

## 65V N-Channel Enhancement Mode MOSFET

### Description

The AP120N06P/T uses advanced trench 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

$V_{DS} = 65V$   $I_D = 125A$

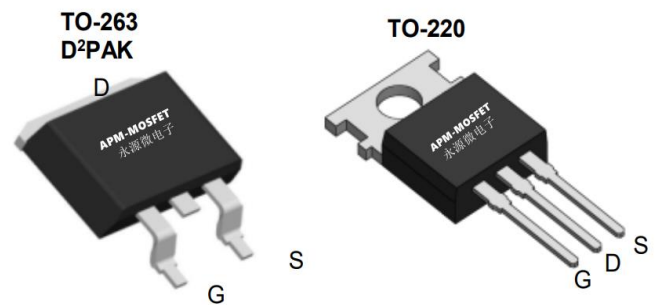
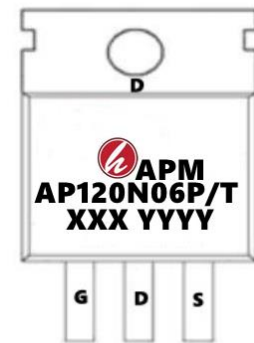
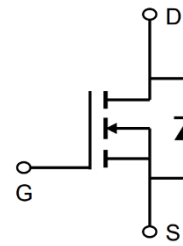
$R_{DS(ON)} < 5.6m\Omega @ V_{GS}=10V$  (Type: 4.8m $\Omega$ )

### Application

Battery protection

Load switch

Uninterruptible power supply



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP120N06P	TO-220-3L	AP120N06P XXX YYYY	1000
AP120N06T	TO-263-3L	AP120N06T XXX YYYY	800

### Absolute Maximum Ratings@ $T_j=25^\circ C$ (unless otherwise specified)

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain source voltage	65	V
V <sub>GS</sub>	Gate source voltage	±25	V
I <sub>D</sub>	Continuous drain current <sup>1)</sup>	125	A
I <sub>DM</sub>	Pulsed drain current <sup>2)</sup>	492	A
I <sub>AS</sub>	Diode forward current	55	A
P <sub>D</sub>	Power dissipation	172	W
E <sub>AS</sub>	Single pulsed avalanche energy <sup>3)</sup>	225	mJ
T <sub>stg</sub> , T <sub>j</sub>	Operation and storage temperature	-55 to 150	°C
R $\theta$ JC	Thermal resistance, junction-case	1.4	°C/W
R $\theta$ JA	Thermal resistance, junction-ambient <sup>4)</sup>	62.5	°C/W



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

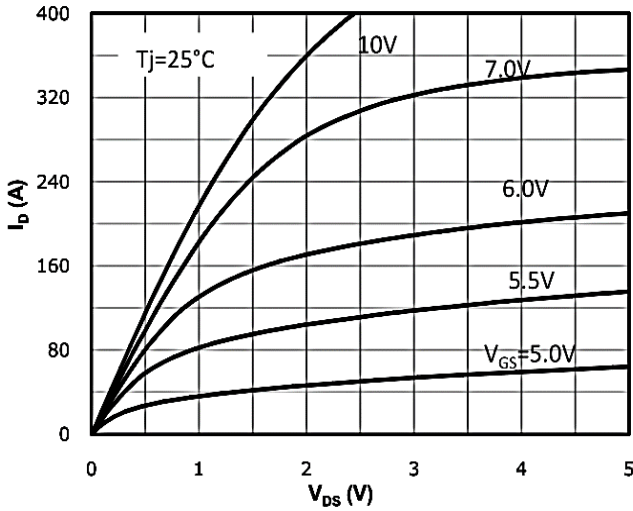
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	65	72	-	V
IDSS	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0	2.8	4.0	V
RDS(on)	Static Drain-Source on-Resistance note	V <sub>GS</sub> =10V, I <sub>D</sub> =55A	-	4.8	5.6	mΩ
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1.0MHz	-	3135	-	pF
C <sub>oss</sub>	Output Capacitance		-	521	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	306	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =55A, V <sub>GS</sub> =10V	-	77	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	18	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	30	-	nC
td(on)	Turn-on Delay Time	V <sub>DS</sub> =30V, I <sub>D</sub> =55A, R <sub>G</sub> =1.8Ω, V <sub>GS</sub> =10V	-	15	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	89	-	ns
td(off)	Turn-off Delay Time		-	36	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	91	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	123	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	492	A
VSD	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> =550A, dI/dt=100A/μs	-	32	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	31	-	nC

