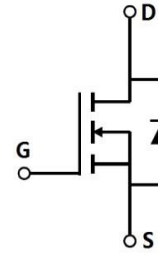


## N-Channel Enhancement Mode MOSFET

### General Description

The AP55N10F uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , device is suitable for use as a Battery protection or in other Switching application.



### General Features

$V_{DS} = 100V$   $I_D = 55A$

$R_{DS(ON)} < 21m\Omega$  @  $V_{GS}=10V$



### Application

Battery protection Load switch

Uninterruptible power supply



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP55N10F	TO-220F-3L	AP55N10F XXX YYYY	1000

### Absolute Maximum Ratings at $T_j=25^\circ C$ unless otherwise noted

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain source voltage	100	V
$V_{GS}$	Gate source voltage	$\pm 20$	V
$I_D$	Continuous drain current <sup>1)</sup> , $T_C=25^\circ C$	55	A
$I_{D, pulse}$	Pulsed drain current <sup>2)</sup> , $T_C=25^\circ C$	110	A
$P_D$	Power dissipation <sup>3)</sup> , $T_C=25^\circ C$	50	W
$E_{AS}$	Single pulsed avalanche energy <sup>5)</sup>	57	mJ
$T_{stg}, T_j$	Operation and storage temperature	-55 to 150	$^\circ C$



## N-Channel Enhancement Mode MOSFET

**Electrical Characteristics** at  $T_j=25\text{ }^\circ\text{C}$  unless otherwise specified

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BVDSS	Drain-source breakdown voltage	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$	100			V
VGS(th)	Gate threshold voltage	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$	1.4		2.5	V
RDS(ON)	Drain-source on-state resistance	$V_{GS}=10\text{ V}, I_D=10\text{ A}$		15	21	m $\Omega$
RDS(ON)	Drain-source on-state resistance	$V_{GS}=4.5\text{ V}, I_D=7\text{ A}$		20	26	m $\Omega$
IGSS	Gate-source leakage current	$V_{GS}=20\text{ V}$			100	nA
		$V_{GS}=-20\text{ V}$			-100	
IDSS	Drain-source leakage current	$V_{DS}=100\text{ V}, V_{GS}=0\text{ V}$			1	$\mu\text{A}$
Ciss	Input capacitance	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V},$ $f=100\text{ kHz}$		1003.9		pF
Coss	Output capacitance			185.4		pF
Crss	Reverse transfer capacitance			9.8		pF
td(on)	Turn-on delay time	$V_{GS}=10\text{ V},$ $V_{DS}=50\text{ V},$ $R_G=10\text{ }\Omega,$ $I_D=5\text{ A}$		16.6		ns
t <sub>r</sub>	Rise time			3.8		ns
td(off)	Turn-off delay time			75.5		ns
t <sub>f</sub>	Fall time			46		ns
Q <sub>g</sub>	Total gate charge	$I_D=5\text{ A},$ $V_{DS}=50\text{ V},$ $V_{GS}=10\text{ V}$		16.2		nC
Q <sub>gs</sub>	Gate-source charge			2.8		nC
Q <sub>gd</sub>	Gate-drain charge			4.1		nC
V <sub>plateau</sub>	Gate plateau voltage			3		V
I <sub>S</sub>	Diode forward current	$V_{GS}<V_{th}$			16	A
ISP	Pulsed source current				48	
VSD	Diode forward voltage	$I_S=123^4\text{ A}, V_{GS}=0\text{ V}$			1.3	V
trr	Reverse recovery time	$I_S=5\text{ A}, di/dt=100$ $\text{A}/\mu\text{s}$		49		ns
Q <sub>rr</sub>	Reverse recovery charge			61.8		nC
I <sub>rrm</sub>	Peak reverse recovery current			2.4		A

