



Description

The AP80N03BD uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS}=30V$ $I_D=80A$

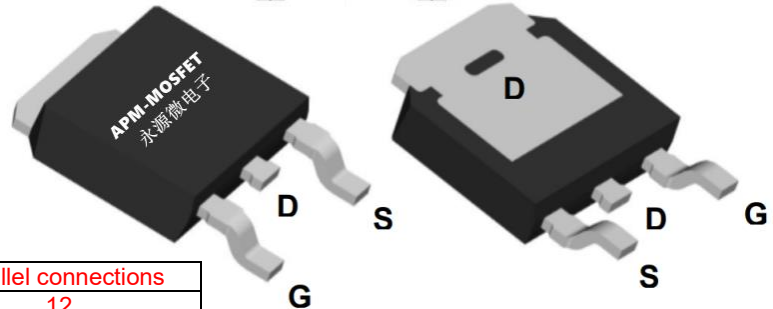
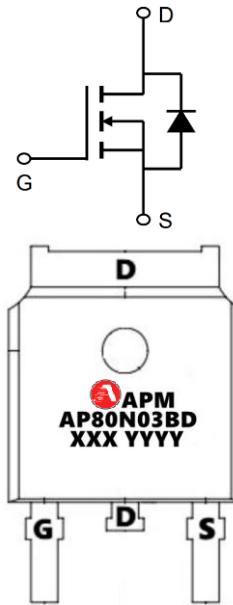
$R_{DS(ON)} < 5.5m\Omega$ @ $V_{GS}=10V$ (Type: 4.1m Ω)

Application

Battery protection

Load switch

Uninterruptible power supply



Grading

Gear position	Threshold voltage	parallel connections
A	1.30-1.60V	12
B	1.61-1.90V	12
C	1.91-2.20V	12

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP80N03BD	TO252-3L	AP80N03BD XXXX YYYY	2500

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	value	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	80	A
$I_D@T_C=75^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V ¹	45	A
I_{DM}	Pulsed Drain Current ²	240	A
EAS	Single Pulse Avalanche Energy ³	56	mJ
I_{AS}	Avalanche Current	18	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	46	W
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ⁴	2.72	W
$T_{STG} T_J$	Operating Junction /Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.72	$^\circ\text{C/W}$

30V N-Channel Enhancement Mode MOSFET
Electrical Characteristics ($T_J=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	30	-		V
IDSS	Zero Gate Voltage Drain Current	$V_{DS} = 30\text{V}$, $V_{GS} = 0\text{V}$	-	-	1.0	μA
IGSS	Gate-Body Leakage Current	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
VGS(th)	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	1.0	1.6	2.5	V
RDS(ON)	Static Drain-Source ON-Resistance ⁽⁴⁾	$V_{GS} = 10\text{V}$, $I_D = 30\text{A}$	-	4.1	5.5	m Ω
		$V_{GS} = 4.5\text{V}$, $I_D = 20\text{A}$	-	7.3	9.5	m Ω
Ciss	Input Capacitance	$V_{GS} = 0\text{V}$, $V_{DS} = 15\text{V}$, $f = 1\text{MHz}$	-	1788		PF
Coss	Output Capacitance		-	225		PF
Crss	Reverse Transfer Capacitance		-	180		PF
Qg	Total Gate Charge	$V_{GS} = 0 \text{ to } 10\text{V}$, $V_{DS} = 15\text{V}$, $I_D = 30\text{A}$	-	34		nC
Qgs	Gate Source Charge		-	6.5		nC
Qgd	Gate Drain("Miller") Charge		-	7.5		nC
td(on)	Turn-On DelayTime	$V_{GS} = 10\text{V}$, $V_{DD} = 15\text{V}$, $I_D = 30\text{A}$, $R_{GEN} = 3\Omega$	-	7		nS
tr	Turn-On Rise Time		-	14		nS
td(off)	Turn-Off DelayTime		-	34		nS
tf	Turn-Off Fall Time		-	11		nS
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	70	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
VSD	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}$, $I_S = 30\text{A}$	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	$I_F = 20\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$	-	10		nS
Qrr	Body Diode Reverse Recovery Charge		-	1.7		nC

Note :

- 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 $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=24\text{V}$, $V_{GS}=10\text{V}$, $L=0.5\text{mH}$, $I_{AS}=18\text{A}$
- 4、The power dissipation is limited by 175°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.