#### Note :

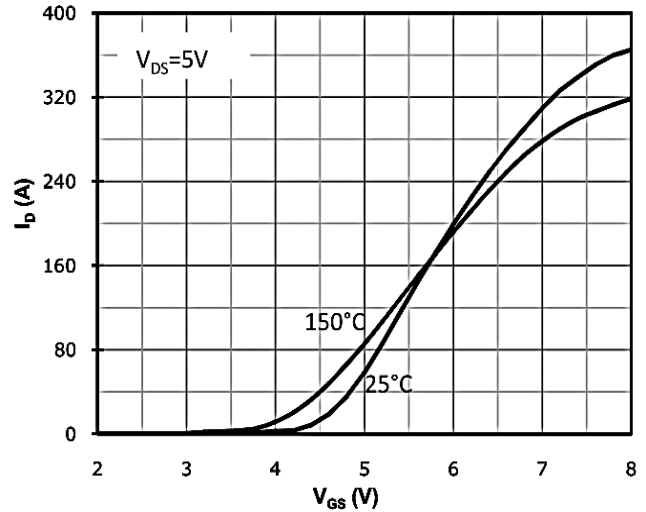
- 1、 The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3、 The test cond ≅ 300us duty cycle ≅ 2%, duty cycle ition is T<sub>J</sub> =25°C, VDD =35V, VG =10V, R G =25Ω, L=0.5mH, IAS =55A
- 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.

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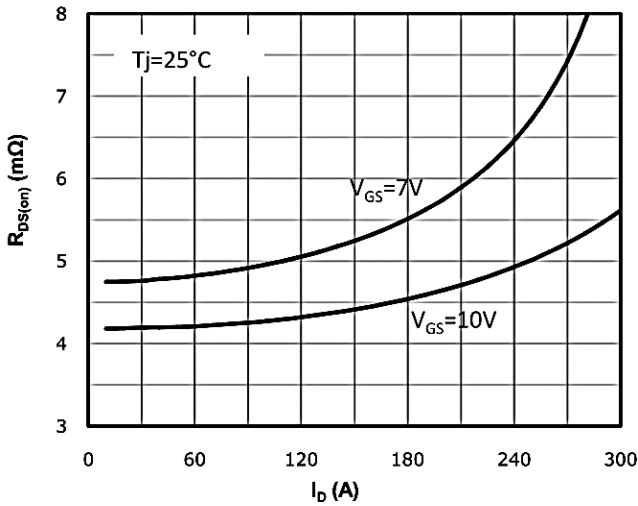
**Electrical Characteristics Diagrams**