1. Calculated continuous current based on maximum allowable junction temperature.

2. Repetitive rating; pulse width limited by max. junction temperature.

3. Pd is based on max. junction temperature, using junction-case thermal resistance.

4. The value of R<sub>θJA</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>a</sub>=25 °C.

5. V<sub>DD</sub>=50 V, R<sub>G</sub>=50 Ω, L=0.3 mH, starting T<sub>j</sub>=25 °C.

## N-Channel Enhancement Mode MOSFET

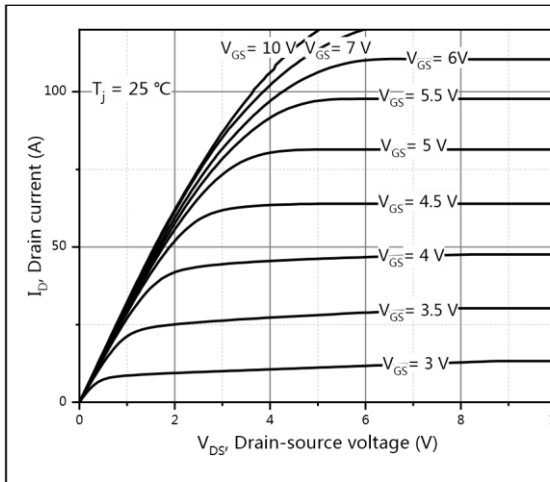


Figure 1, Typ. output characteristics

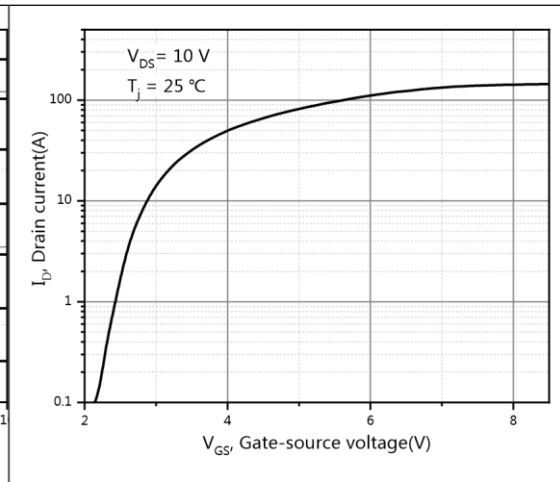


Figure 2, Typ. transfer characteristics

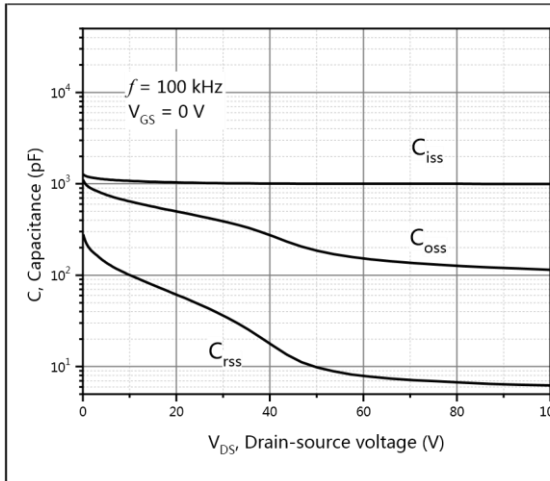


Figure 3, Typ. capacitances

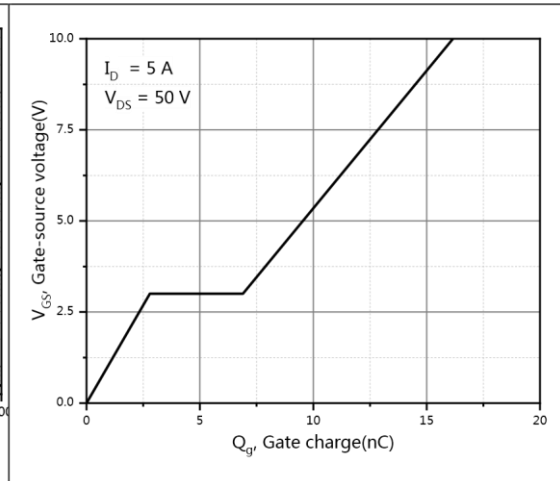


Figure 4, Typ. gate charge

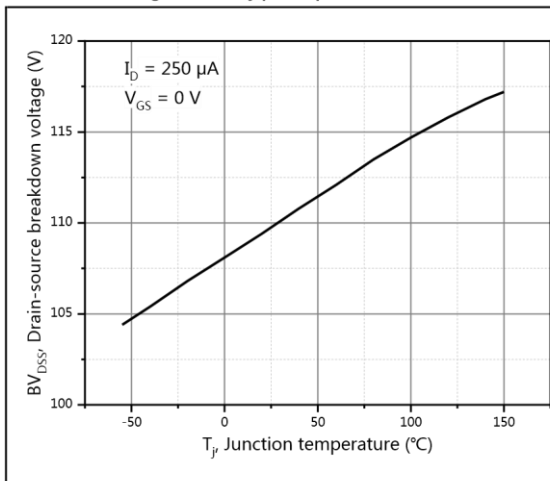


Figure 5, Drain-source breakdown voltage

