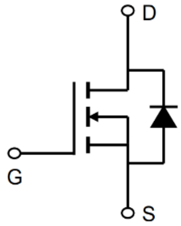
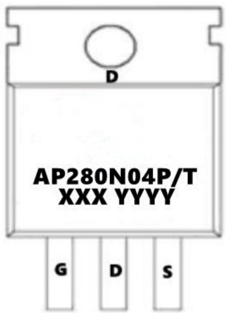
AP280N04P/T

40V N-Channel Enhancement Mode MOSFET

Description



The AP280N04P/T uses advanced **SGT V** 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} = 40V I_D =280A

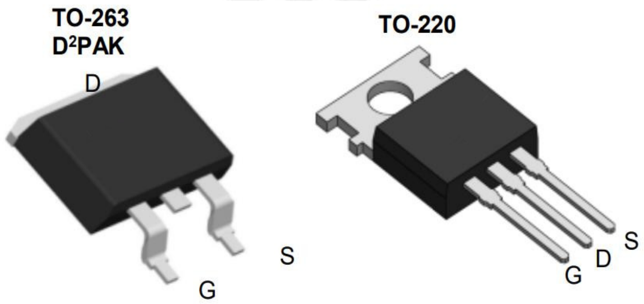
$R_{DS(ON)}$ < 1.5mΩ @ V_{GS}=10V **（Type：1.2mΩ）**

Application

BMS

BLDC

UPS



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP280N04P	TO-220-3L	AP280N04P XXX YYYY	1000
AP280N04T	TO-263-3L	AP280N04T XXX YYYY	800

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	40	V
VGSS	Gate-Source Voltage	±20	V
ID@TC=25℃	Continuous Drain Current, VGS @ 10V1	280	A
ID@TC=100℃	Continuous Drain Current, VGS @ 10V1	200	A
IDM	Pulsed Drain Current	1120	A
EAS	Single Pulsed Avalanche Energy	818	mJ
IAS	Avalanche Current	70	A
PD@TC=25℃	Power Dissipation	230	W
R_{θ}JA	Thermal Resistance Junction-Ambient [1]	60	°C/W
RθJC	Thermal Resistance, Junction to Case	1.5	℃/W
T_J	Operating Junction Temperature Range	-55 to 150	°C
TSTG	Storage Temperature Range	-55 to 150	°C

N-Channel Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	40	48	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=40V, V_{GS}=0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.8	2.5	V
RDS(on)	Static Drain-Source on-Resistance	V_{GS}=10V, I_D=30A	-	1.2	1.5	mΩ
		V_{GS}=4.5V, I_D=20A	-	1.7	2.5	mΩ
Ciss	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1.0MHz	-	8300	-	pF
Coss	Output Capacitance		-	1510	-	pF
Crss	Reverse Transfer Capacitance		-	130	-	pF
Q_g	Total Gate Charge	V_{DS}=20V, I_D=85A, V_{GS}=10V	-	127	-	nC
Qgs	Gate-Source Charge		-	35	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	26	-	nC
td(on)	Turn-on Delay Time	V_{DD}=20V, I_D=85A, R_G=1.6Ω, V_{GS}=10V	-	22.5	-	ns
tr	Turn-on Rise Time		-	6.7	-	ns
td(off)	Turn-off Delay Time		-	80.3	-	ns
t_f	Turn-off Fall Time		-	26.9	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	300	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	750	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	T_J=25℃, I_F=I_S,dI/dt=100A/μs	-	100	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	163	-	nC

Note :

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 =32V,VGS =10V,L=0.1mH,IAS =70A

4、The power dissipation is limited by 150℃ 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