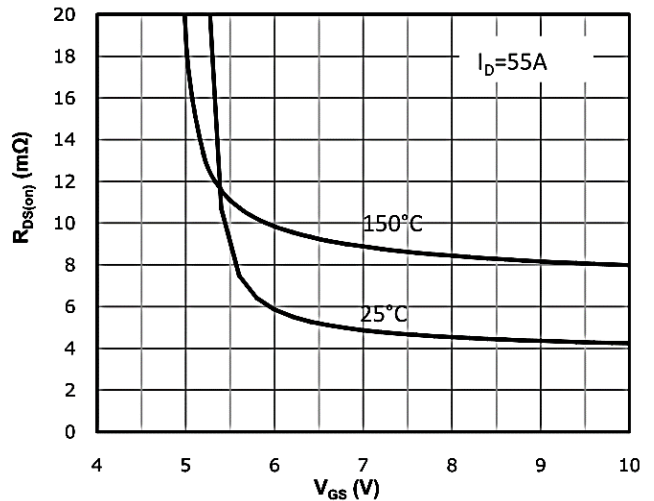
**Figure 1: Output Characteristics**



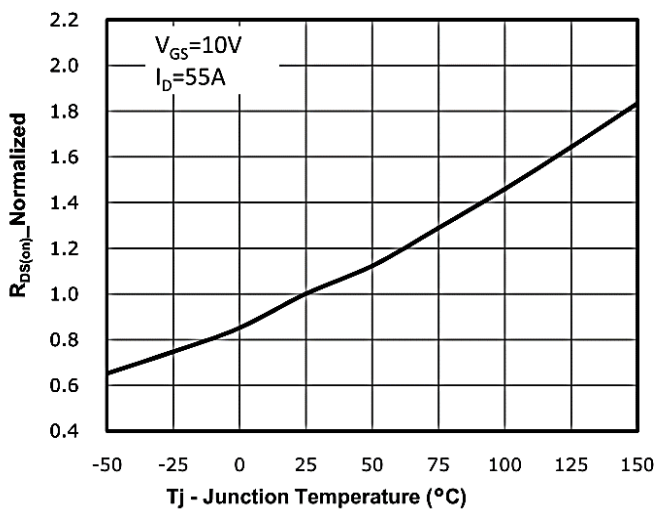
**Figure 2: Typical Transfer Characteristics**



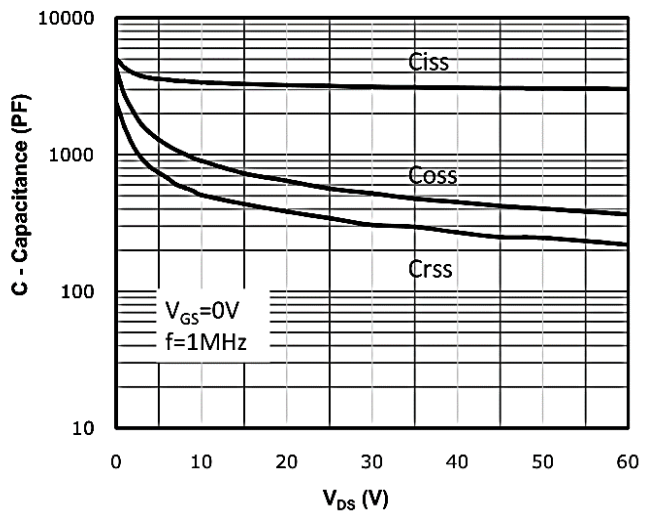
**Figure 3: Rds(on) vs Drain Current and**



**Figure 4: Rds(on) vs Gate Voltage**



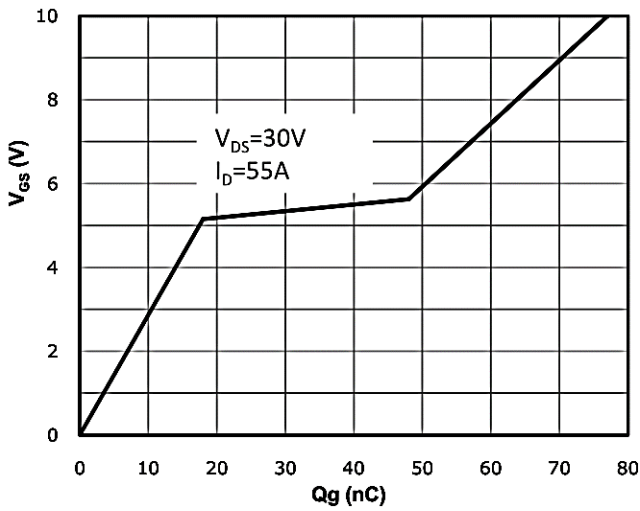
**Figure 5: Rds(on) vs. Temperature**



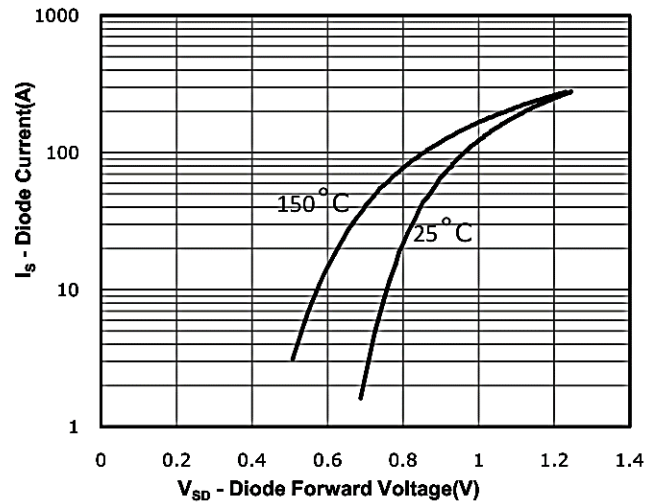
**Figure 6: Capacitance Characteristics**



