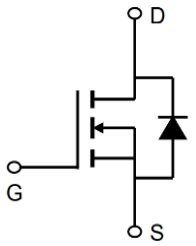
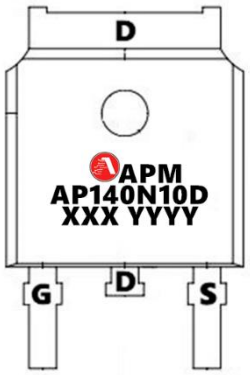
AP140N10D

100V N-Channel Enhancement Mode MOSFET

Description

The AP140N10D 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} = 100V I_D =140A

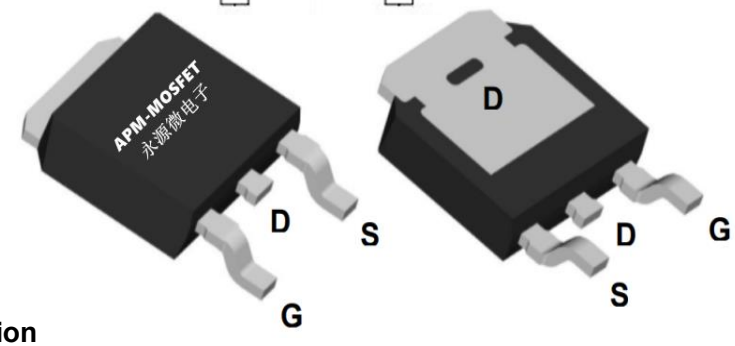
$R_{DS(ON)}$ < 5.5mΩ @ V_{GS}=10V **(Type：4.5mΩ)**

Application

DC/DC Converter

LED Backlighting

Power Management Switches



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP140N10D	TO-252-3L	AP140N10D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	100	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	140	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	85	A
IDM	Pulsed Drain Current	417	A
EAS	Single Pulse Avalanche Energy	245	mJ
IAS	Avalanche Current	42	A
P_D@T_C=25℃	Total Power Dissipation[4]	167	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient	0.88	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case	62	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VDSS	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	100	-	-	V
IGSS	Gate-body Leakage current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
IDSS	Zero Gate Voltage Drain Current T_J=25°C	V_{DS} =100V, V_{GS} = 0V	-	-	1	μA
IDSS	Zero Gate Voltage Drain Current T_J=100°C		-	-	100	
VGS(th)	Gate-Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	2.9	4.0	V
RDS(on)	Drain-Source on-Resistance[2]	V_{GS} = 10V, I_D = 20A	-	4.5	5.5	mΩ
Ciss	Input Capacitance	V_{DS} = 50V, V_{GS} =0V, f =1MHz	-	2816	-	pF
Coss	Output Capacitance		-	614	-	
Crss	Reverse Transfer Capacitance		-	7.4	-	
R_g	Gate Resistance	V_{GS} = 0V, V_{DS} = 0V, f =1MHz	-	2.4	-	Ω
Q_g	Total Gate Charge	V_{GS} = 10V, V_{DS} = 50V, I_D=20A	-	42	-	nC
Qgs	Gate-Source Charge		-	9.7	-	
Qgd	Gate-Drain Charge		-	10.6	-	
td(on)	Turn-on Delay Time	V_{GS} =10V, V_{DS} =50V, R_G = 3Ω, I_D= 20A	-	13	-	ns
t_r	Rise Time		-	25	-	
td(off)	Turn-off Delay Time		-	43	-	
t_f	Fall Time		-	37	-	
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	-	-	167	A
trr	Body Diode Reverse Recovery Time	I_F = 20A, dI/dt=100A/μs	-	60	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	61	-	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 ≤ 300us , duty cycle ≤ 2%

3、The EAS data shows Max. rating . The test condition is V_{DD}=50V, V_{GS}=10V, L=0.4mH, I_{AS}=42A