Typical Characteristics

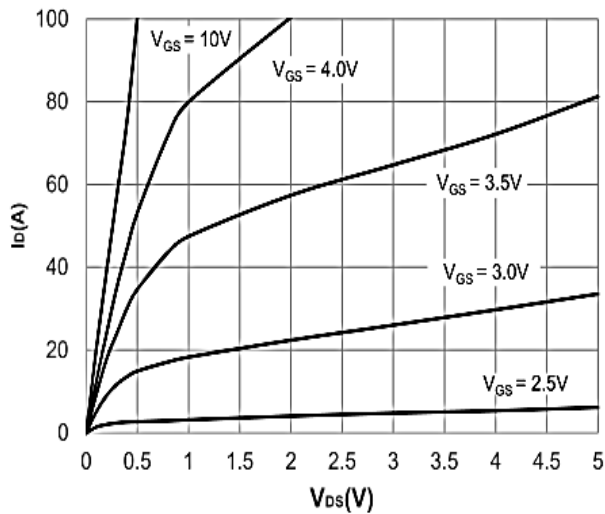


Figure 1: Output Characteristics

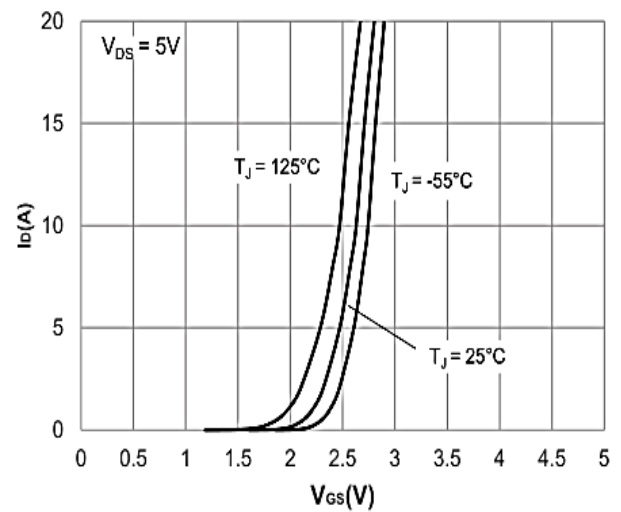


Figure 2: Typical Transfer Characteristics

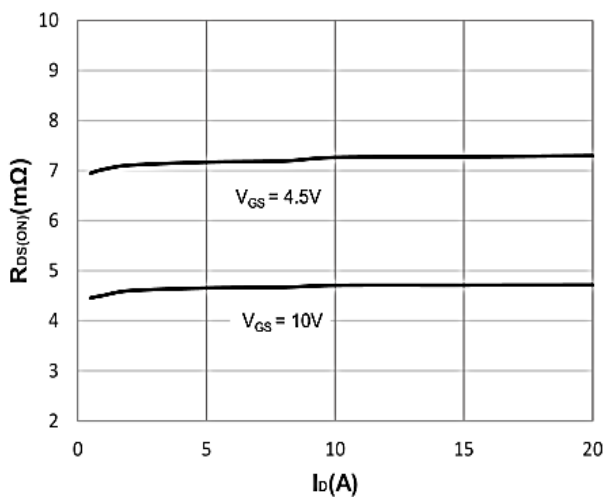


Figure 3: On-resistance vs. Drain Current

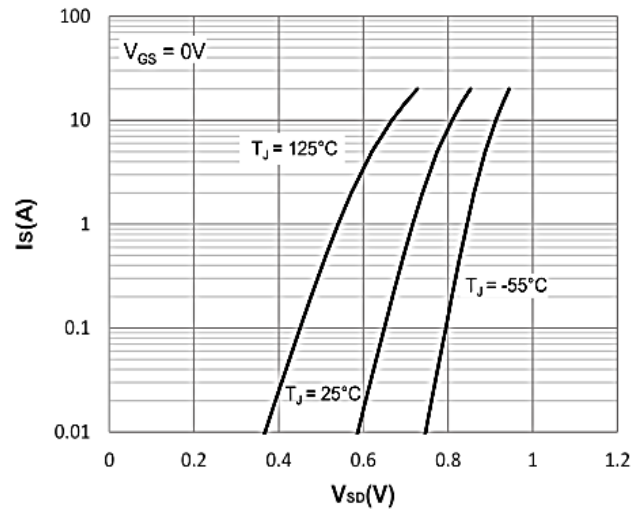


Figure 4: Body Diode Characteristics

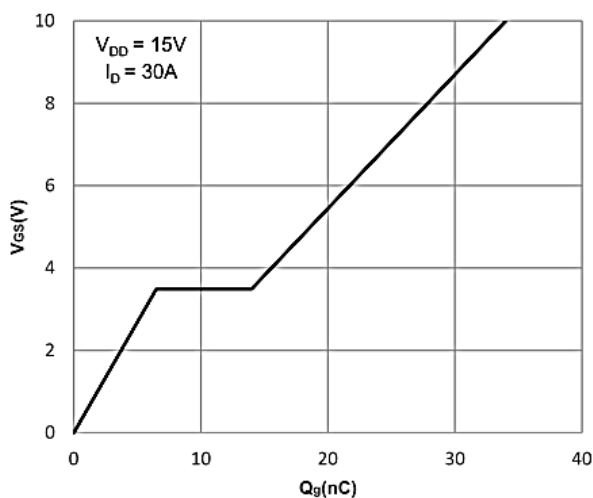


Figure 5: Gate Charge Characteristics

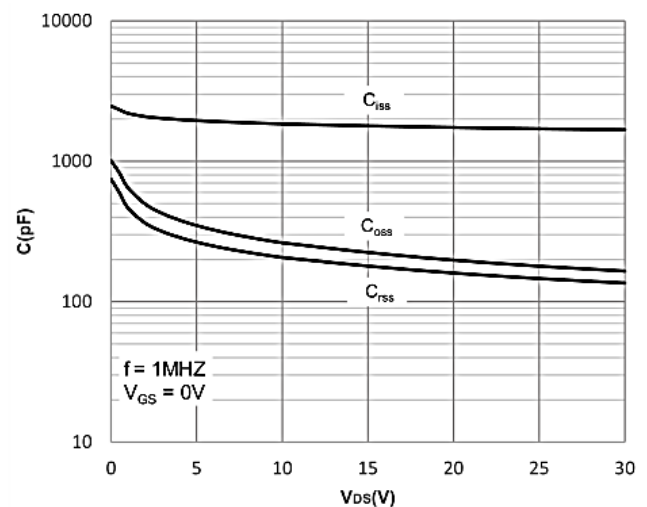


Figure 6: Capacitance Characteristics

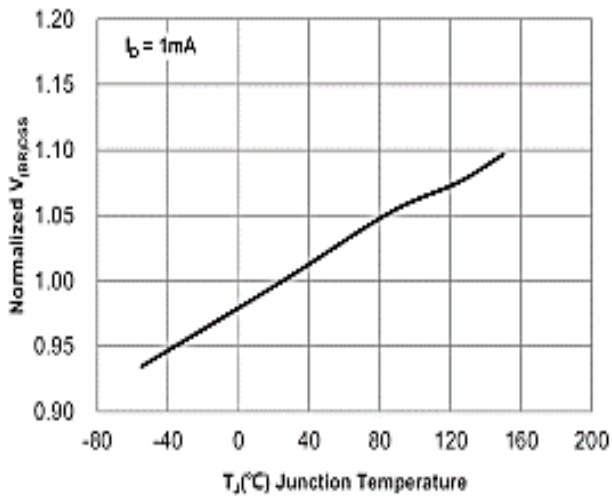


