

-60V P-Channel Enhancement Mode MOSFET

Description

The AP80P06P/T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 6V. This device is suitable for use as a Battery protection or in other Switching application.

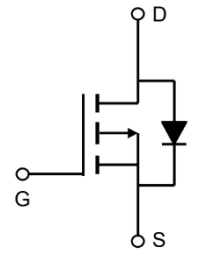
General Features

$V_{DS} = -60V$ $I_D = -82A$

$R_{DS(ON)} < -12m\Omega$ @ $V_{GS} = -10V$ (Type: $10m\Omega$)

Application

Lithium battery protection
 Switching Mode Power Supply
 UPS



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP80P06P	TO-220-3L	AP80P06P XXX YYYY	1000
AP80P06T	TO-263-3L	AP80P06T XXX YYYY	800

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-82	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-52	A
I_{DM}	Pulsed Drain Current ²	-328	A
EAS	Single Pulse Avalanche Energy ³	450	mJ
I_{AS}	Avalanche Current	52	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation ⁴	110	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	0.70	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	60	$^\circ C/W$

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Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-60	-68	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.035	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-20A	---	10	12	mΩ
		V _{GS} =-4.5V, I _D =-15A	---	13	16	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-2.1	-3.0	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	4.28	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-60V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =-60V, V _{GS} =0V, T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-5V, I _D =-20A	---	50	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.0	---	Ω
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-30V, V _{GS} =-10V, I _D =-20A	---	56	---	nC
Q _{gs}	Gate-Source Charge		---	11	---	
Q _{gd}	Gate-Drain Charge		---	9	---	
Td(on)	Turn-On Delay Time	V _{DD} =-30V, V _{GS} =-10V, R _G =3Ω, I _D =-20A	---	4.5	---	ns
T _r	Rise Time		---	2.5	---	
Td(off)	Turn-Off Delay Time		---	14.5	---	
T _f	Fall Time		---	3.8	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	3500	---	pF
C _{oss}	Output Capacitance		---	600	---	
Cr _{ss}	Reverse Transfer Capacitance		---	25	---	
I _s	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-80	A
ISM	Pulsed Source Current ^{2,5}		---	---	-240	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V

Note :

- 1、 The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z 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 =-48V, VGS =-10V, L=0.1mH, IAS =-52A
- 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.

Typical Characteristics

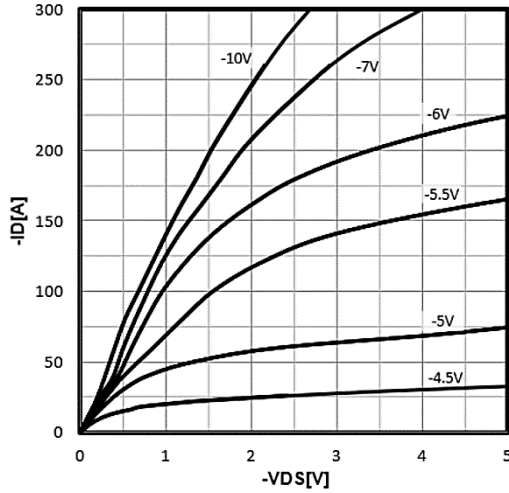


Figure 1. Type. Output Characteristics ($T_j=25\text{ }^\circ\text{C}$)

