

100V N-Channel Enhancement Mode MOSFET

Description

The AP40N10P uses advanced **APM-SGT₁₁** 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

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

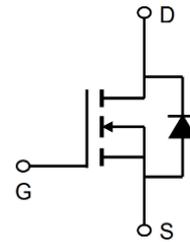
$R_{DS(ON)} < 25m\Omega$ @ $V_{GS}=10V$ (Type: **18mΩ**)

Application

DC/DC Converter

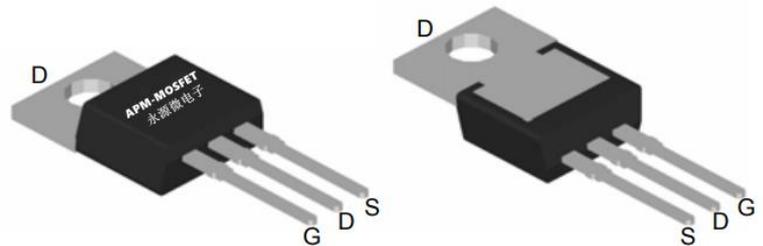
LED Backlighting

Power Management Switches



Top View

Bottom View



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP40N10P	TO-220-3L	AP40N10P XXX YYYY	1000

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, $V_{GS} @ 10V$	38	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 ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
BVDSS	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	100	108	-	V
IDSS	Drain-Source Leakage Current	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	μA
IGSS	Gate to Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
VGS(th)	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	2.8	4.0	V
RDS(on)	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 15A$	-	18	25	m Ω
		$V_{GS} = 4.5V, I_D = 10A$	-	28	38	m Ω
gfs	Forward Threshold Voltage	$V_{DS} = 10V, I_D = 20A$	-	22	-	S
Rg	Gate Resistance	$V_{DS} = V_{GS} = 0V, f = 1.0\text{MHz}$	-	1.62	-	Ω
Ciss	Input Capacitance	$V_{DS} = 50V, V_{GS} = 0V, f = 1.0\text{MHz}$	-	822	-	pF
Coss	Output Capacitance		-	310	-	pF
Crss	Reverse Transfer Capacitance		-	23.5	-	pF
Qg	Total Gate Charge	$V_{DS} = 50V, I_D = 20A, V_{GS} = 10V$	-	22.7	-	nC
Qgs	Gate-Source Charge		-	6.2	-	
Qgd	Gate-Drain("Miller") Charge		-	5.3	-	
td(on)	Turn-On Delay Time	$V_{DS} = 50V, I_D = 20A, R_G = 3\Omega, V_{GS} = 10V$	-	15	-	ns
tr	Turn-On Rise Time		-	3.2	-	
td(off)	Turn-Off Delay Time		-	30	-	
tf	Turn-Off Fall Time		-	7.6	-	
Is	Continuous Source Current		-	-	25	A
VSD	Diode Forward Voltage	$I_S = 20A, V_{GS} = 0V$	-	0.88	1.0	V
trr	Reverse Recovery Time	$I_{SD} = 20A, dI_{SD}/dt = 100A/\mu s$	-	45	-	ns
Qrr	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、 The EAS data shows Max. rating . The test condition is $V_{DD} = 50V, V_{GS} = 10V, L = 0.5\text{mH}, I_{AS} = 8A$
- 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

