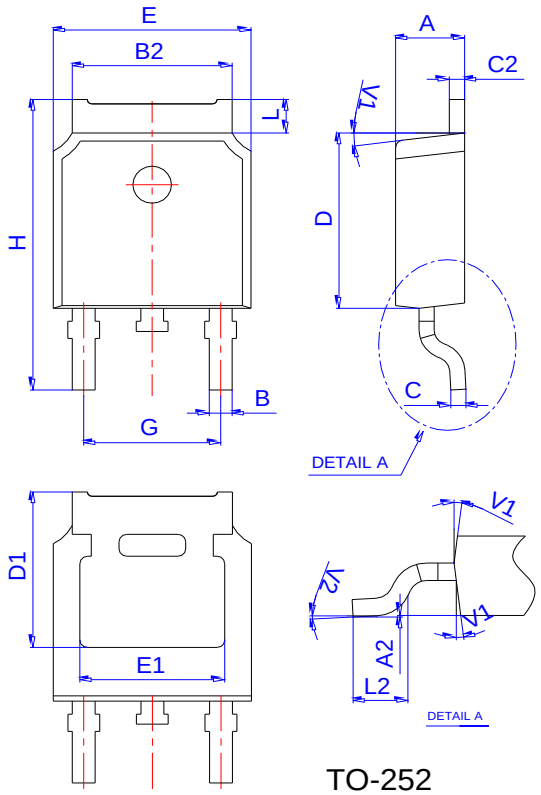


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

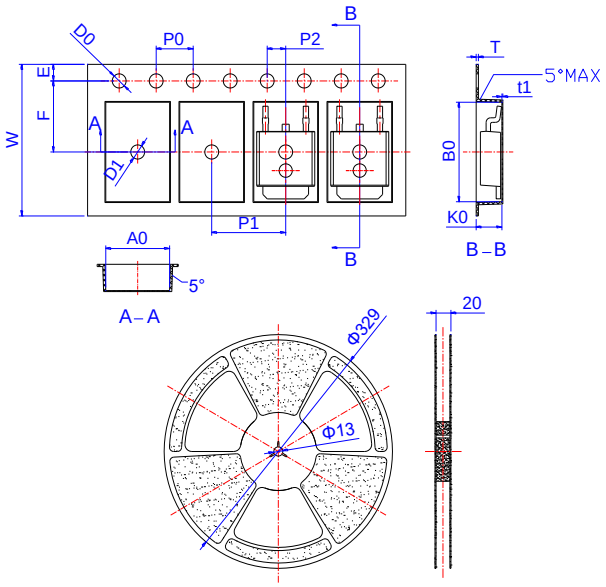
Package Mechanical Data:TO-252-3L



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

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20V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2021/7/28	Initial release