

## 100V N-Channel Enhancement Mode MOSFET

### Description

The AP150N10P/T uses advanced **APM-SGT<sub>11</sub>** 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

$V_{DS} = 100V$   $I_D = 150A$

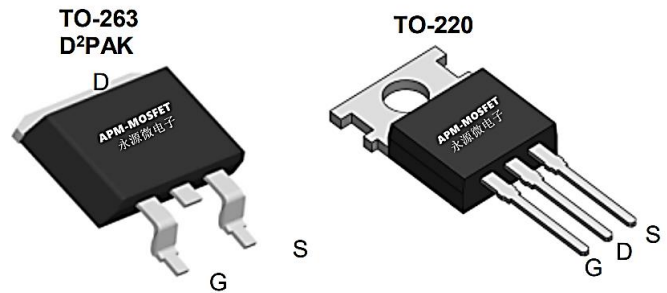
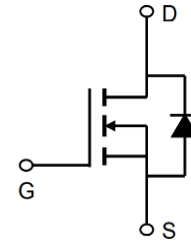
$R_{DS(ON)} < 5.5m\Omega @ V_{GS}=10V$  (Type: 4.2m $\Omega$ )

### Application

DC/DC Converter

LED Backlighting

Power Management Switches



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP150N10P	TO-220-3L	AP150N10P XXX YYYY	1000
AP150N10T	TO-263-3L	AP150N10T XXX YYYY	800

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V$	150	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V$	110	A
IDM	Pulsed Drain Current	420	A
EAS	Single Pulse Avalanche Energy	250	mJ
IAS	Avalanche Current	53.4	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	148	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	0.84	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	62	$^\circ\text{C/W}$



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### Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise noted)

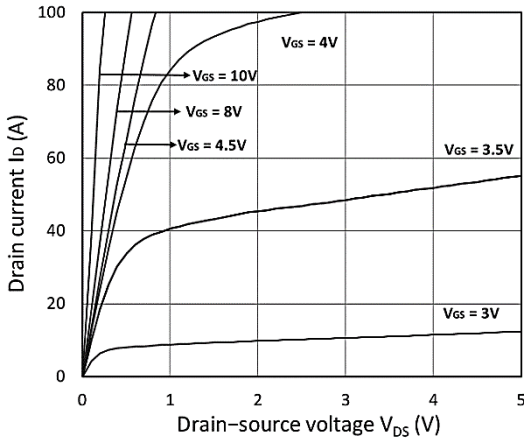
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VDSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	100	-	-	V
IGSS	Gate-body Leakage current	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
IDSS	Zero Gate Voltage Drain Current T <sub>J</sub> =25°C	V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V	-	-	1	μA
IDSS	Zero Gate Voltage Drain Current T <sub>J</sub> =100°C		-	-	100	
VGS(th)	Gate-Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0	2.9	4.0	V
RDS(on)	Drain-Source on-Resistance <sup>2</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A	-	4.2	5.5	mΩ
Ciss	Input Capacitance	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V, f = 1MHz	-	4400	-	pF
Coss	Output Capacitance		-	645	-	
Crss	Reverse Transfer Capacitance		-	20	-	
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz	-	1.7	-	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 50V, I <sub>D</sub> =20A	-	75	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	17	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	13	-	
td(on)	Turn-on Delay Time	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 50V, R <sub>G</sub> = 3Ω, I <sub>D</sub> = 20A	-	15.4	-	ns
t <sub>r</sub>	Rise Time		-	13	-	
td(off)	Turn-off Delay Time		-	34	-	
t <sub>f</sub>	Fall Time		-	6.2	-	
VSD	Diode Forward Voltage <sup>2</sup>	I <sub>F</sub> = 20A, V <sub>GS</sub> = 0V	-	-	1.2	V
IS	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	-	-	95	A
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> = 20A, dI/dt=100A/μs	-	55	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	101	-	nC

#### Notes:

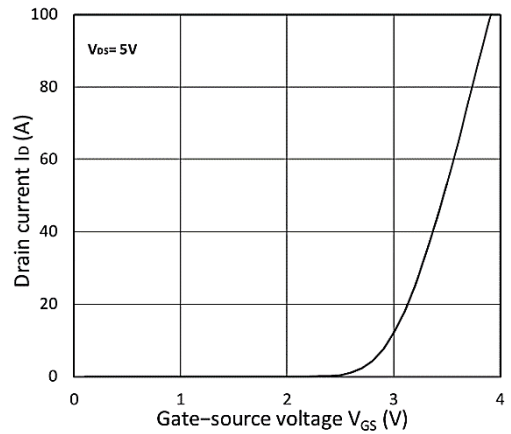
- 1、 The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、 The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, L=0.4mH, I<sub>AS</sub>=32A
- 4、 The power dissipation is limited by 150°C junction temperature
- 5、 The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.

