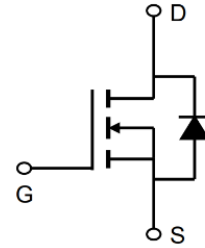


## 100V N-Channel Enhancement Mode MOSFET

### Description

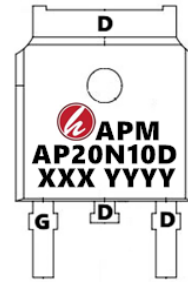
The AP20N10D uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



### General Features

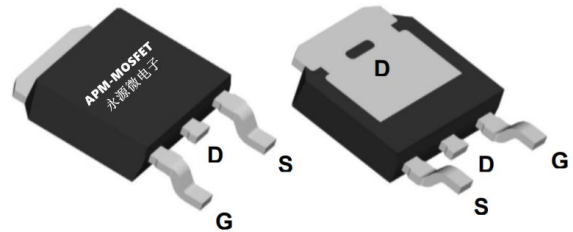
$V_{DS} = 100V$   $I_D = 20A$

$R_{DS(ON)}$  Type:  $65m\Omega @ V_{GS}=10V$



### Application

- Lithium battery protection
- Wireless impact
- Mobile phone fast charging



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20N10D	TO-252-3L	AP20N10D XXX YYYY	2500

### Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	100	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Drain Current, V <sub>GS</sub> @ 10V	20	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V	13	A
IDM	Pulsed Drain Current <sup>1</sup>	57.9	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	30	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>3</sup>	2.7	W
EAS	Single Pulse Avalanche Energy <sup>4</sup>	7	mJ
TSTG	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C
RθJA	Maximum Thermal Resistance, Junctionambient	55	°C/W
RθJC	Maximum Thermal Resistance, Junction-case	5.1	°C/W



## 100V N-Channel Enhancement Mode MOSFET

### Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	100	107	-	V
IDSS	Zero Gate Voltage Drain Current	VDS=100V, VGS=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	VDS=0V, VGS=±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.2	1.85	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	VGS=10V, ID=5A	-	65	85	mΩ
		VGS=4.5V, ID=3A	-	75	100	MΩ
g fs	Forward Transconductance	V DS =5V , I D =5A		14		S
RG	Gate Resistance	VDS = 0V, VGS =0V,f =1MHz		3		Ω
Ciss	Input Capacitance	VDS=15V, VGS=0V, f=1.0MHz	-	1100	-	pF
Coss	Output Capacitance		-	55	-	pF
Crss	Reverse Transfer Capacitance		-	40	-	pF
Qg	Total Gate Charge	VDS=50V, ID=5A, VGS=10V	-	11.9	-	nC
Qgs	Gate-Source Charge		-	2.8	-	nC
Qgd	Gate-Drain("Miller") Charge		-	1.7	-	nC
td(on)	Turn-on Delay Time	VDS=30V, ID=5A, RG=1.8Ω, VGS=10V	-	3.8	-	ns
tr	Turn-on Rise Time		-	25.8	-	ns
td(off)	Turn-off Delay Time		-	16	-	ns
tf	Turn-off Fall Time		-	8.8	-	ns
IS	Continuous Source Current1,5	VG=VD=0V , Force Current	-	-	14.6	A
ISM	Pulsed Source Current2,5		-	-	25	A
VSD	Diode Forward Voltage2	VGS=0V, IS=10A	-	-	1.2	V

#### Notes:

- 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 =80V,VGS =10V,L=0.1mH,I AS =7A
- 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