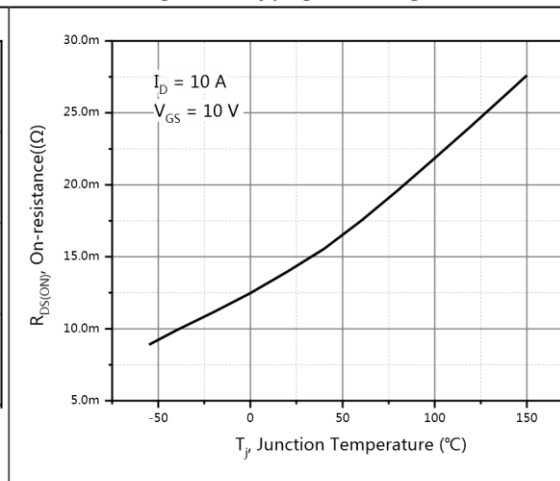


Figure 6, Drain-source on-state resistance

## N-Channel Enhancement Mode MOSFET

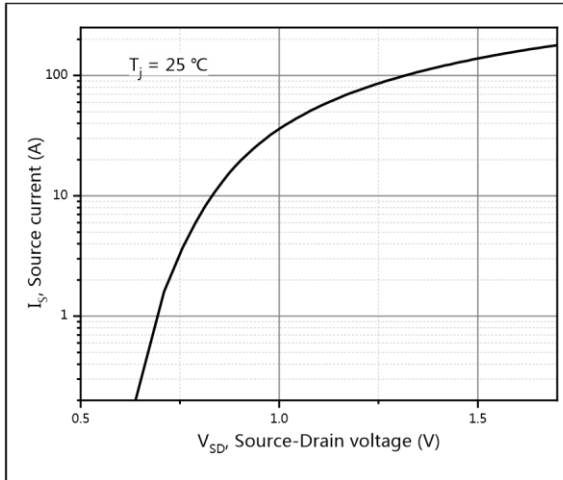


Figure 7, Forward characteristic of body diode

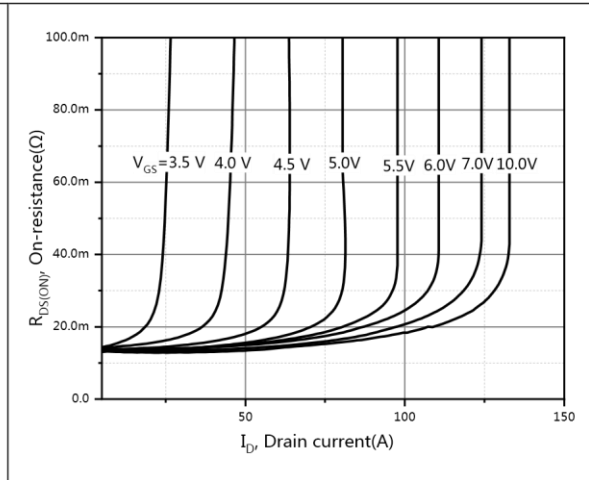


Figure 8, Drain-source on-state resistance

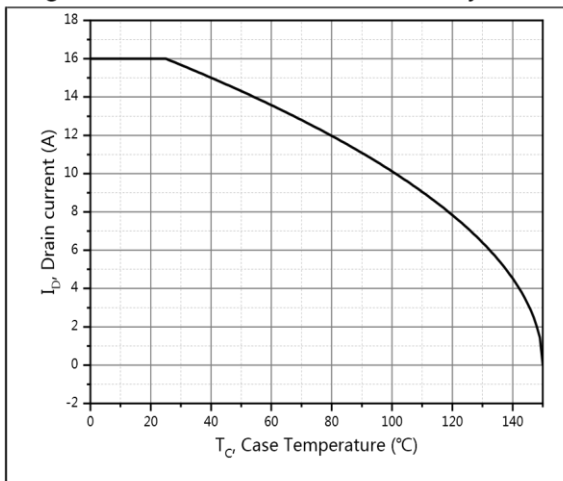


Figure 9, Drain current

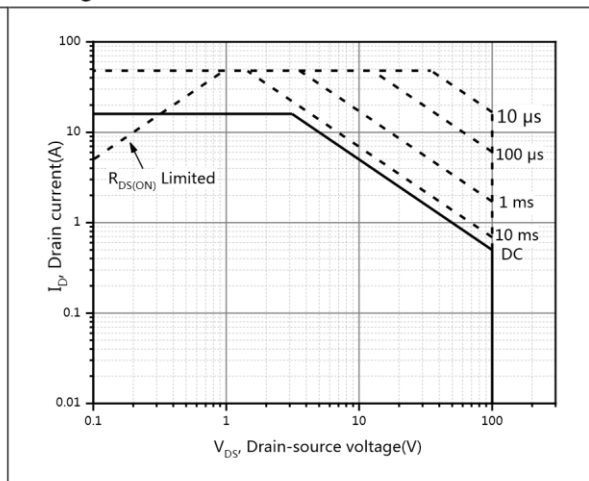
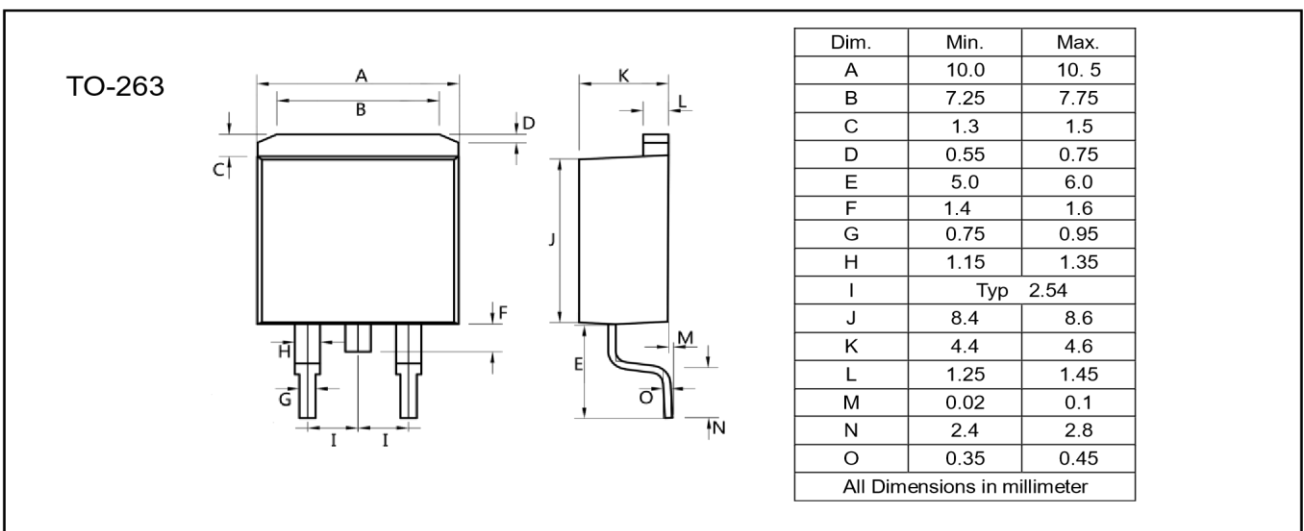