### Typical Characteristics

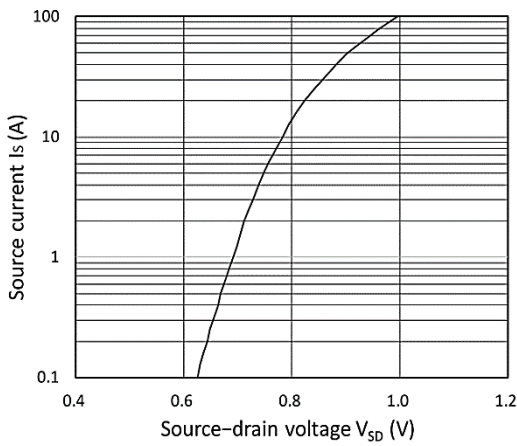
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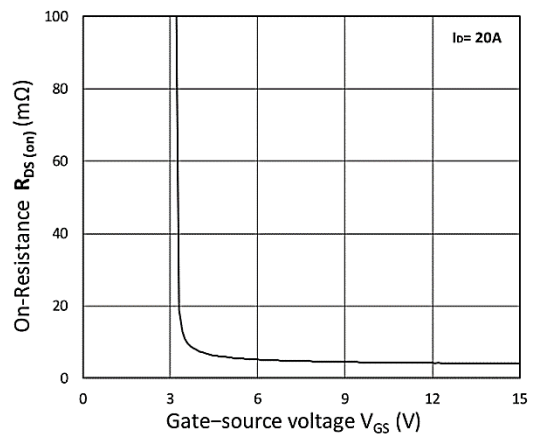
**Figure 1. Output Characteristics**



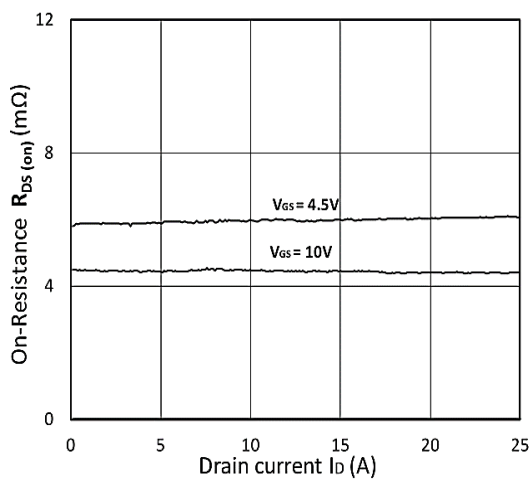
**Figure 2. Transfer Characteristics**



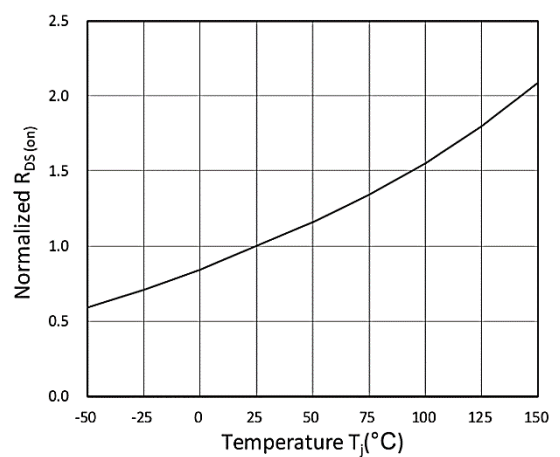
**Figure 3. Forward Characteristics of Reverse**