## 100V N-Channel Enhancement Mode MOSFET

### Typical Characteristics

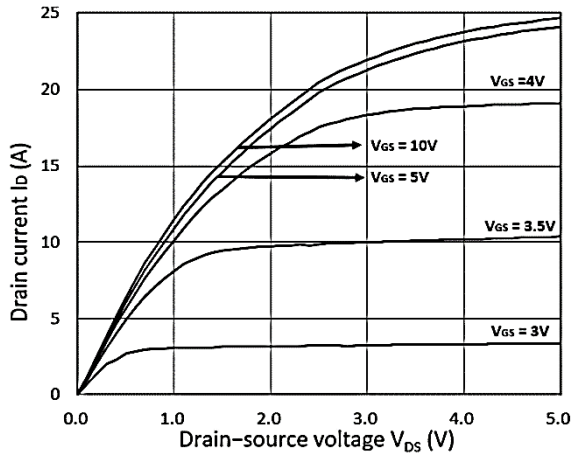


Figure 1. Output Characteristics

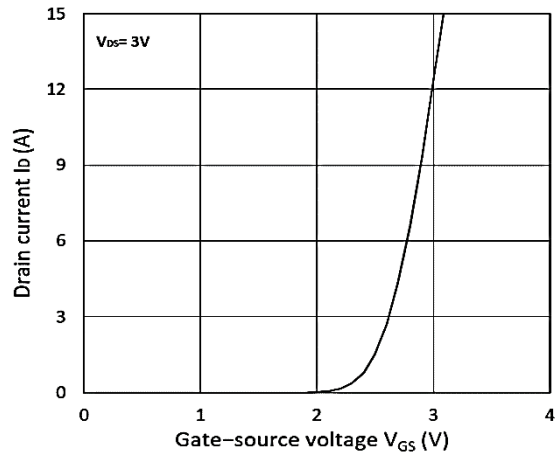


Figure 2. Transfer Characteristics

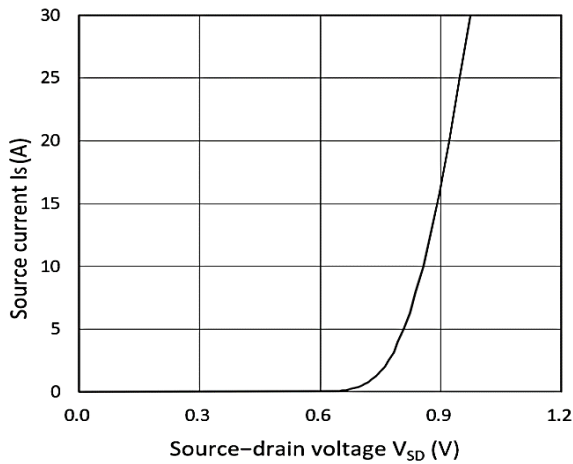


Figure 3. Forward Characteristics of Reverse

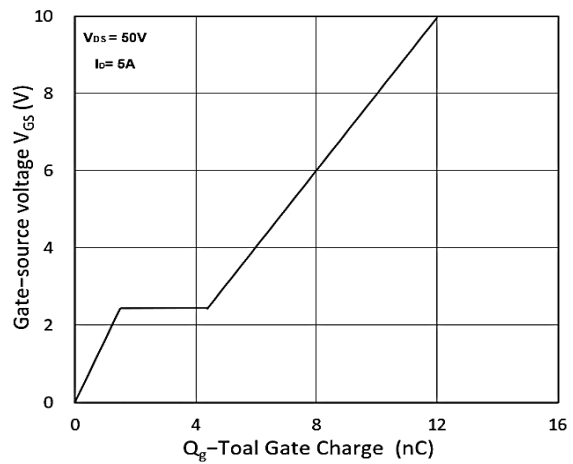


Figure 4. Gate Charge Characteristics

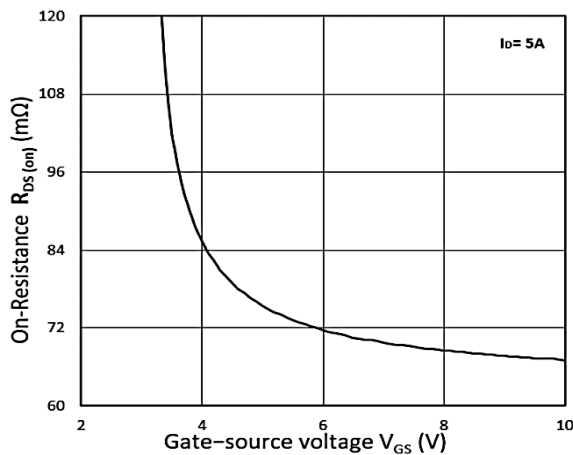


Figure 5.  $R_{DS(on)}$  vs.  $V_{GS}$