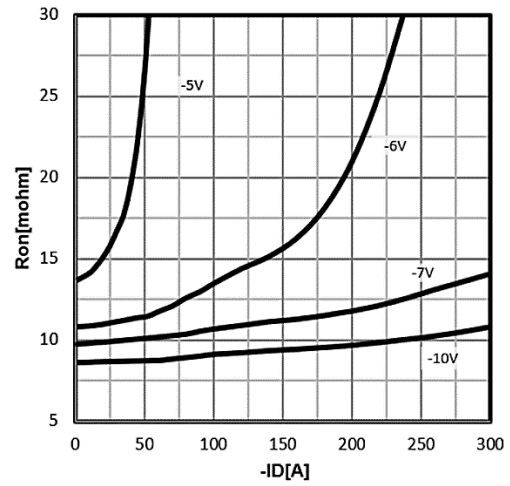


Figure 2. Type. drain-source on resistance

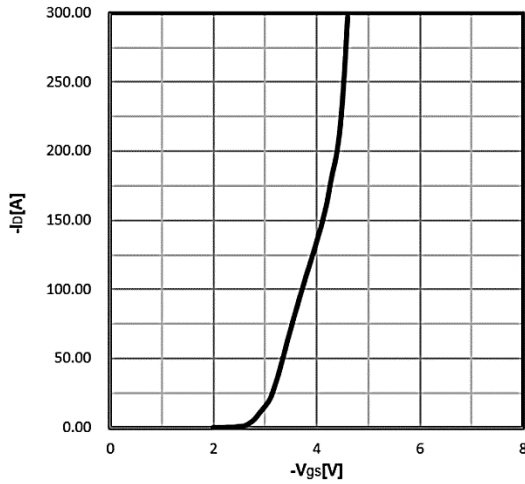


Figure 3. Type. transfer characteristics

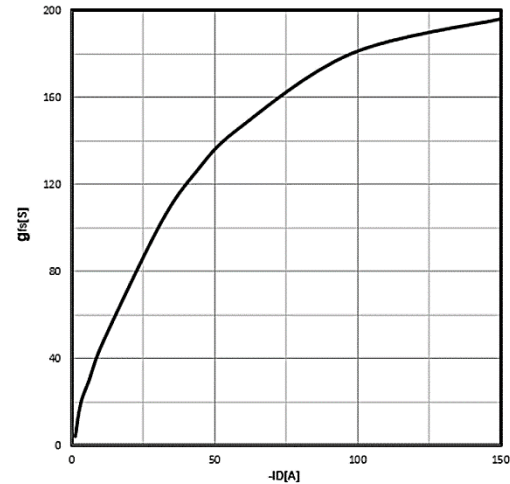


Figure 4. Type. forward transconductance

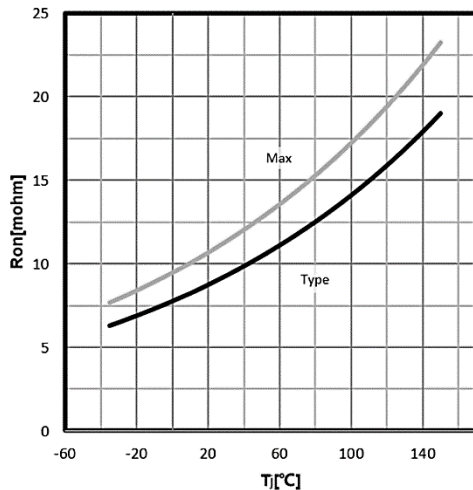


Figure 5. Drain-source on-state resistance $R_{DS(on)} = f(T_j)$; $I_D = 80\text{A}$; $V_{GS} = 10\text{V}$

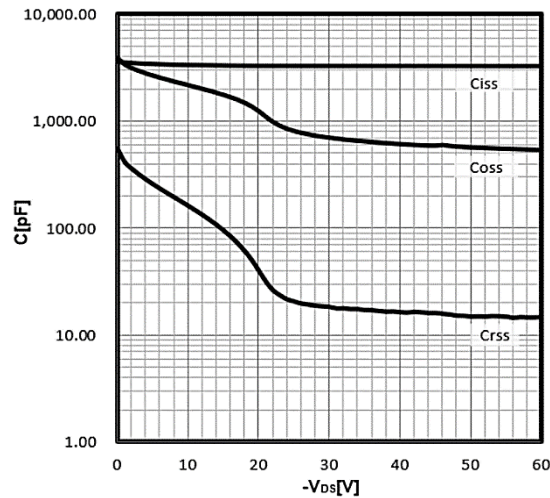


Figure 6. Body-Diode Characteristics $C = f(V_{DS})$; $V_{GS} = 0\text{V}$; $f = 1\text{MHz}$