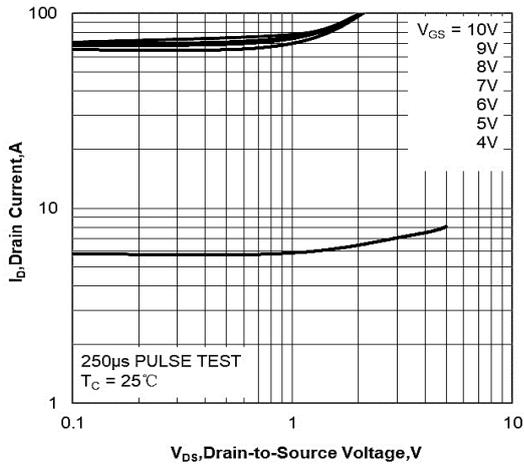


Figure 1. Output Characteristics

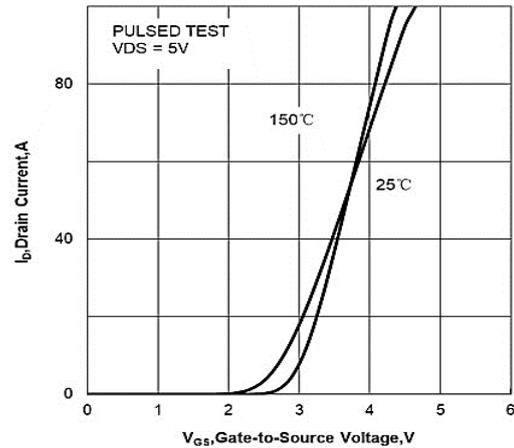


Figure 2. Transfer Characteristics

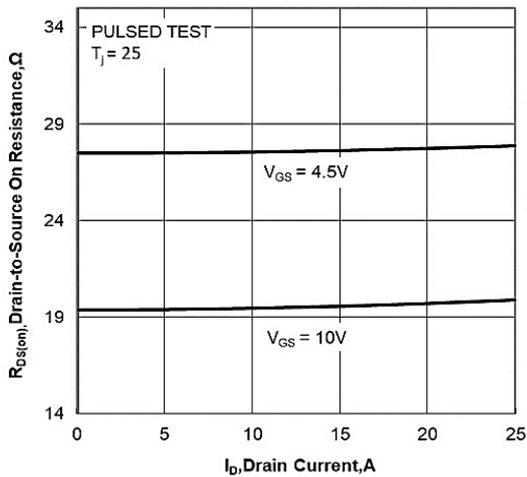


Figure 3. Drain-to-Source On Resistance vs Drain Current

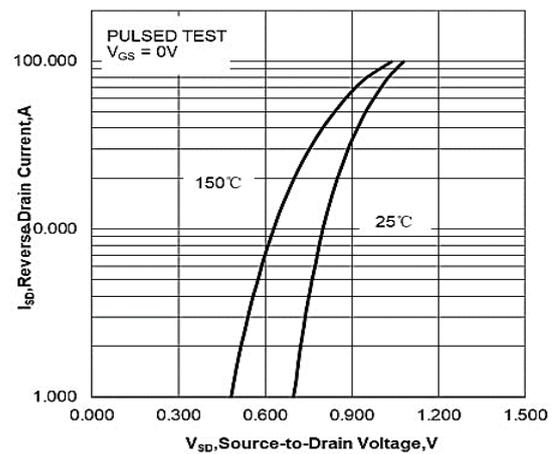


Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

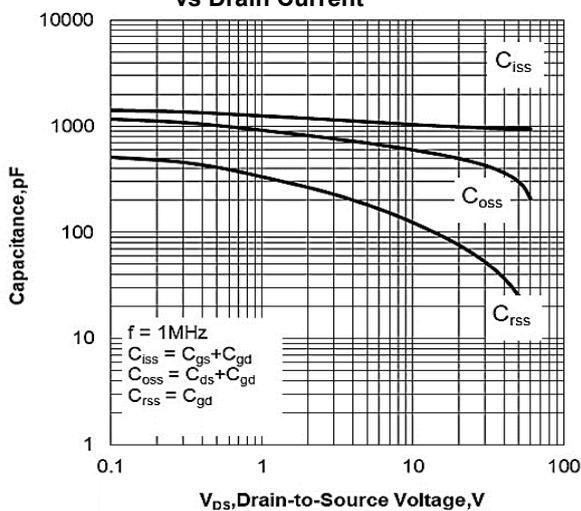


Figure 5. Capacitance Characteristics

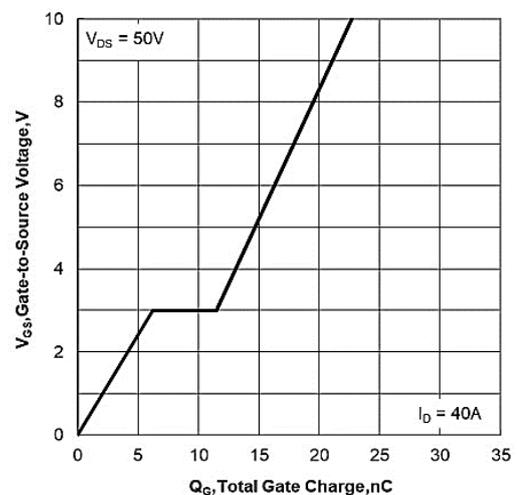


Figure 6. Gate Charge Characteristics

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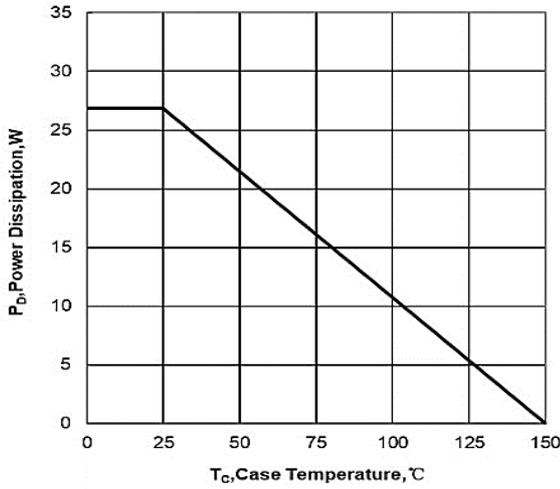


