

100V N-Channel Enhancement Mode MOSFET

Description

The AP40N10D uses advanced **APM-SGT₁₁** 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

$V_{DS} = 100V$ $I_D = 40A$

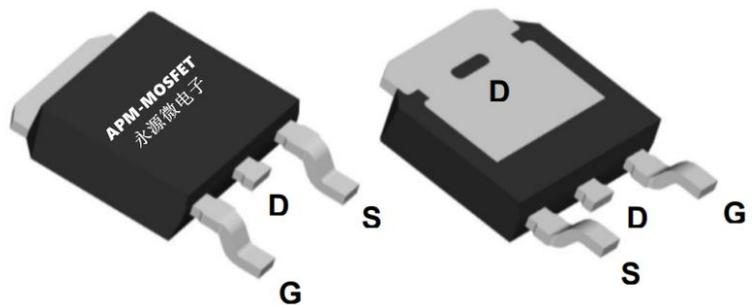
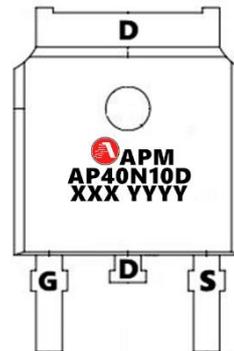
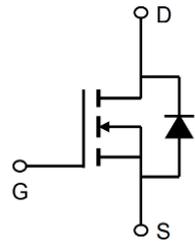
$R_{DS(ON)} < 25m\Omega$ @ $V_{GS}=10V$ (Type: **18mΩ**)

Application

DC/DC Converter

LED Backlighting

Power Management Switches



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP40N10D	TO-252-3L	AP40N10D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V$	40	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V$	18	A
IDM	Pulsed Drain Current	100	A
EAS	Single Pulse Avalanche Energy	160	mJ
IAS	Avalanche Current	53.4	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	27	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	4.65	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	62	$^\circ\text{C/W}$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
BVDSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	100	108	-	V
IDSS	Drain-Source Leakage Current	V _{DS} = 80V, V _{GS} = 0V	-	-	1	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	1.2	2.6	V
RDS(on)	Static Drain-Source On-Resistance	V _{GS} = 10V, I _D = 15A	-	18	25	mΩ
		V _{GS} = 4.5V, I _D = 10A	-	28	38	mΩ
g _{fs}	Forward Threshold Voltage	V _{DS} = 10V, I _D = 20A	-	22	-	S
R _g	Gate Resistance	V _{DS} = V _{GS} = 0V, f = 1.0MHz	-	1.62	-	Ω
C _{iss}	Input Capacitance	V _{DS} = 50V, V _{GS} = 0V, f = 1.0MHz	-	822	-	pF
C _{oss}	Output Capacitance		-	310	-	pF
C _{rss}	Reverse Transfer Capacitance		-	23.5	-	pF
Q _g	Total Gate Charge	V _{DS} = 50V, I _D = 20A, V _{GS} = 10V	-	22.7	-	nC
Q _{gs}	Gate-Source Charge		-	6.2	-	
Q _{gd}	Gate-Drain("Miller") Charge		-	5.3	-	
td(on)	Turn-On Delay Time	V _{DS} = 50V, I _D = 20A, R _G = 3Ω, V _{GS} = 10V	-	15	-	ns
t _r	Turn-On Rise Time		-	3.2	-	
td(off)	Turn-Off Delay Time		-	30	-	
t _f	Turn-Off Fall Time		-	7.6	-	
I _s	Continuous Source Current		-	-	25	A
VSD	Diode Forward Voltage	I _S = 20A, V _{GS} = 0V	-	0.88	1.0	V
t _{rr}	Reverse Recovery Time	I _{SD} = 20A, dI _{SD} /dt = 100A/μs	-	45	-	ns
Q _{rr}	Reverse Recovery Charge		-	59	-	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=0.5mH, I_{AS}=8A
- 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