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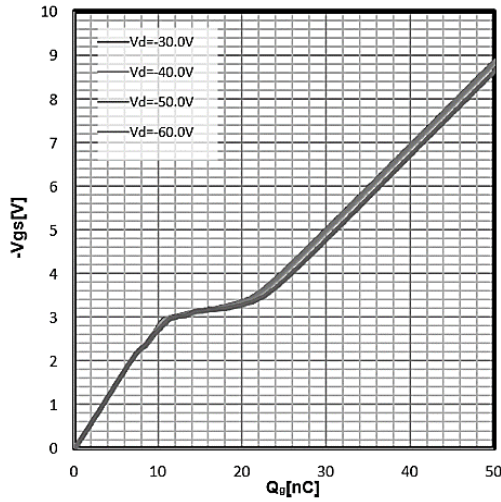


Figure 7. Typ. gate charge
 $V_{GS} = f(Q_{gate}) ; I_D = 20A$

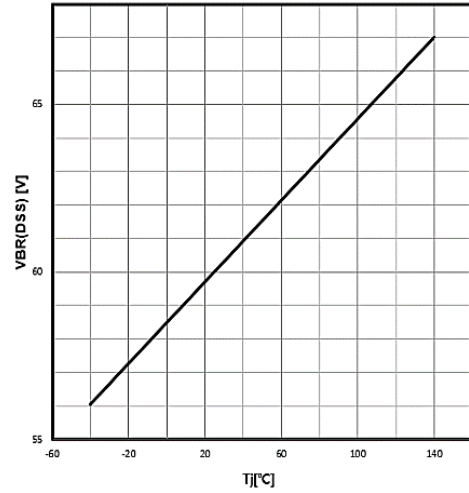


Figure 8. Drain Current Derating
 $V_{BR}(DSS) = f(T_j) ; I_D = 250\mu A$