Figure 9. Maximum Continuous Drain Current vs Case Temperature

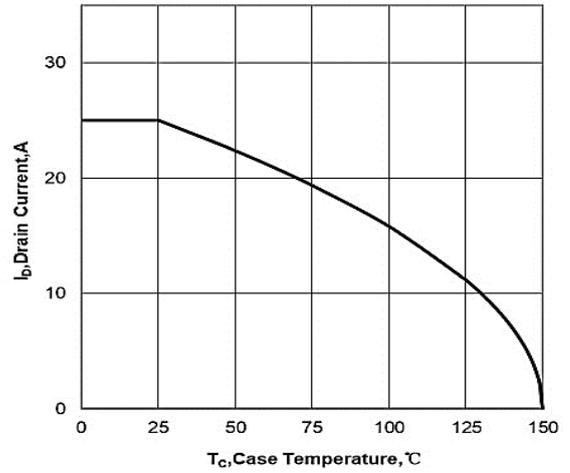


Figure 10. Maximum Power Dissipation vs Case Temperature

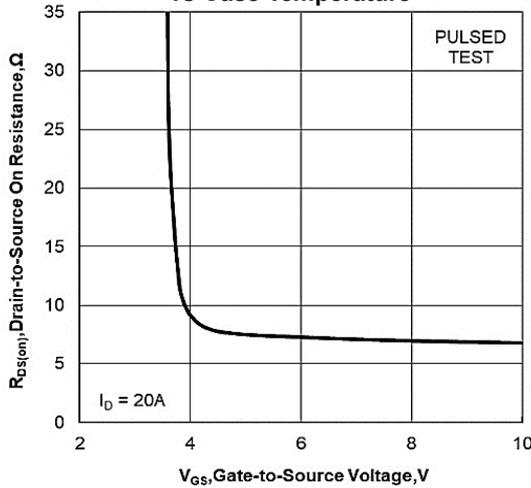


Figure 11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

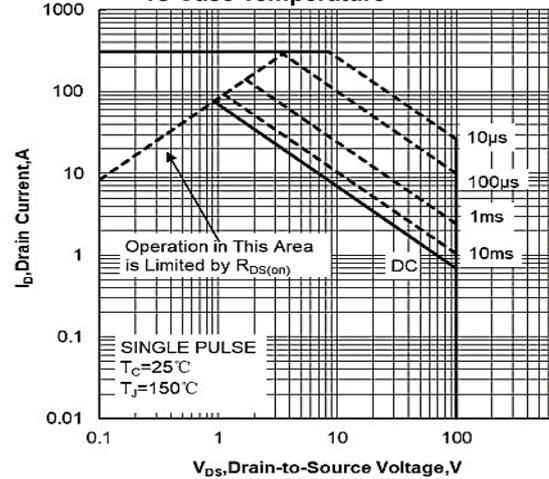


Figure 12. Maximum Safe Operating Area

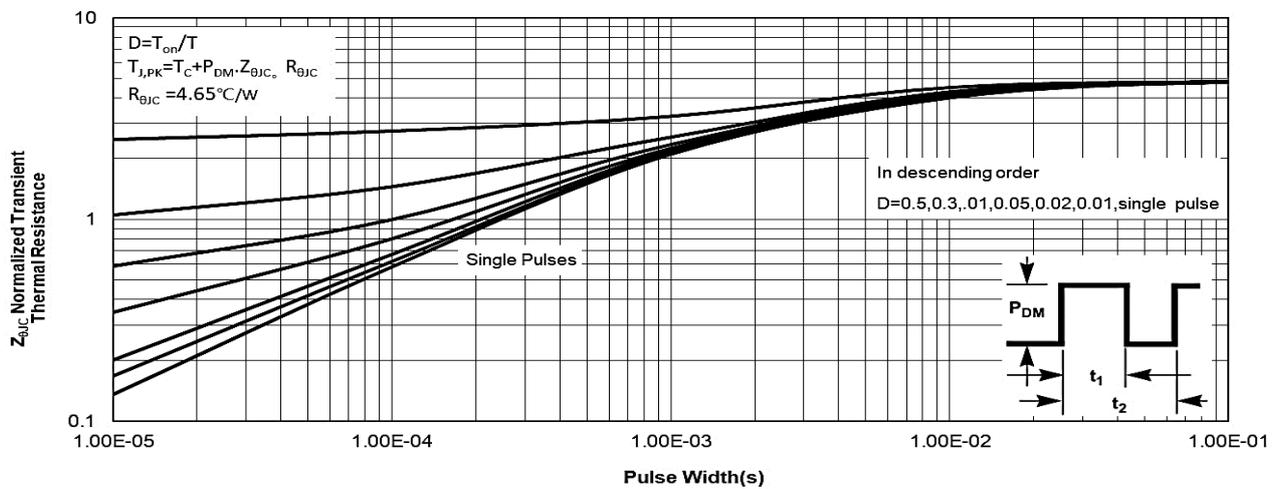
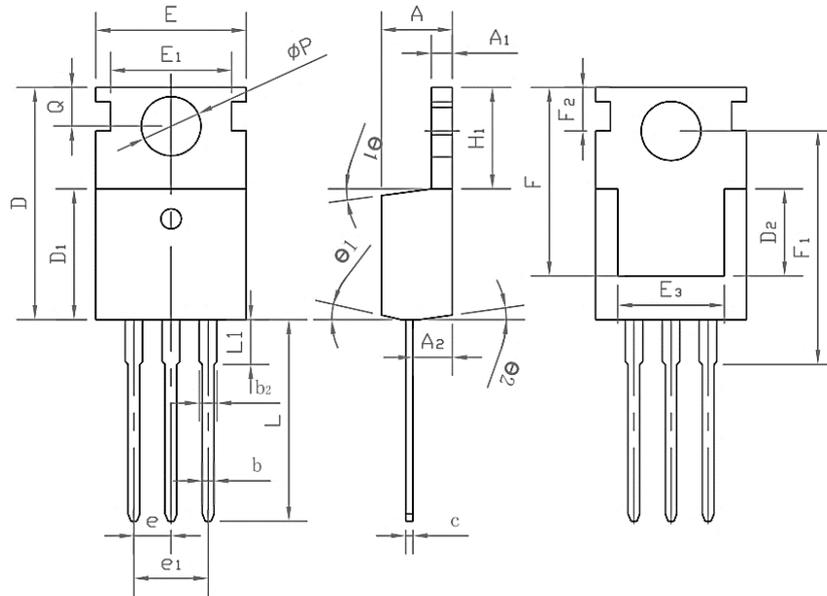


Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data-TO-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
C	0.40	0.50	0.65
D	15.1	15.6	16.1
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
$\theta 1$	4°	7°	10°
$\theta 2$	0°	3°	6°
F	13.30	13.50	13.70
F1	15.50	15.90	16.30
F2	2.80	3.00	3.20

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Edition	Date	Change
Rve1.0	2022/2/2	Initial release

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