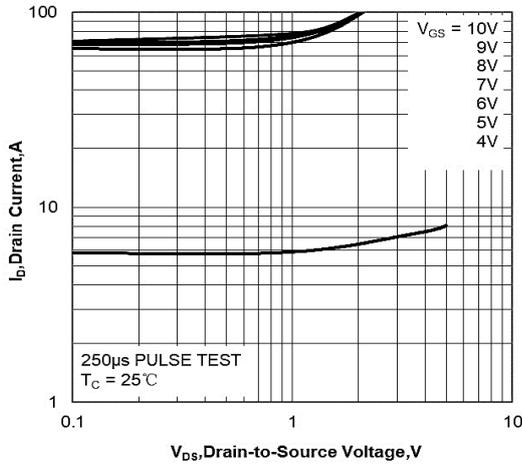


Figure 1. Output Characteristics

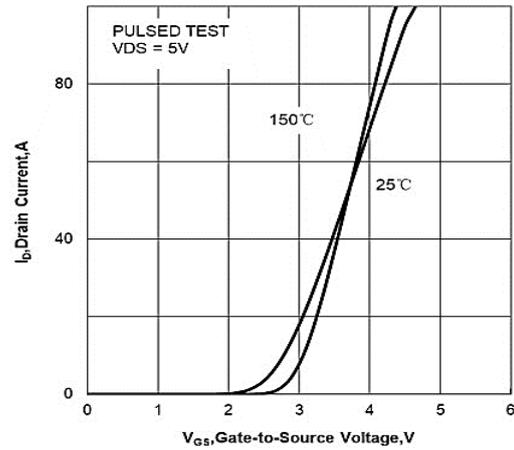


Figure 2. Transfer Characteristics

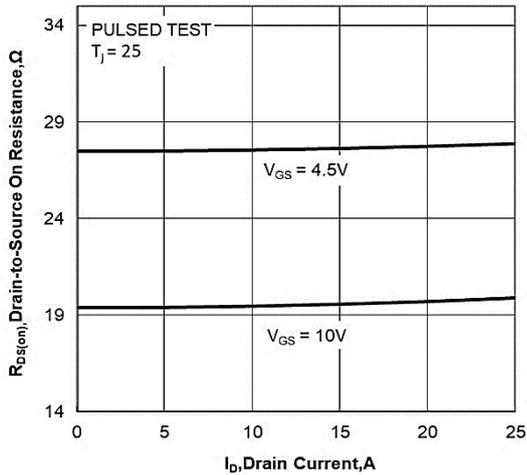


Figure 3. Drain-to-Source On Resistance vs Drain Current

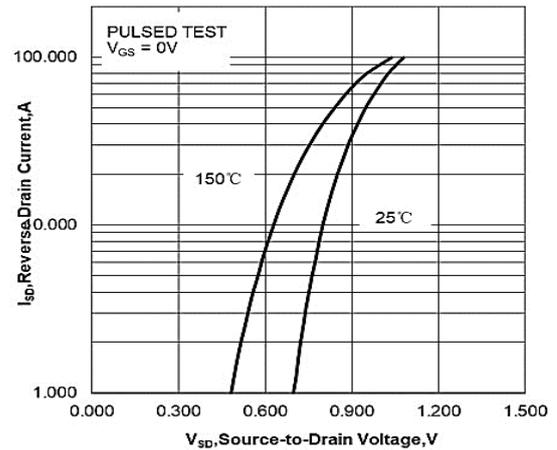


Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

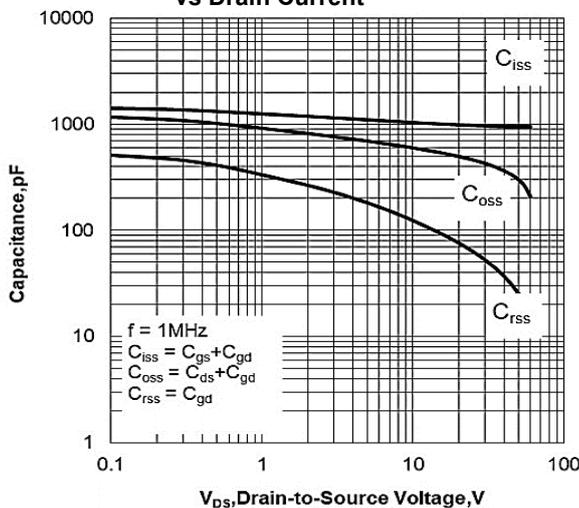


Figure 5. Capacitance Characteristics

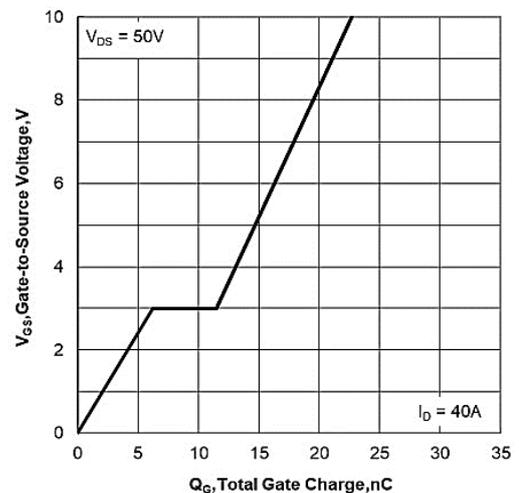


Figure 6. Gate Charge Characteristics



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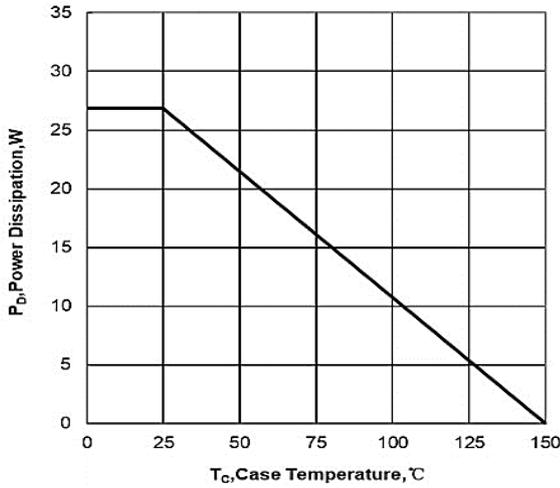