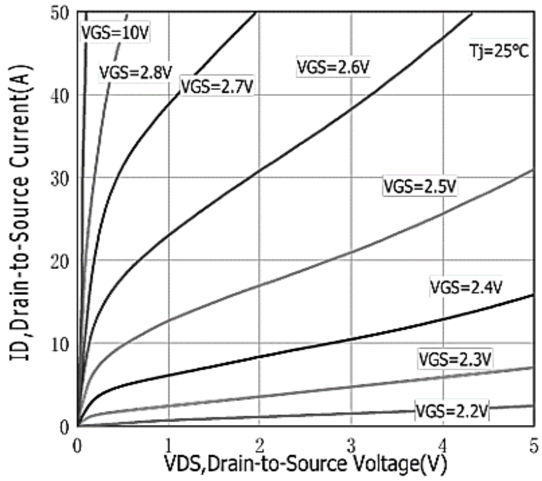


Figure.1 Typical Output Characteristics

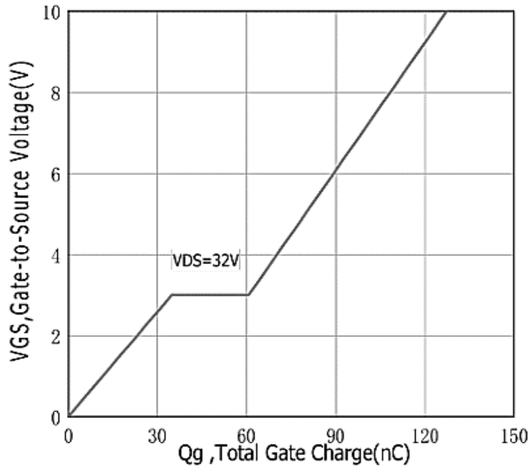


Figure.2 Typical Gate Charge vs Gate to Source Voltage

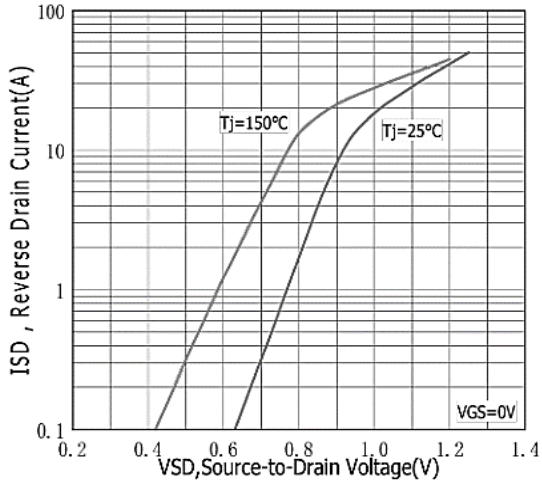


Figure.3 Typical Body Diode Transfer Characteristics

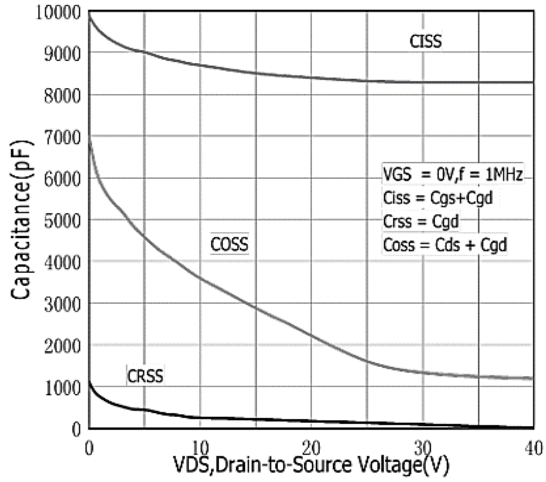


Figure 4: Body Diode Characteristics

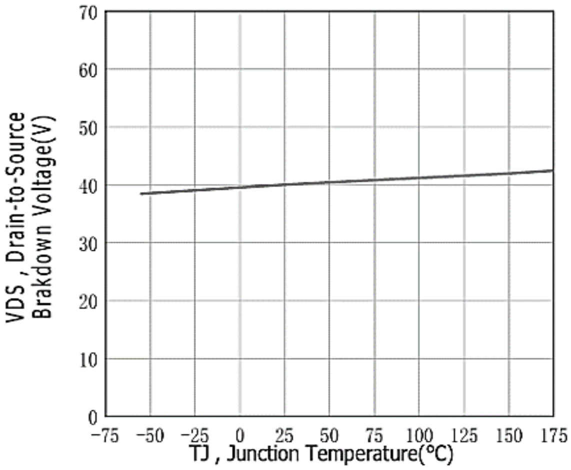


Figure.5 Typical Breakdown Voltage vs Junction Temperature