**Figure 4. RDS(ON) vs. VGS**



**Figure 5. R DS(ON) vs. I D**



**Figure 6. Normalized R DS(on) vs. Temperature**

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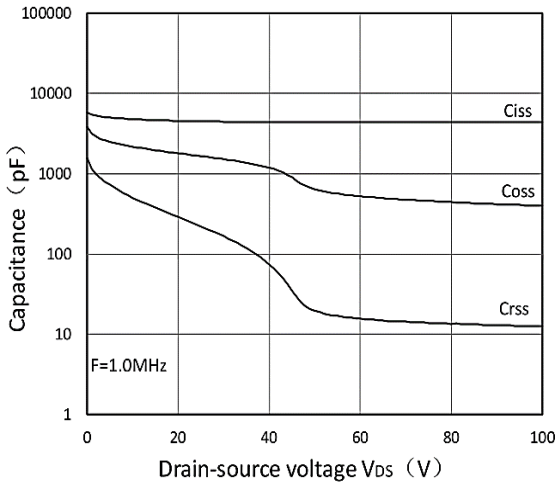


Figure 7. Capacitance Characteristics

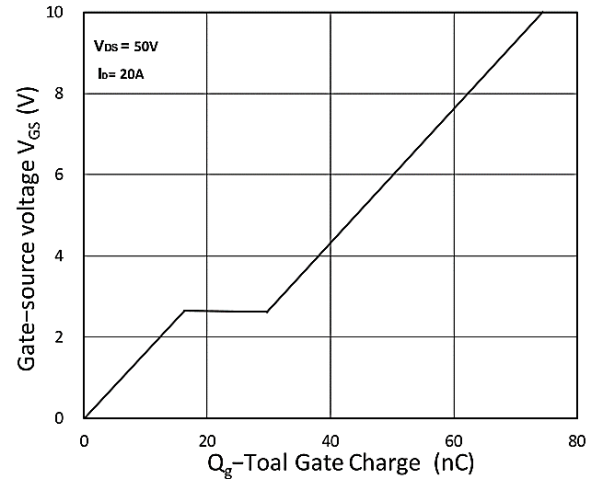


Figure 8. Gate Charge Characteristics

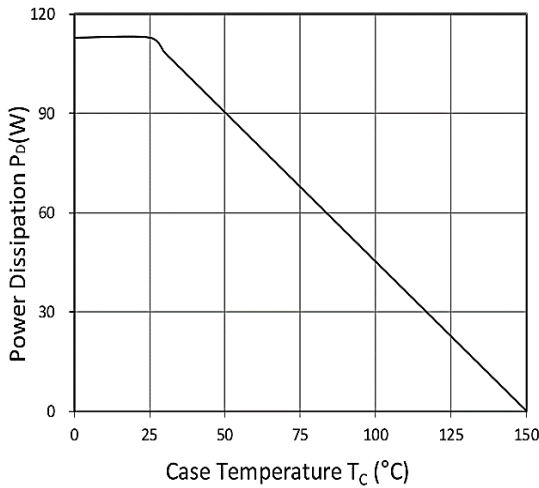


Figure 9. Power Dissipation

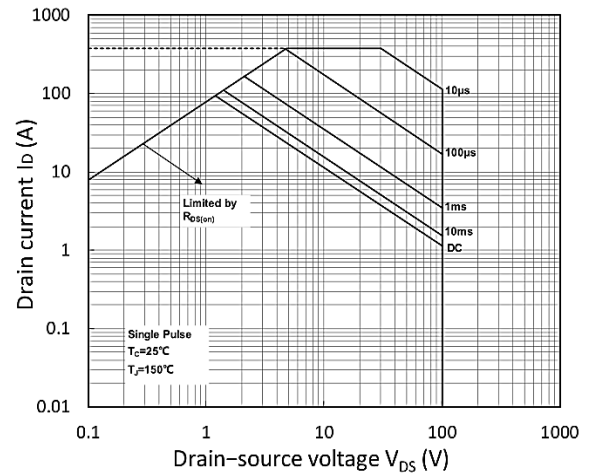


Figure 10. Safe Operating Area

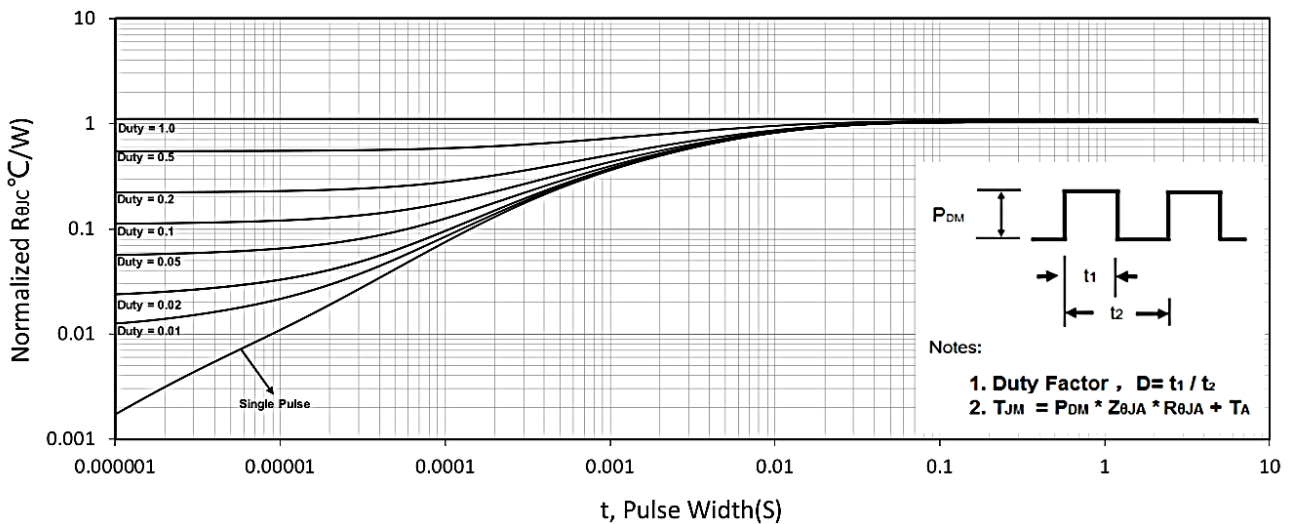
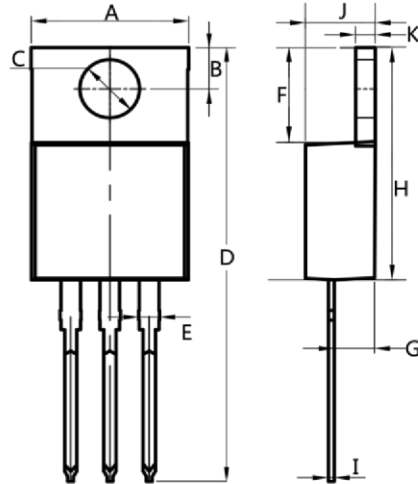


Figure 11. Normalized Maximum Transient Thermal Impedance

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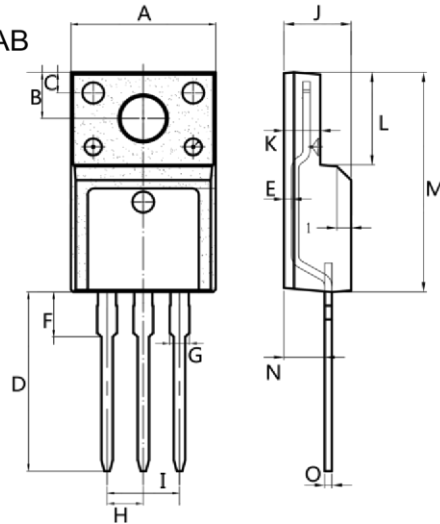
TO-220AB



Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4

All Dimensions in millimeter

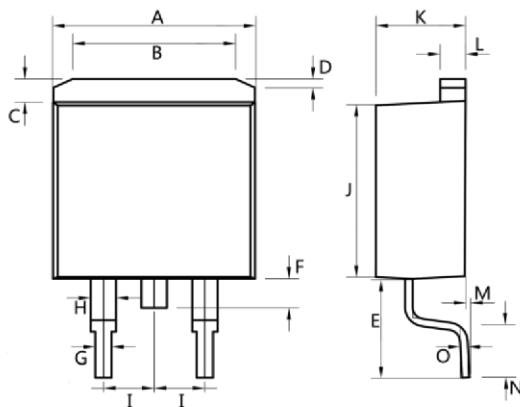
ITO-220AB



Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2.7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60

All Dimensions in millimeter

TO-263



Dim.	Min.	Max.
A	10.0	10.5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	Typ 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45

All Dimensions in millimeter

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Edition	Date	Change
Rve1.0	2021/8/5	Initial release

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