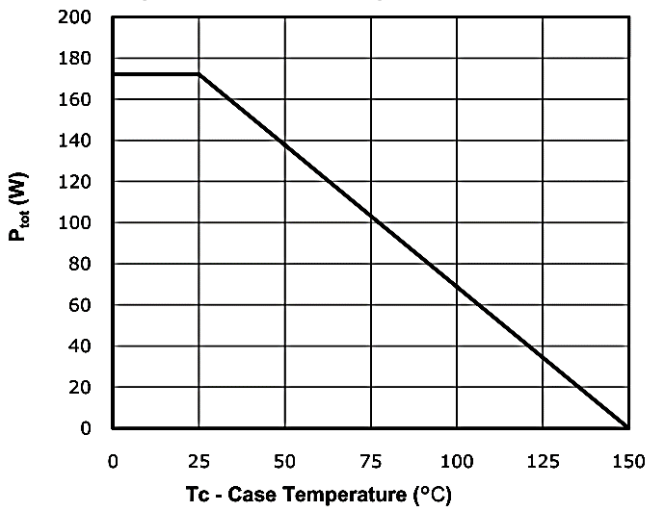
**65V N-Channel Enhancement Mode MOSFET**



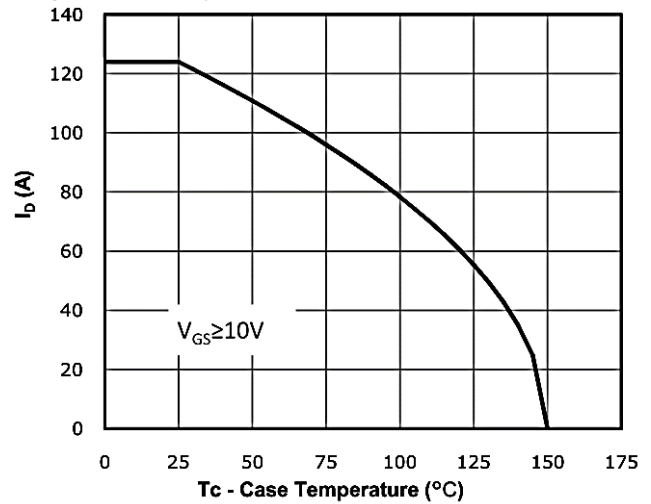
**Figure 7: Gate Charge Characteristics**



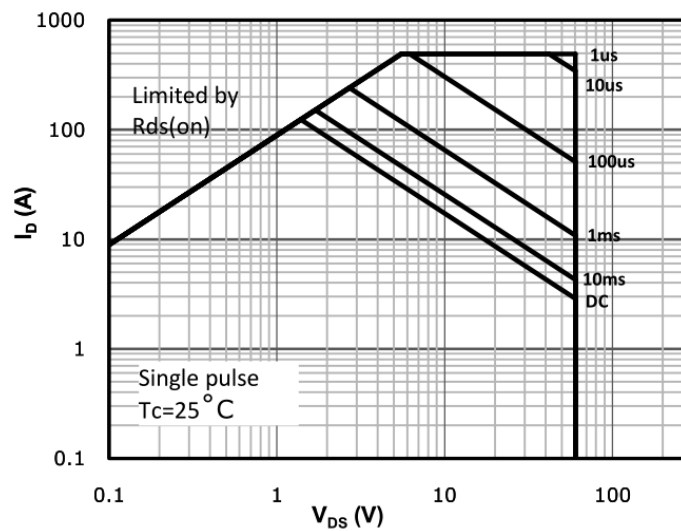
**Figure 8: Body-diode Forward Characteristics**