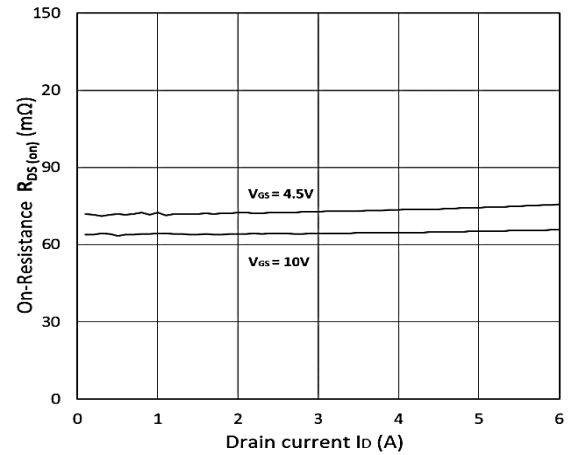


Figure 6.  $R_{DS(on)}$  vs.  $I_D$

## 100V N-Channel Enhancement Mode MOSFET

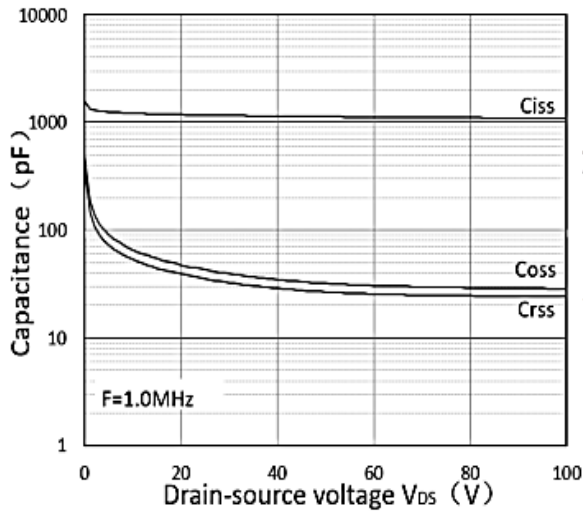


Figure 7. Capacitance Characteristics

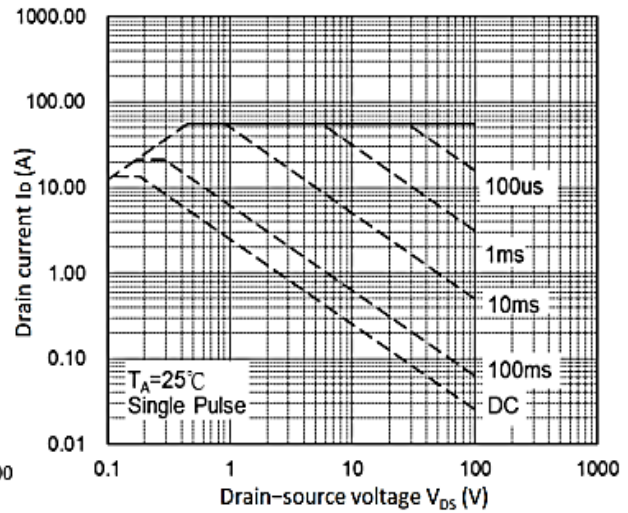


Figure 8. Safe Operating Area

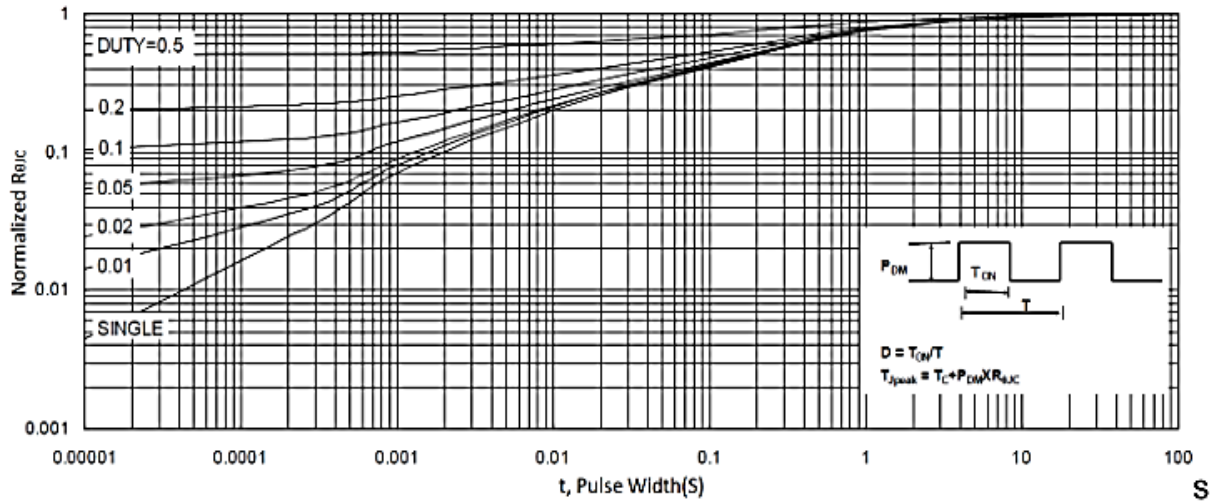


Figure 9. Normalized Maximum Transient Thermal Impedance

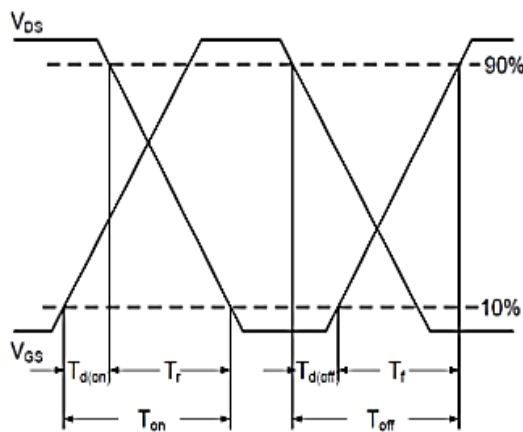


Figure 10. Switching Time Waveform

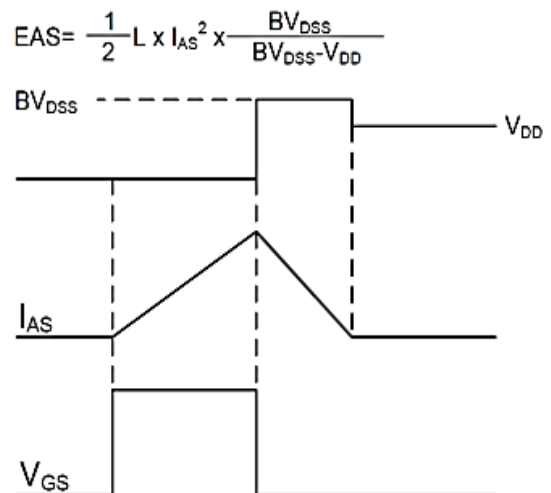
