

250V N-Channel Enhancement Mode MOSFET

Description

The AP80N25P/T uses advanced **APM-SGT** 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

$V_{DS} = 250V$ $I_D = 80A$

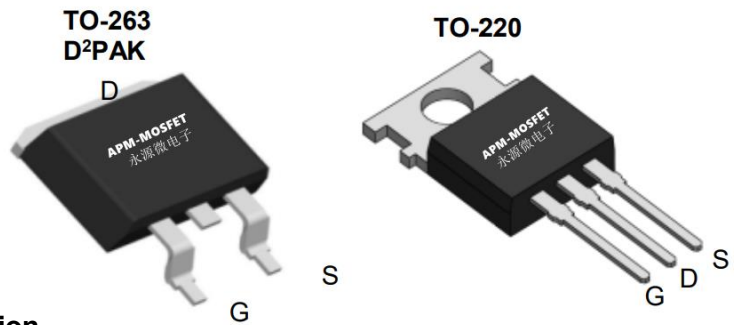
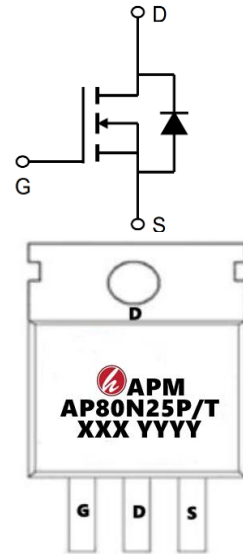
$R_{DS(ON)} < 20m\Omega$ @ $V_{GS}=10V$ (Type: **18mΩ**)

Application

DC/DC Converter

Power Management Switches

BMS/UPS



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP80N25P	TO-220-3L	AP80N25P XXX YYYY	1000
AP80N25T	TO-263-3L	AP80N25T XXX YYYY	800

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	250	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	80	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	65	A
IDM	Pulsed Drain Current	330	A
EAS	Single Pulse Avalanche Energy	2000	mJ
IAS	Avalanche Current	45	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	278	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	0.5	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	40	$^\circ\text{C/W}$

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Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VDSS	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	250	-	-	V
IGSS	Gate-body Leakage current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
IDSS	Zero Gate Voltage Drain Current $T_J=25^{\circ}\text{C}$	$V_{DS} = 2500V, V_{GS} = 0V$	-	-	1	μA
IDSS	Zero Gate Voltage Drain Current $T_J=100^{\circ}\text{C}$		-	-	100	
VGS(th)	Gate-Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.5	4.5	V
RDS(on)	Drain-Source on-Resistance ²	$V_{GS} = 10V, I_D = 20A$	-	18	20	m Ω
Ciss	Input Capacitance	$V_{DS} = 125V, V_{GS} = 0V, f = 1MHz$	-	10602	-	pF
Coss	Output Capacitance		-	8.1	-	
Crss	Reverse Transfer Capacitance		-	270	-	
Rg	Gate Resistance	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$	-	1.7	-	Ω
Qg	Total Gate Charge	$V_{DD} = 100V, I_D = 55A, V_{GS} = 10V$	-	136	-	nC
Qgs	Gate-Source Charge		-	52	-	
Qgd	Gate-Drain Charge		-	25	-	
td(on)	Turn-on Delay Time	$V_{DD} = 100, I_D = 55A, V_{GS} = 10V, R_G = 4.7\Omega$	-	54.5	-	ns
tr	Rise Time		-	24.2	-	
td(off)	Turn-off Delay Time		-	73.6	-	
tf	Fall Time		-	15.6	-	
VSD	Diode Forward Voltage ²	$I_F = 20A, V_{GS} = 0V$	-	-	1.2	V
IS	Continuous Source Current ^{1,5}	$V_G = V_D = 0V$, Force Current	-	-	330	A
trr	Body Diode Reverse Recovery Time	$I_F = 40A, dI/dt = 100A/\mu s$	-	267	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	765	-	nC

Notes:

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=45A$
- 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