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

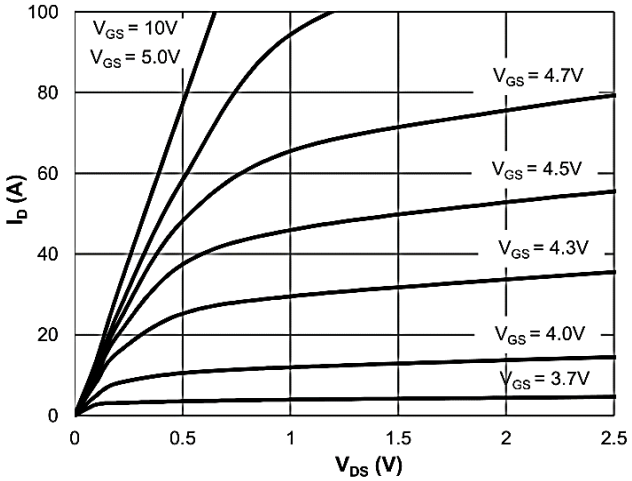


Figure 1: Saturation Characteristics

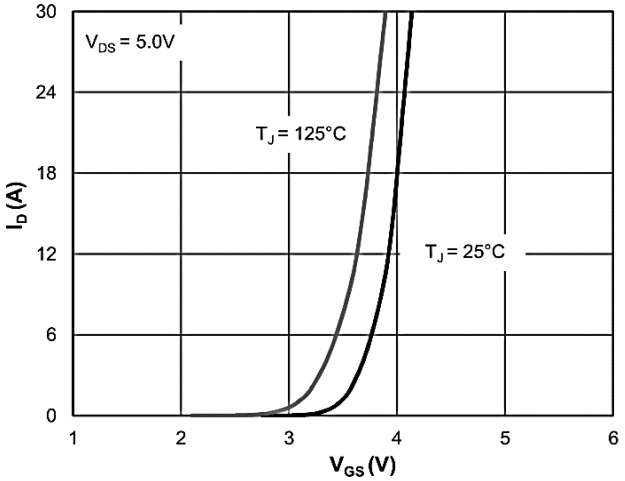


Figure 2: Transfer Characteristics

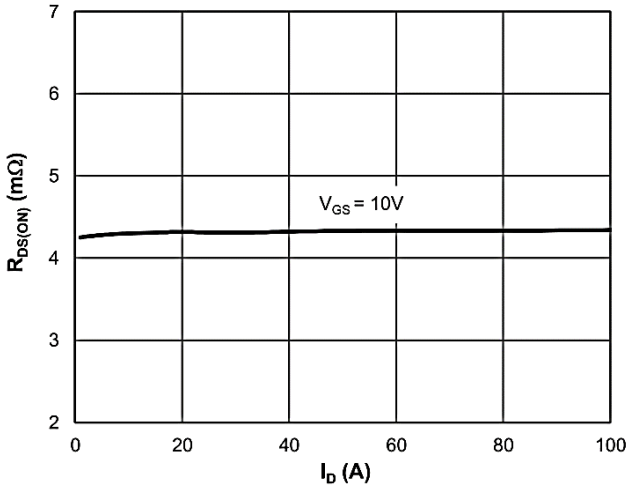


Figure 3: $R_{DS(ON)}$ vs. Drain Current

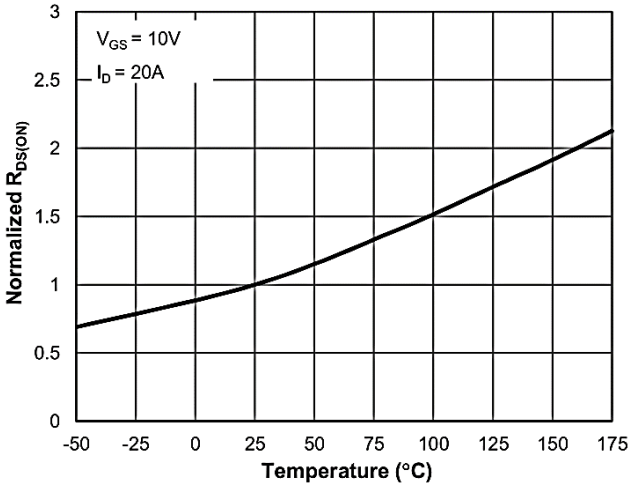


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

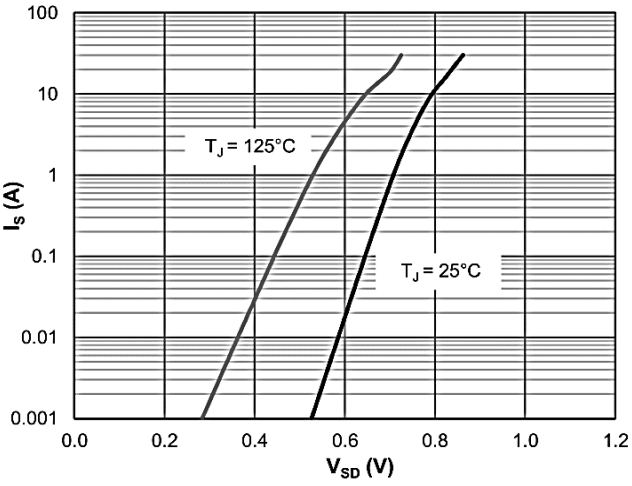


Figure 5: Body-Diode Characteristics