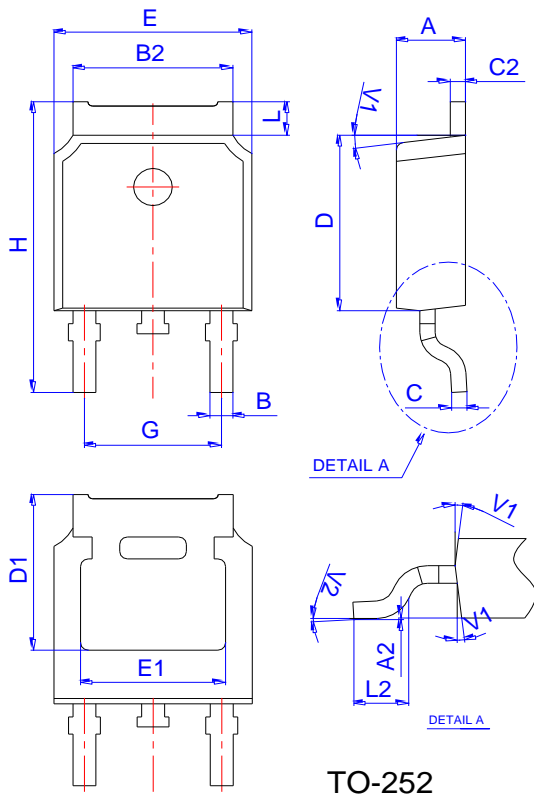


Figure 11. Unclamped Inductive Switching Waveform



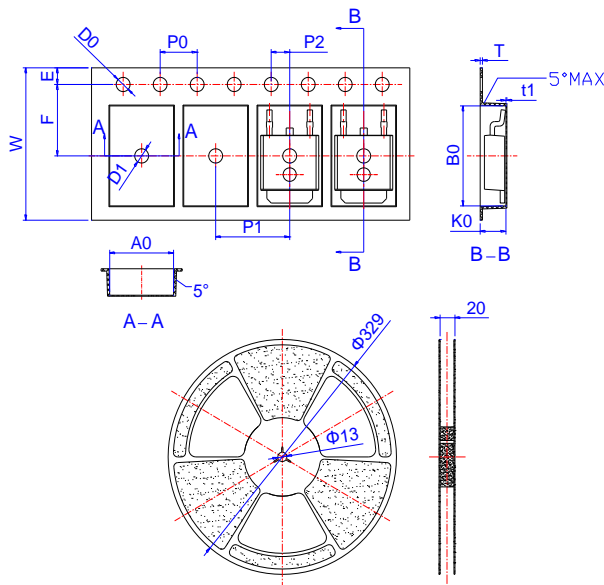
## 100V N-Channel Enhancement Mode MOSFET

### Package Mechanical Data



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

## 100V N-Channel Enhancement Mode MOSFET

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**100V N-Channel Enhancement Mode MOSFET**

Edition	Date	Change
Rve1.0	2020/1/31	Initial release

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