Figure 9. Maximum Continuous Drain Current vs Case Temperature

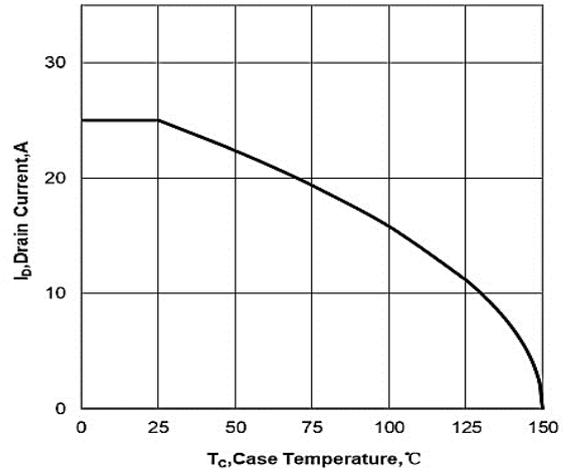


Figure 10. Maximum Power Dissipation vs Case Temperature

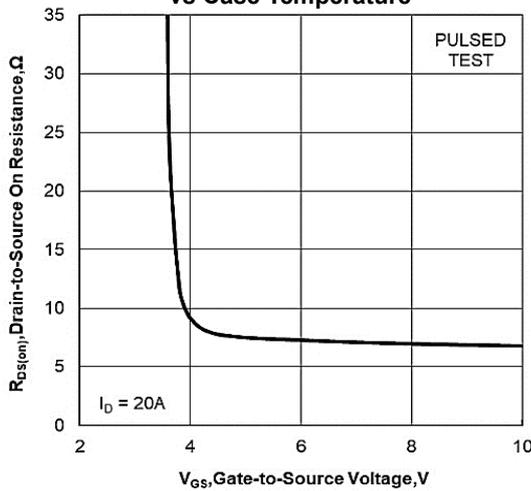


Figure 11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

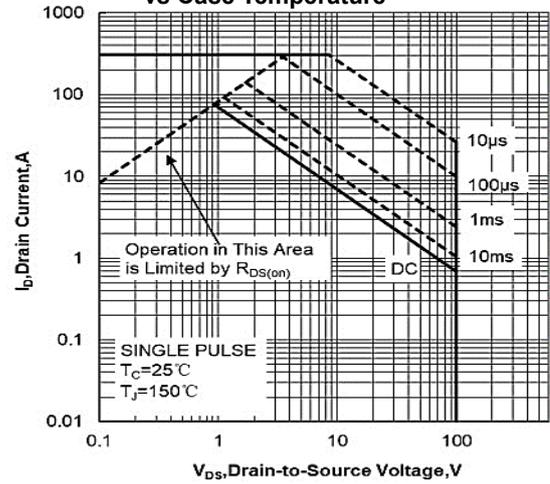


Figure 12. Maximum Safe Operating Area