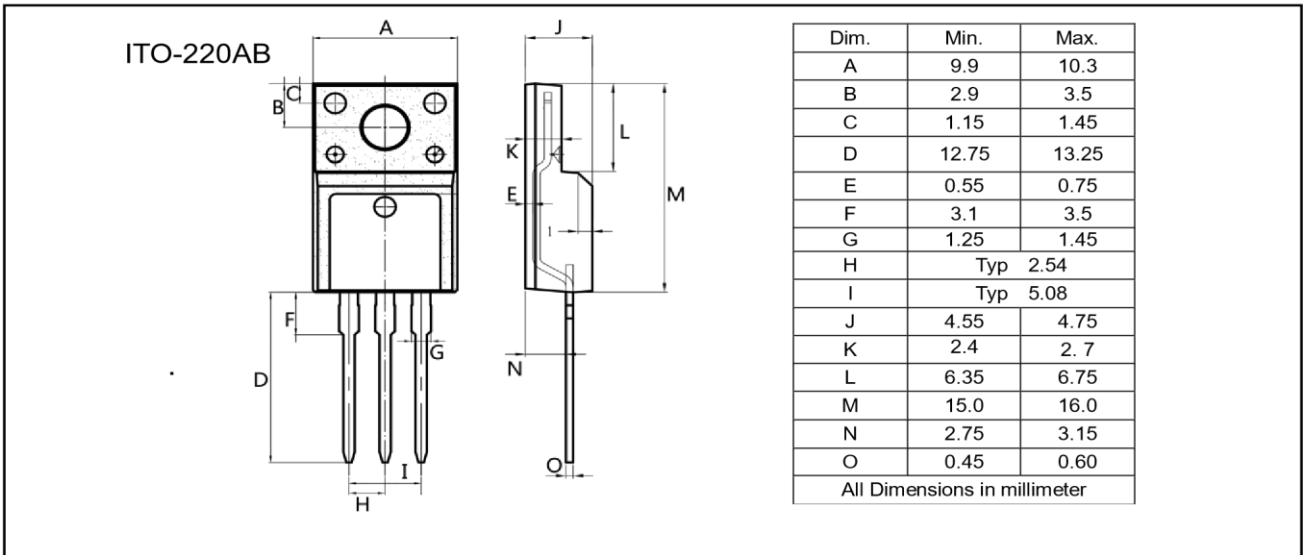
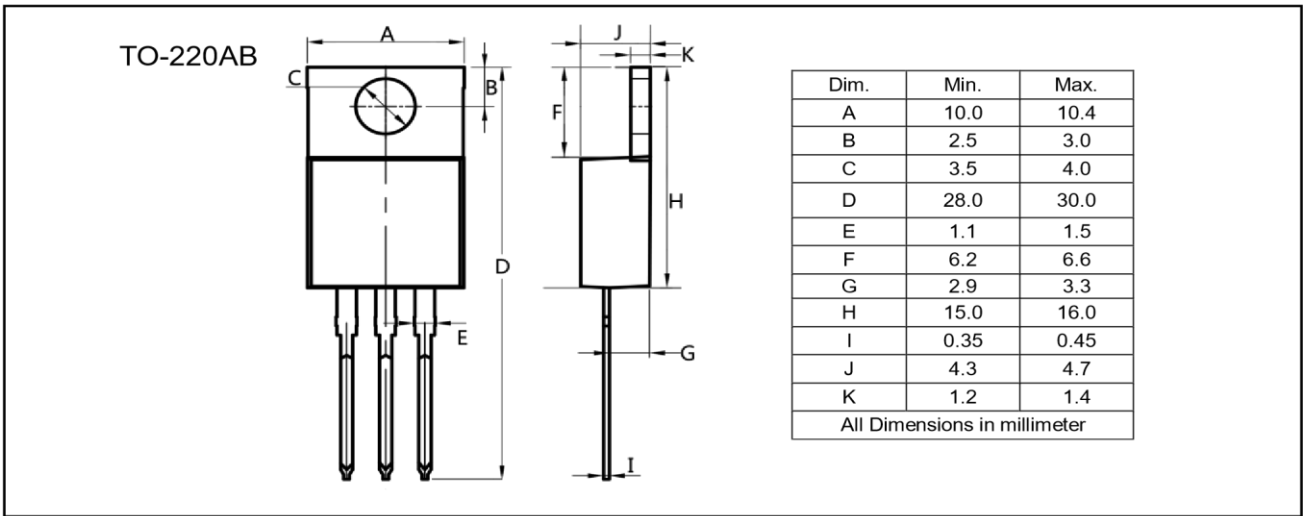


Figure 10, Safe operation area  $T_C=25\text{ }^\circ\text{C}$

## N-Channel Enhancement Mode MOSFET



## **N-Channel Enhancement Mode MOSFET Attention**

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## N-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2019/12/31	Initial release

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