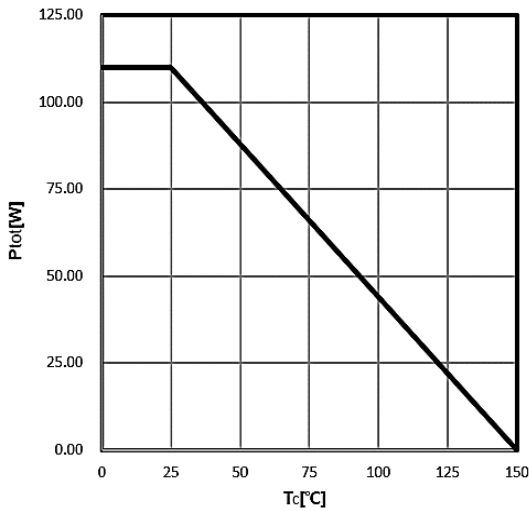


Figure 7. Power Dissipation

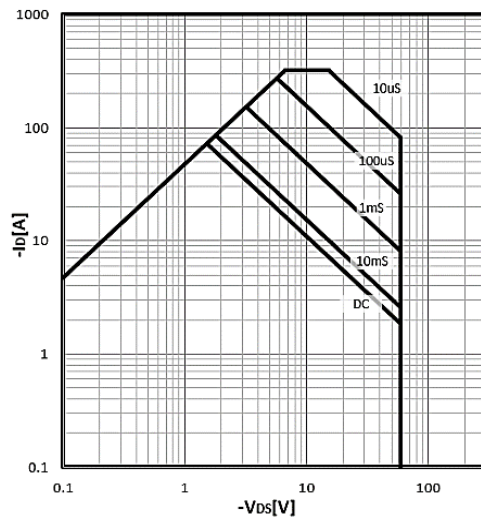


Figure 8. Safe operating area

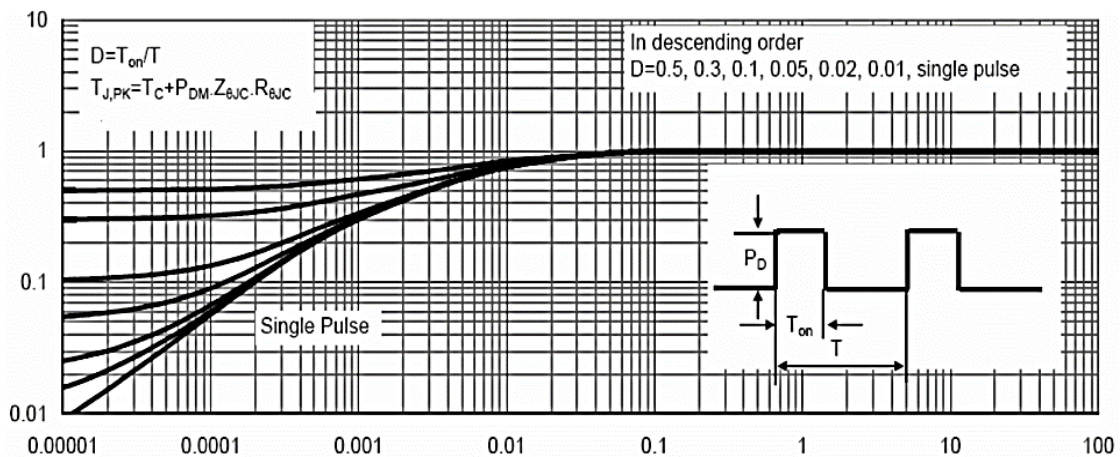
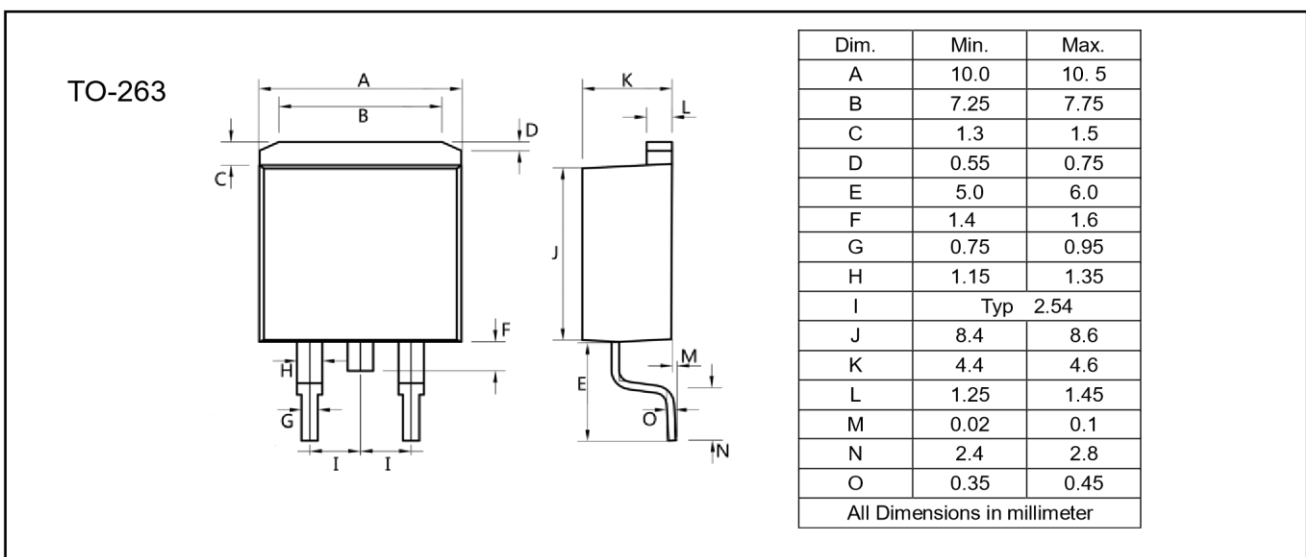
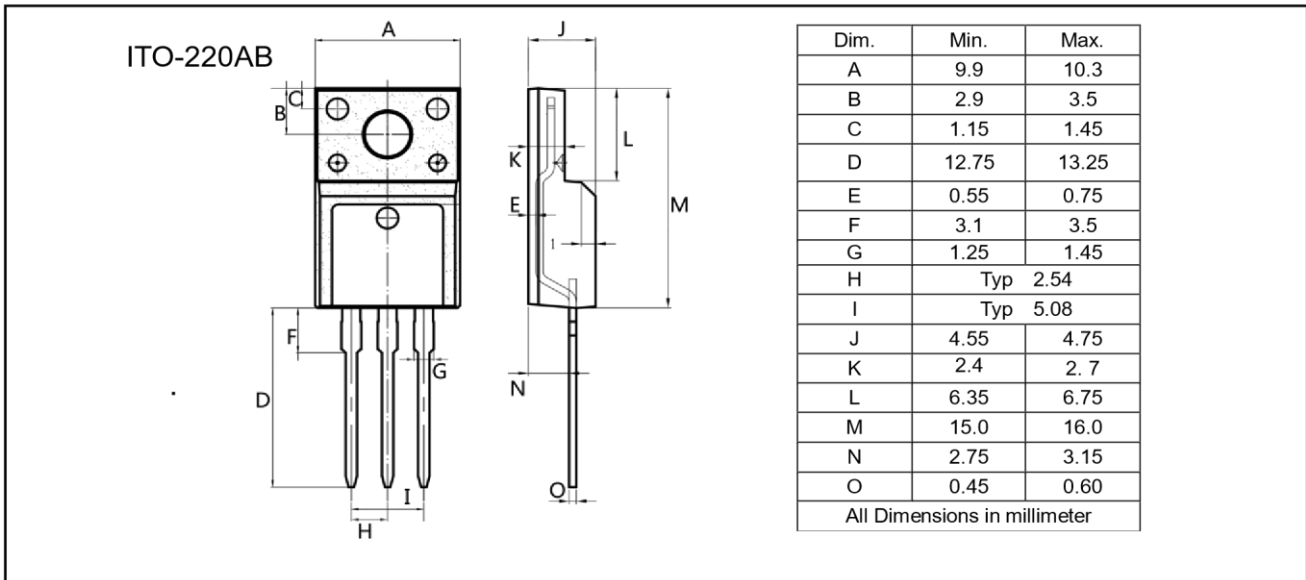