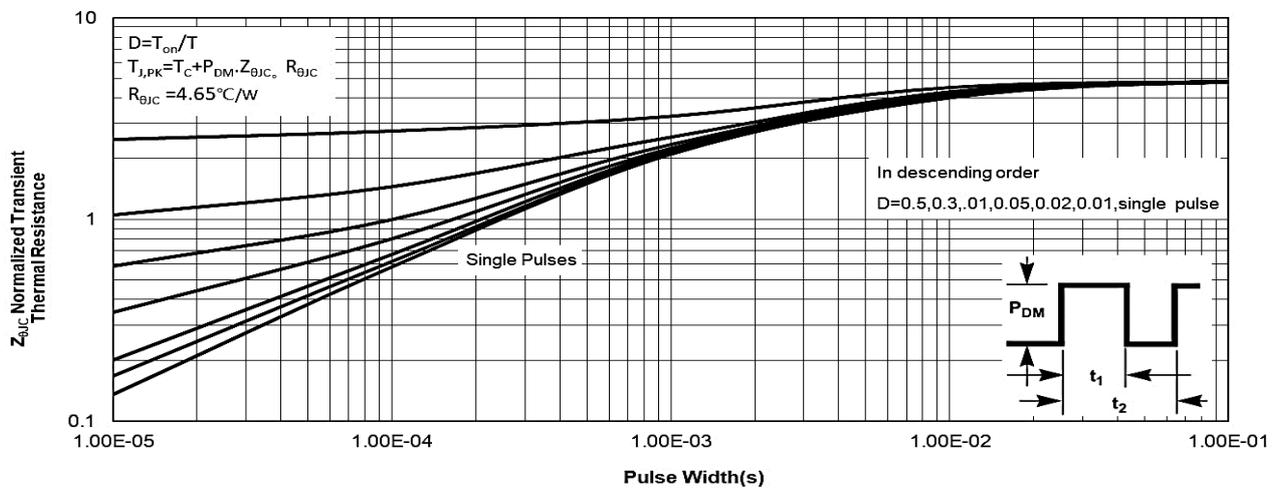
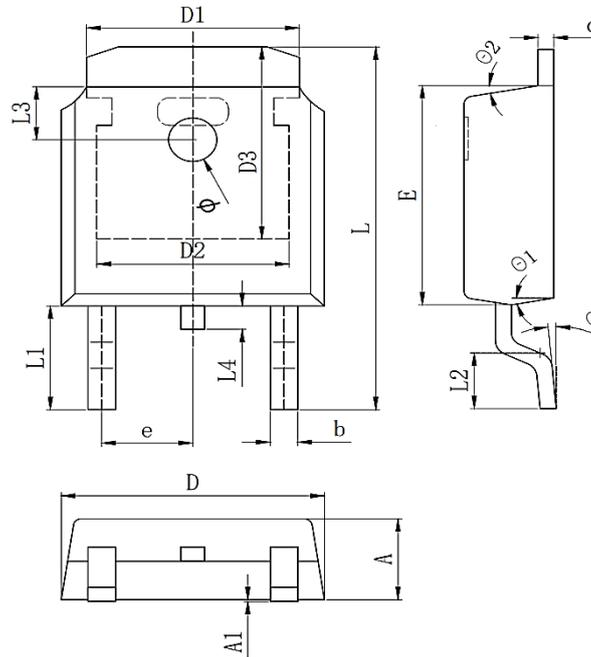


Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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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Edition	Date	Change
REV1.0	2023/05/01	Initial release

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