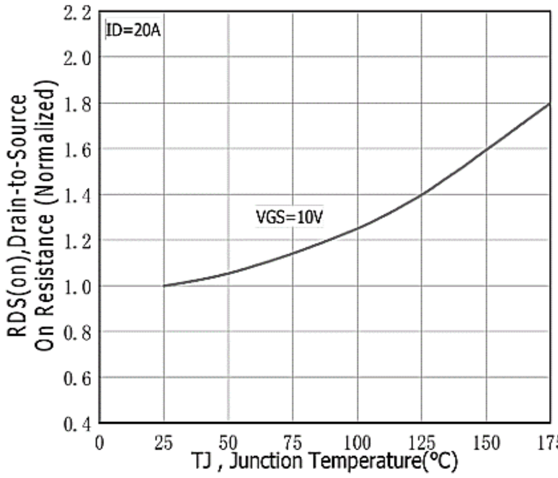


Figure 6: CapacitanceCharacteristics

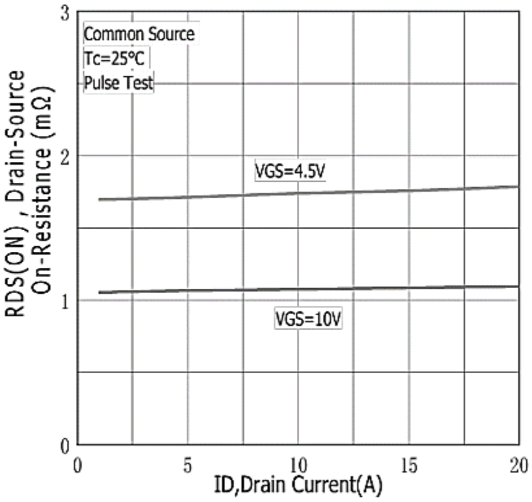


Figure.7 Typical Drain to Source ON Resistance vs Drain Current

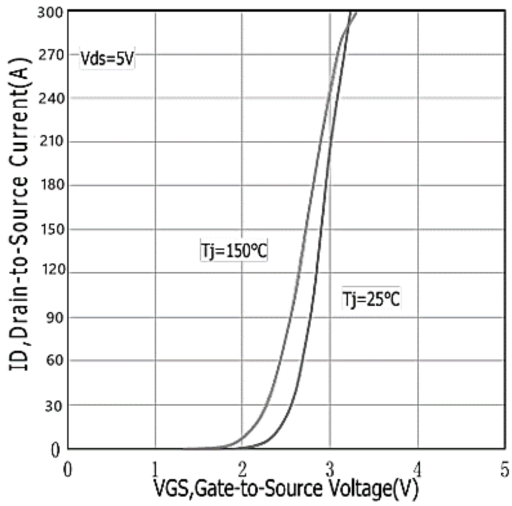


Figure.10 Typical Transfer Characteristics

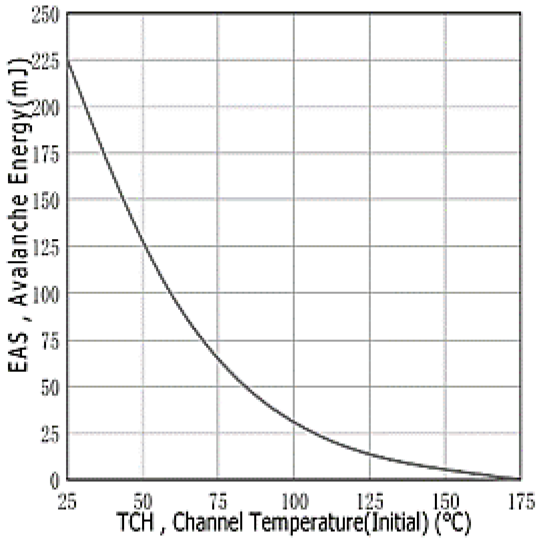


Figure.9 Maximum EAS vs Channel Temperature

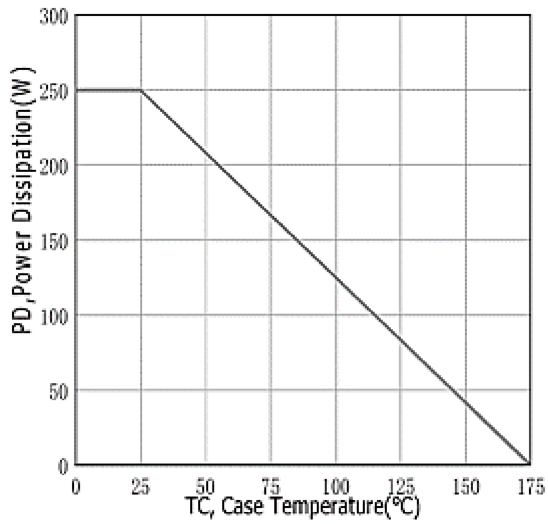


Figure.12 Maximum Power Dissipation vs Case Temperature