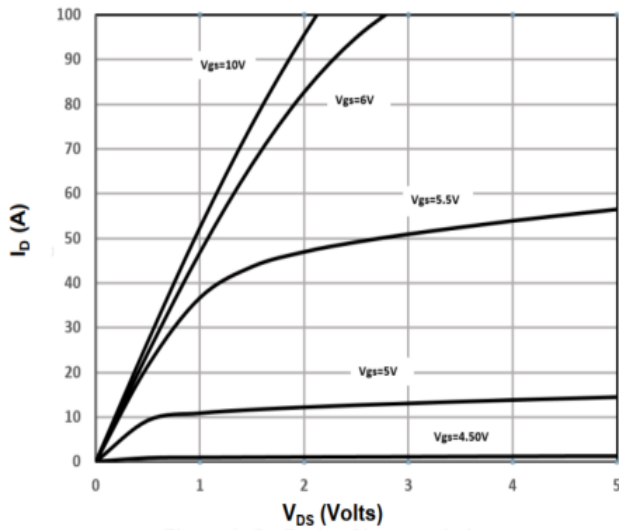


Figure 1: On-Region Characteristics

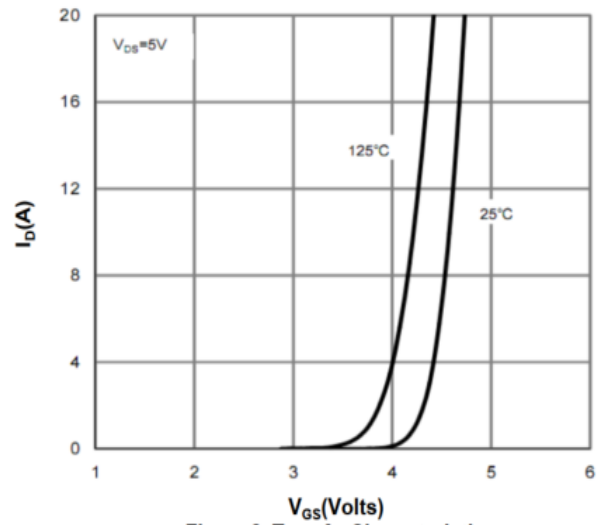


Figure 2: Transfer Characteristics

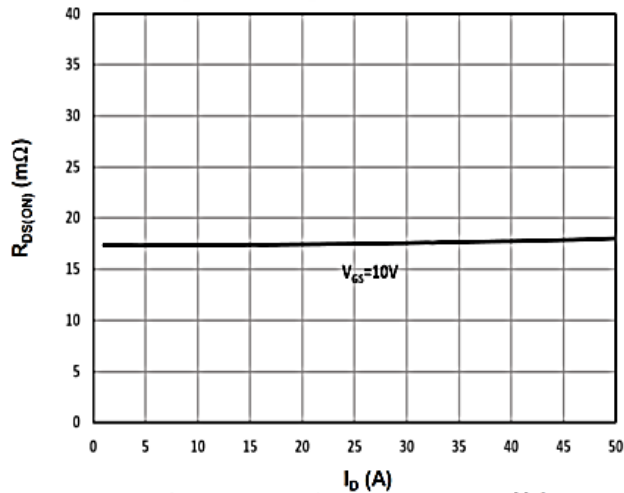


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

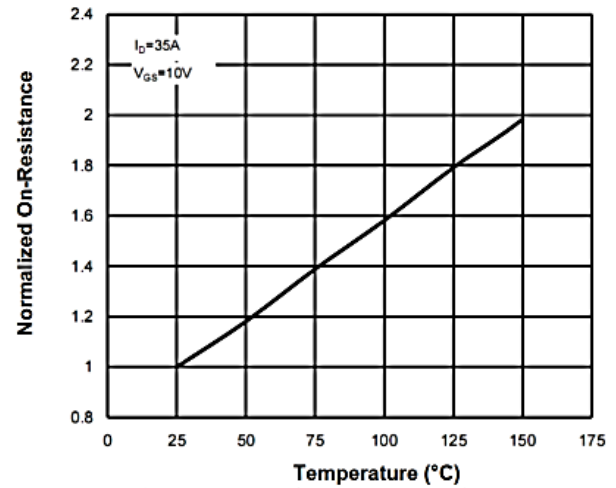