**Figure 9: Power Dissipation**



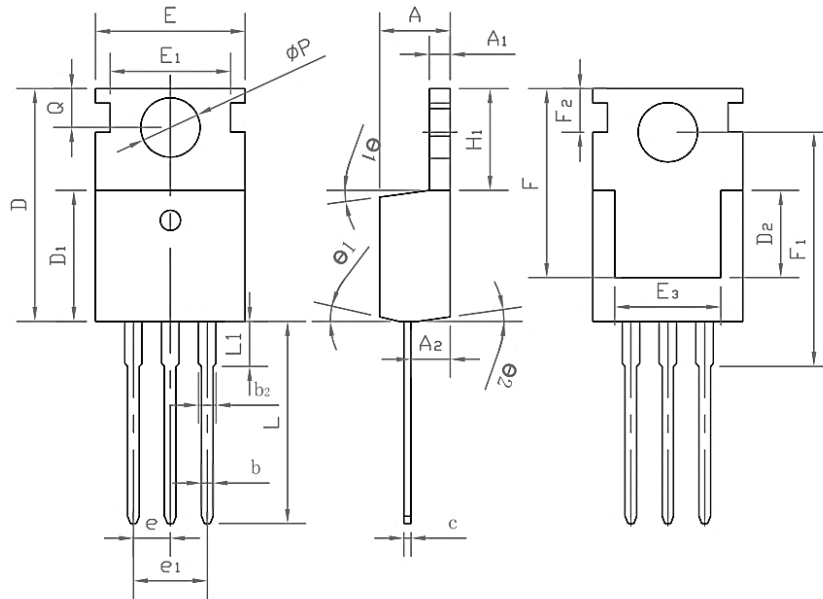
**Figure 10: Drain Current Derating**



**Figure.11: Safe Operating Area**

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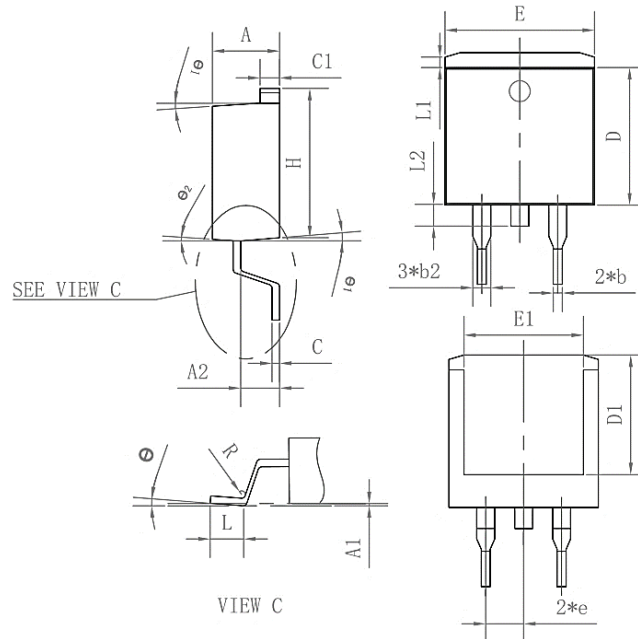
### Package Mechanical Data-TO-220-3L-SLK



Symbol	Common		
	mm		
	Mim	Nom	Max
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
D	0.40	0.50	0.65
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.63	10.00	10.35
E3	7.00	8.00	8.40
e		0.37	
e1		0.10	
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
Φp	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ1	4°	7°	10°
θ2	0°	3°	6°
F	13.30	13.50	13.70
F1	15.50	15.90	16.30
F2	2.80	3.00	3.20

## 65V N-Channel Enhancement Mode MOSFET

### Package Mechanical Data-TO-263-3L-SLK



Symbol	Common		
	mm		
	Mim	Nom	Max
A	4.35	4.47	4.60
A1	0.09	0.10	0.11
A2	2.30	2.40	2.70
b	0.70	0.80	1.00
b2	1.25	1.36	1.50
C	0.45	0.50	0.65
C1	1.29	1.30	9.40
D	9.10	9.20	9.30
D1	7.90	8.00	8.10
E	9.85	10.00	10.20
E1	7.90	8.00	8.10
H	15.30	15.50	15.70
e	-	2.54	-
L	2.34	2.54	2.74
L1	1.00	1.10	1.20
L2	1.30	1.40	1.50
R	0.24	0.25	0.26
theta	0°	4°	8°
theta1	4°	7°	10°
theta2	0°	3°	6°

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## 65V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2021/12/14	Initial release

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