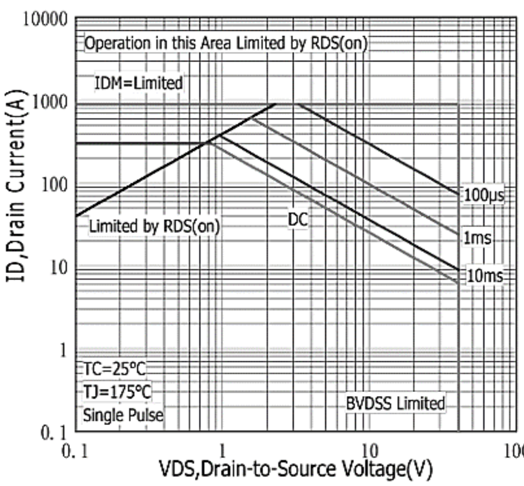


Figure 11: Maximum Safe Operating Area

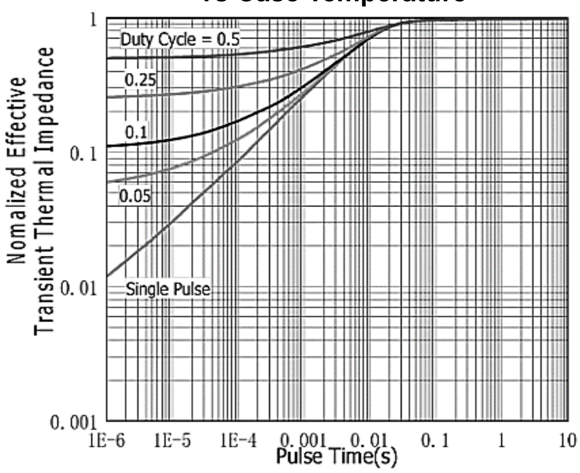
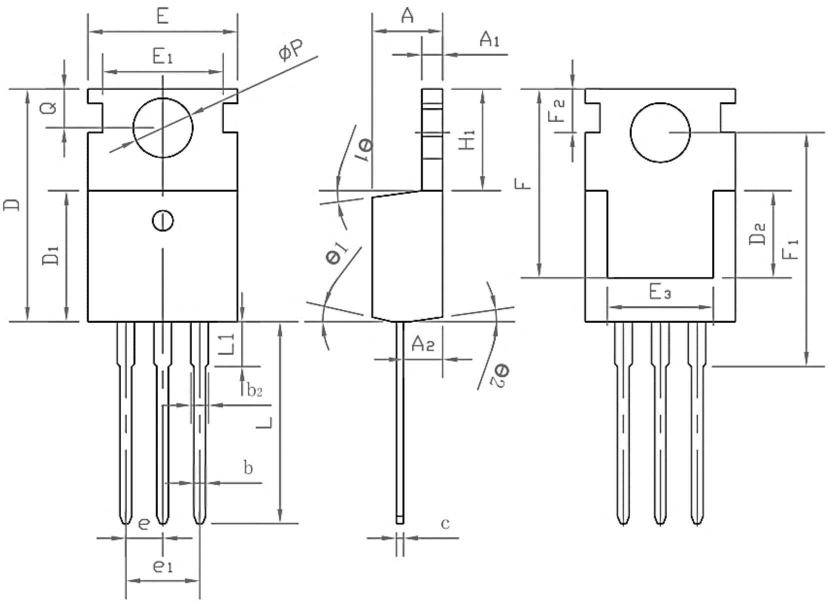


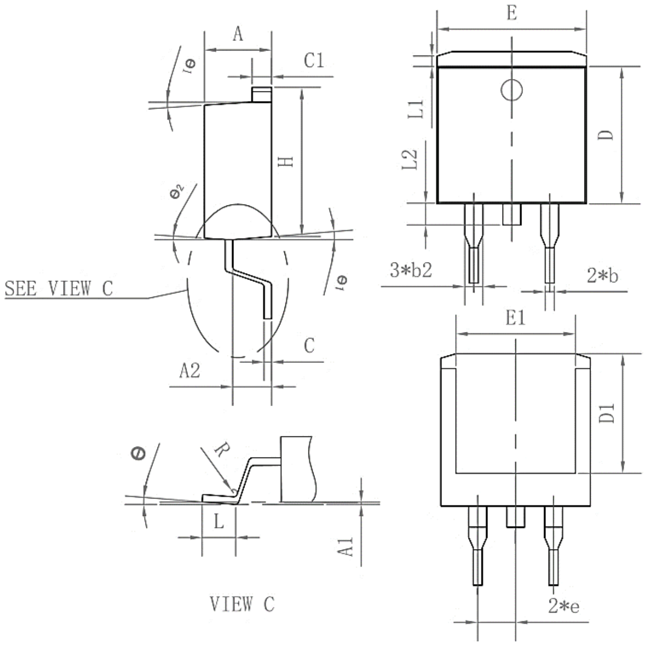
Figure.12: Maximum EffectiveTransient Thermal Impedance, Junction-to-Cas

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

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
θ	0°	4°	8°
Θ1	4°	7°	10°
Θ2	0°	3°	6°