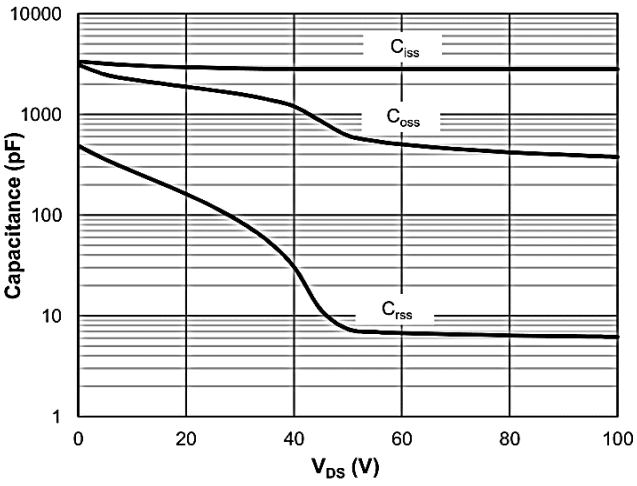


Figure 6: Capacitance Characteristics

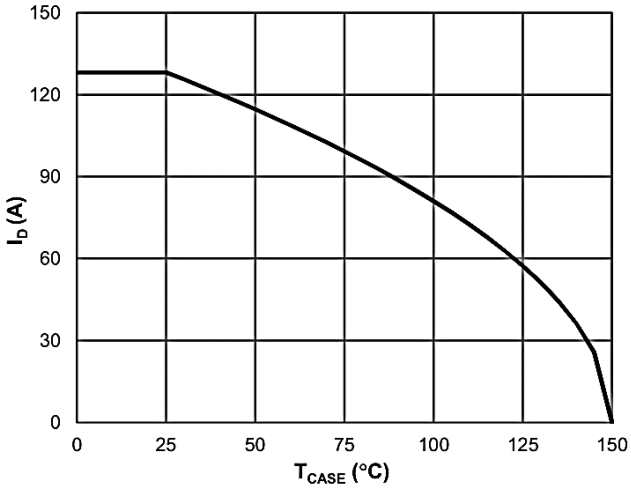


Figure 7: Current De-rating

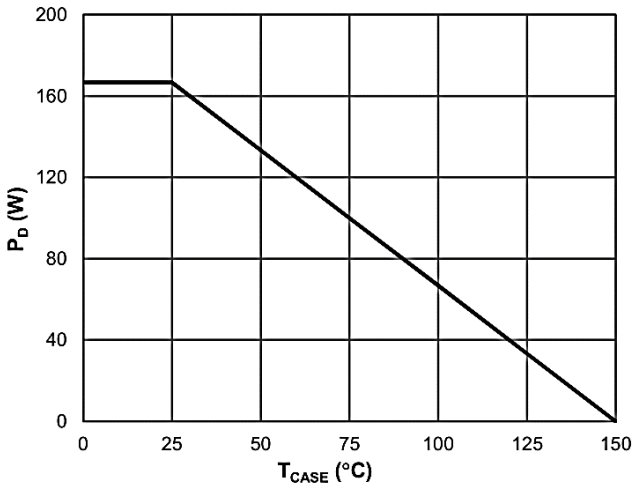


Figure 8: Power De-rating

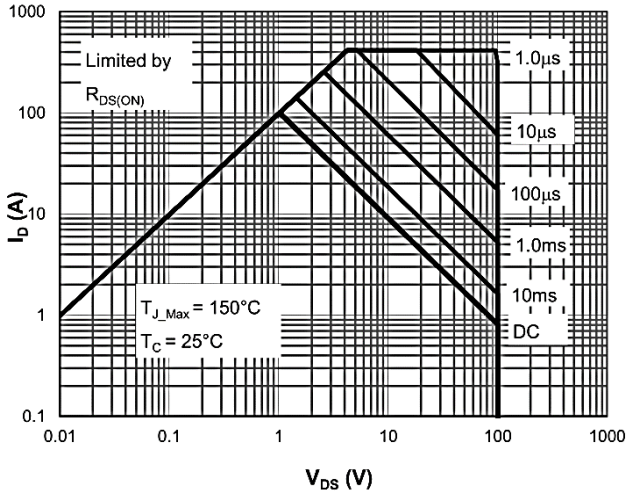


Figure 9: Maximum Safe Operating Area

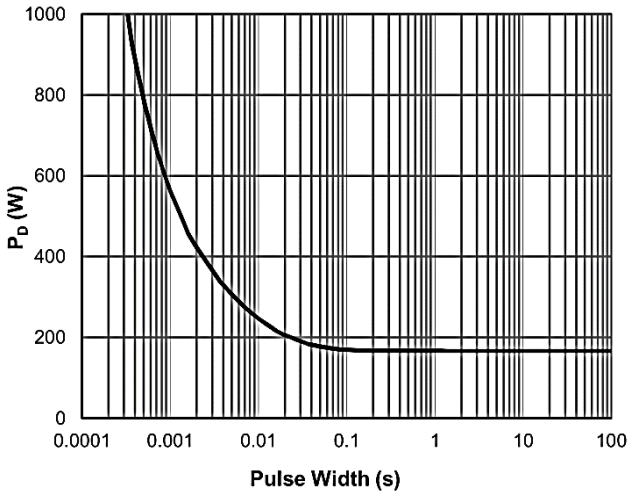


Figure 10: Single Pulse Power Rating, Junction-to-Case

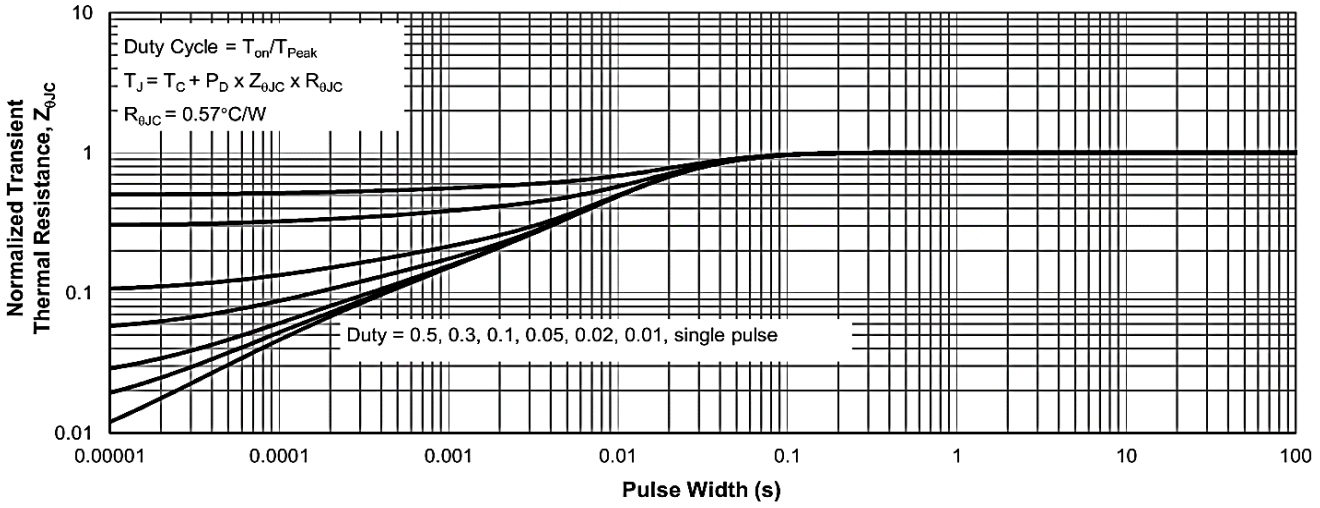
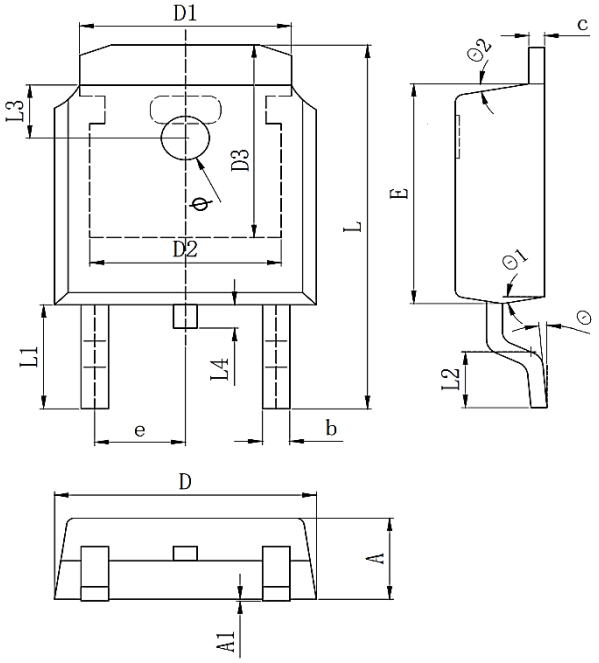


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-TO-252-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	2.1	2.3	2.5
A1	0	0.064	0.128
b	0.64	0.75	0.86
c	0.45	0.52	0.6
D	6.4	6.6	6.8
D1	5.33REF		
D2	4.83REF		
D3	5.25REF		
E	5.9	6.1	6.3
e	2.286TYP		
L	9.8	10.1	10.4
L1	2.888REF		
L2	1.4	1.5	1.7
L3	1.65REF		
L4	0.6	0.8	1
ϕ	1.1	1.2	1.3
θ	0°		10°
θ1	5°		10°
θ2	5°		10°

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100V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
REV1.0	2022/8/5	Initial release