Figure 4: On-Resistance vs. Junction Temperature

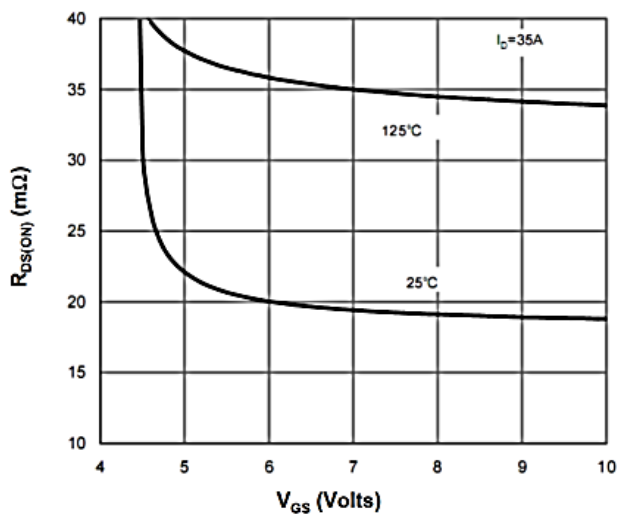


Figure 5: On-Resistance vs. Gate-Source Voltage

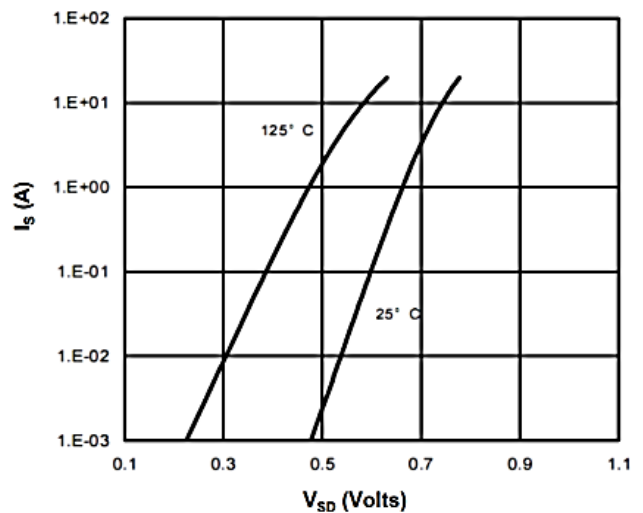


Figure 6: Body-Diode Characteristics

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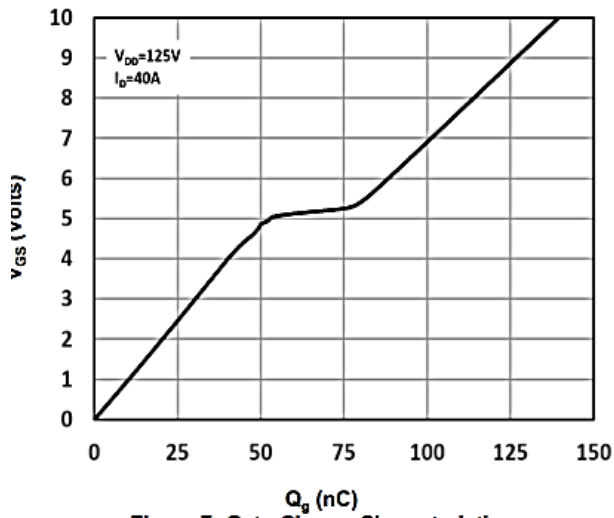