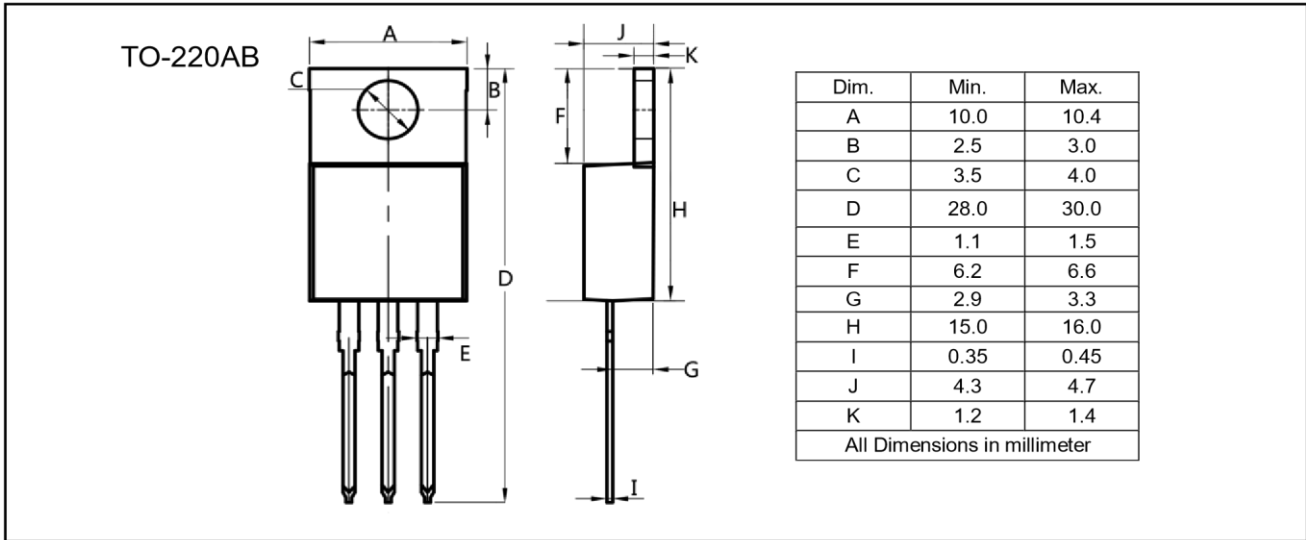


Figure 10. Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

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Edition	Date	Change
Rve1.0	2021/2/31	Initial release

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