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

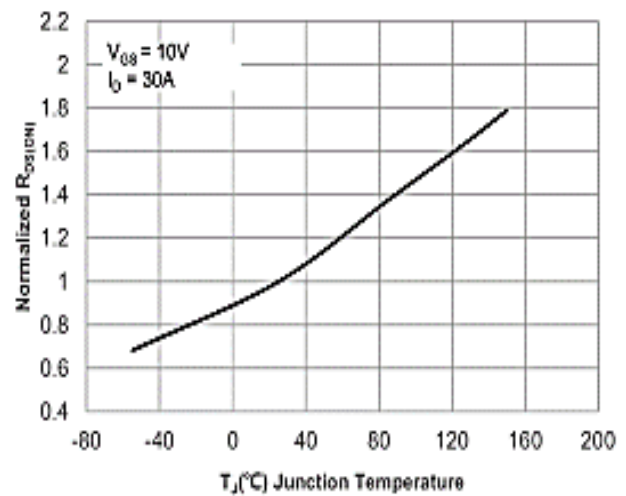


Figure 8: Normalized on Resistance vs. Junction Temperature

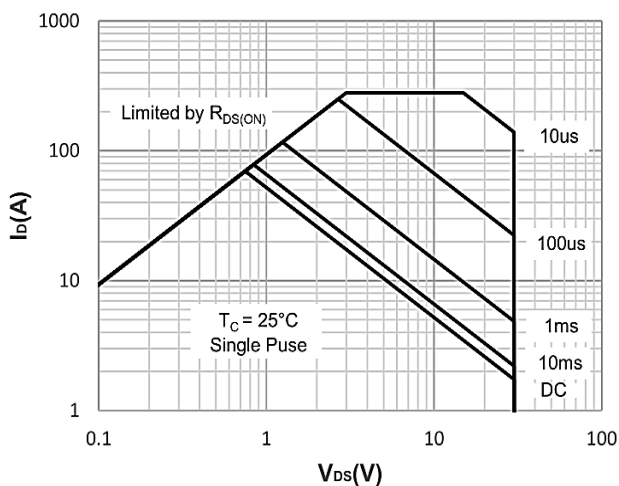


Figure 9: Maximum Safe Operating Area

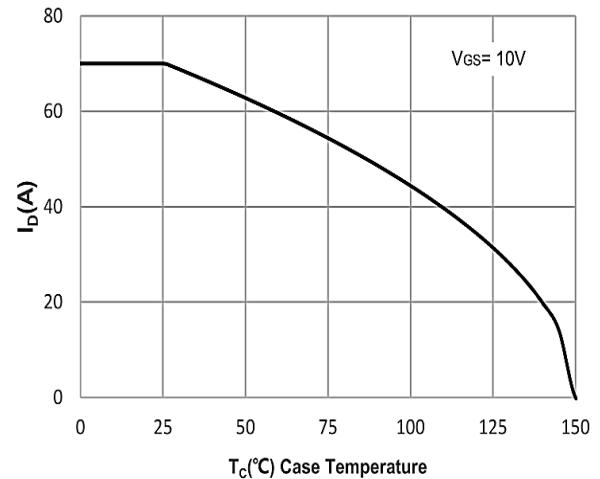


Figure 10: Maximum Continuous Driant Current vs. Case Temperature

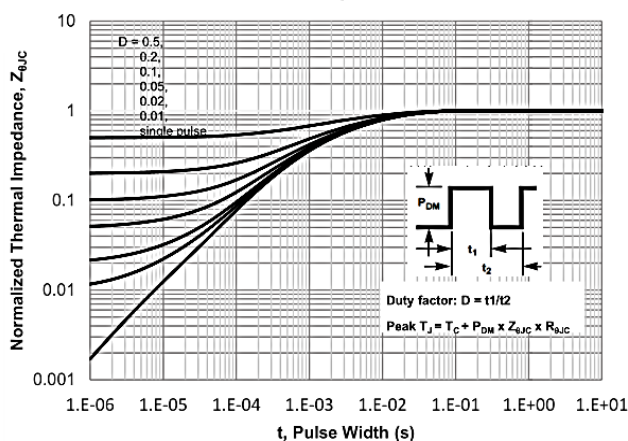


Figure 11: Normalized Maximum Transient

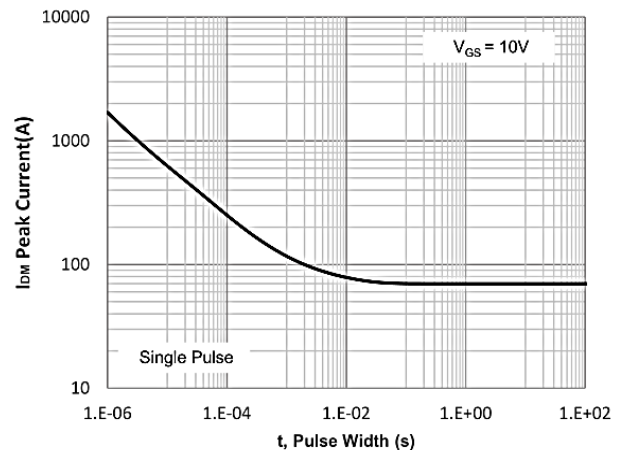
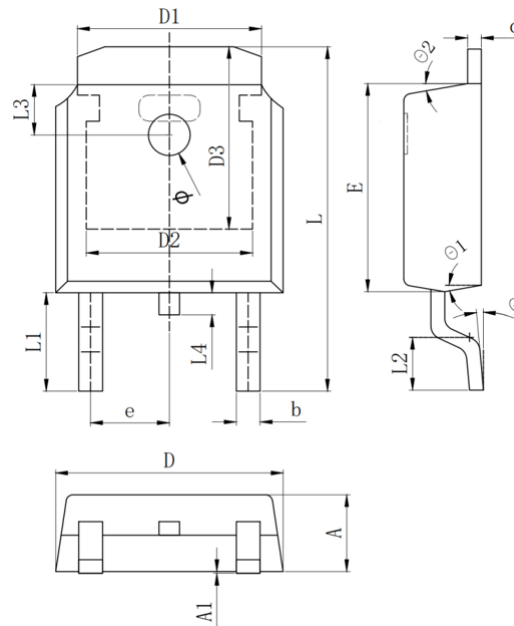


Figure 12: Peak Current Capacity Thermal Impedance



Package Mechanical Data-TO252-3L



Symbol	Dimensions In Millimeters		
	min.	typ.	max.
A	2.10	2.30	2.50
A1	0.00	0.064	0.128
b	0.64	0.75	0.86
c	0.45	0.52	0.60
D	6.40	6.60	6.80
D1	5.33REF		
D2	4.83REF		
D3	5.25REF		
E	5.90	6.10	6.30
e	2.286TYP		
L	9.80	10.10	10.40
L1	2.888REF		
L2	1.40	1.50	1.70
L3	1.65REF		
L4	0.60	0.80	1.00
	1.10	1.20	1.30
θ	0°		10°
θ1	5°		10°
θ2	5°		10°



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Edition	Date	Change
REV1.0	2023/6/21	Initial release
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