Figure 7: Gate-Charge Characteristics

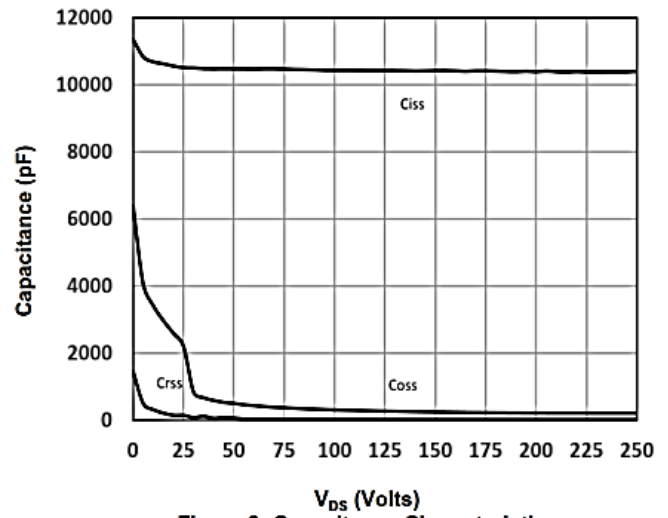


Figure 8: Capacitance Characteristics

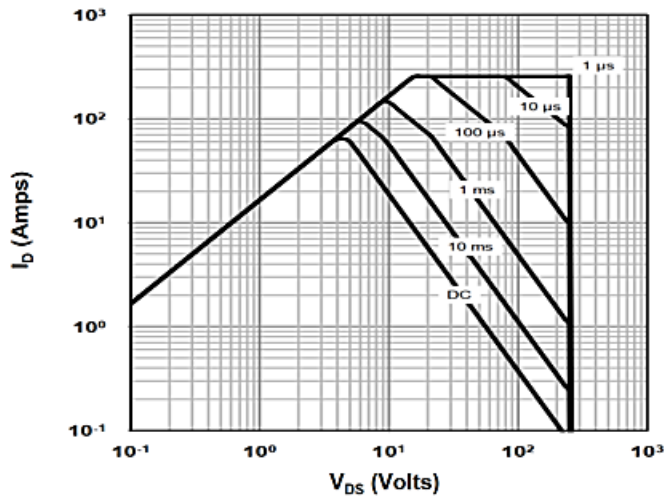
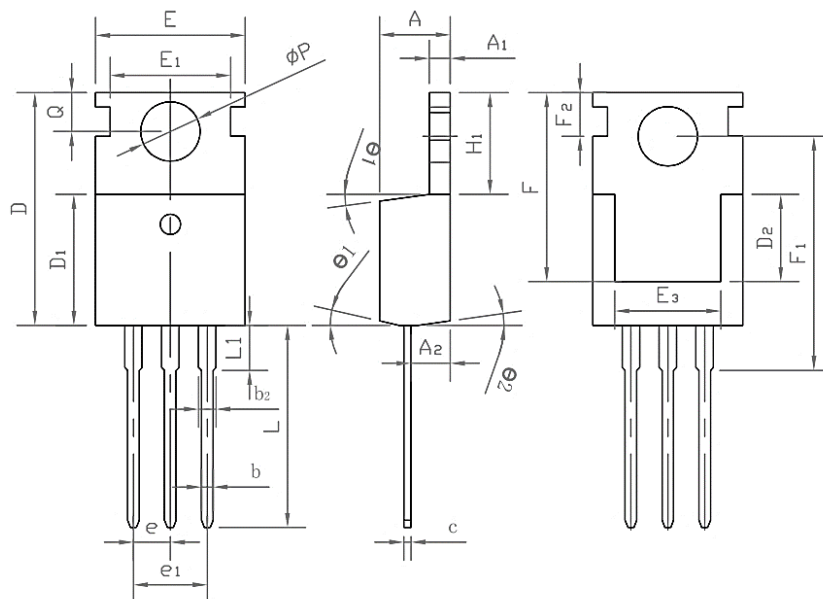


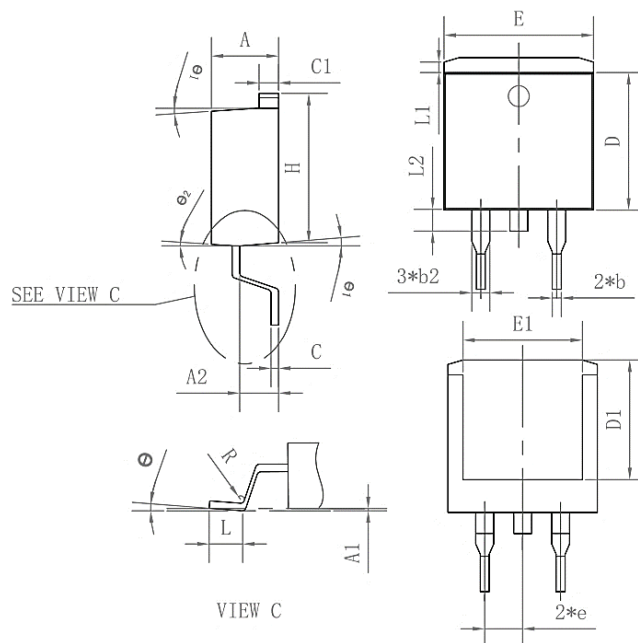
Figure 9: Maximum Forward Biased Safe Operating Area

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°

250V N-Channel Enhancement Mode MOSFET**Attention**

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Edition	Date	Change
REV1.0	2023/5/5	Initial release

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