

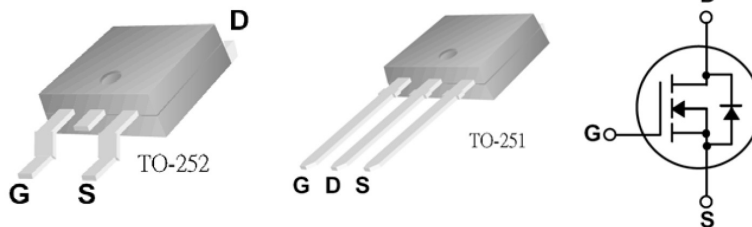
1 Description

These N-Channel enhancement mode power field effect transistors are produced using planar stripe, DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

2 Features

- 40V / 39A
- $R_{DS(on)} = 9m\Omega(\text{typ})$, $V_{GS} = 10V$, $I_D = 15A$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability..



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

Symbol	Parameter	APQ39SN04AA-XXM0	APQ39SN04AB-XXM0	Units
		APQ39SN04AA-XXJ0	APQ39SN04AB-XXJ1	
		APQ39SN04AA-XXF0	APQ39SN04AB-XXF0	
		TO-251	TO-252	
V_{DSS}	Drain-Source Voltage	40		V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 70^\circ\text{C}$)	39		A
		31		A
I_{DM}	Drain Current – Pulsed ①	156		A
V_{GS}	Gate-Source Voltage	± 20		V
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$) - De-rate above 25°C	30		W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		$^\circ\text{C}$

* note :

① Repetitive Rating: Pulse width limited by maximum junction temperature.

4 Thermal Characteristics

Symbol	Parameter	APQ39SN04AA-XXM0	APQ39SN04AB-XXM0	Units
		APQ39SN04AA-XXJ0	APQ39SN04AB-XXJ1	
		APQ39SN04AA-XXF0	APQ39SN04AB-XXF1	
		TO-251	TO-252	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	4.3		$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	42		$^{\circ}\text{C}/\text{W}$

 5 Electrical Characteristics $T_C = 25^{\circ}\text{C}$ unless otherwise noted

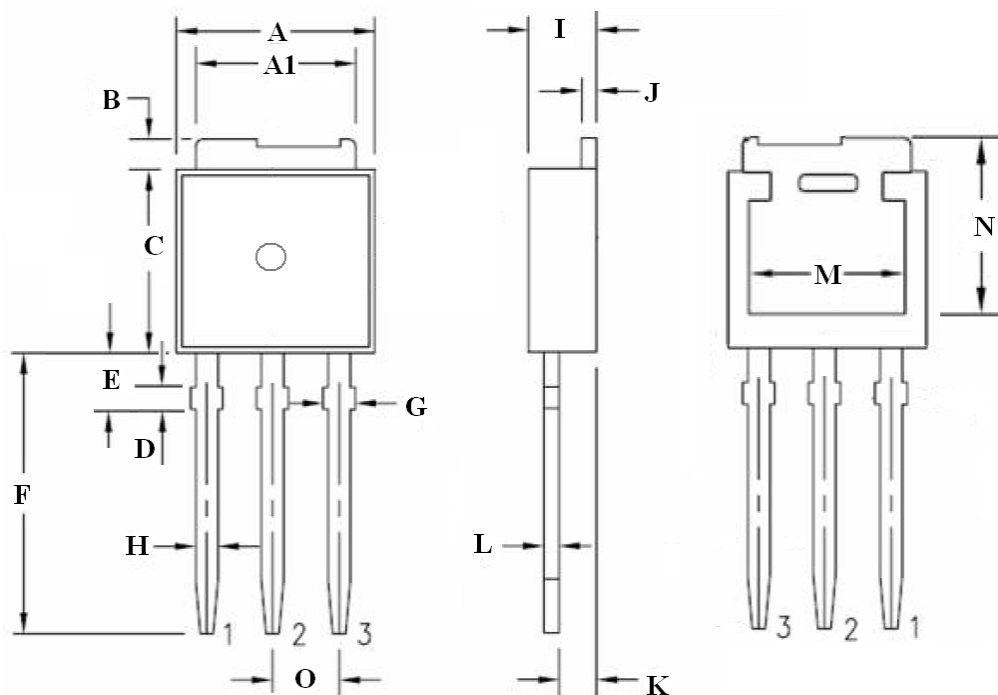
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	40	--	--	V
I_{DSS}	Gate to Source leakage current	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	1.0	--	3.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$ ①	--	9	12	m Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	1240	--	pF
C_{oss}	Output Capacitance		--	170	--	pF
C_{riss}	Reverse Transfer Capacitance		--	60	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 20\text{ V}, I_D = 1\text{ A},$ $R_G = 6\ \Omega$ ①	--	16	--	Ns
t_r	Turn-On Rise Time		--	13	--	Ns
$t_{d(off)}$	Turn-Off Delay Time		--	60	--	Ns
t_f	Turn-Off Fall Time		--	7	--	Ns
Q_g	Total Gate Charge	$V_{DS} = 20\text{ V}, I_D = 15\text{ A},$ $V_{GS} = 10\text{ V}$ ①	--	31	--	nC
Q_{gs}	Gate-Source Charge		--	6.5	--	nC
Q_{gd}	Gate-Drain Charge		--	8.3	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 15\text{ A}$	--	0.8	--	V

Notes:

 ① Pulse Test: Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$. Depend on FT Test

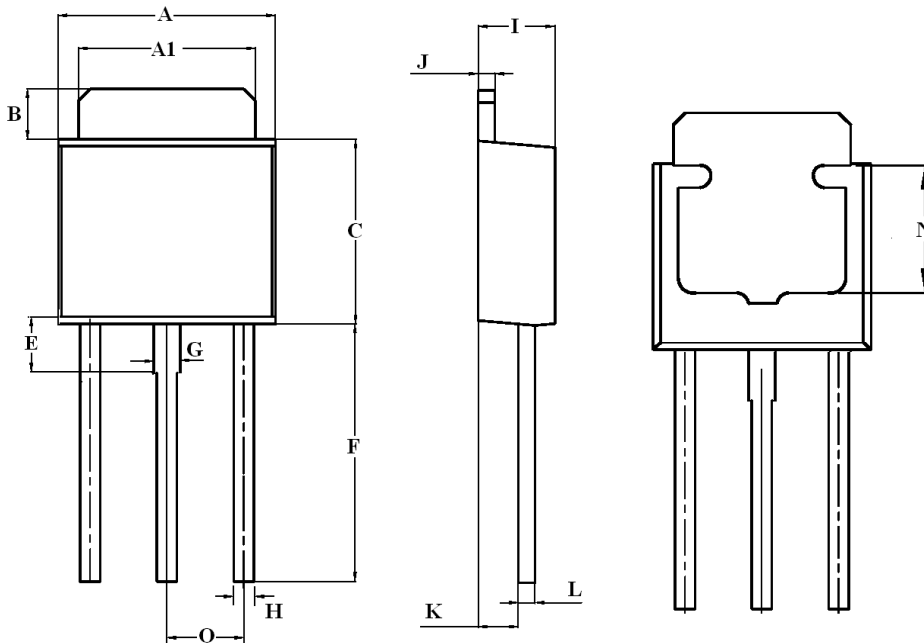
6 Package Dimensions

APQ39SN04AA-XXM0
TO-251



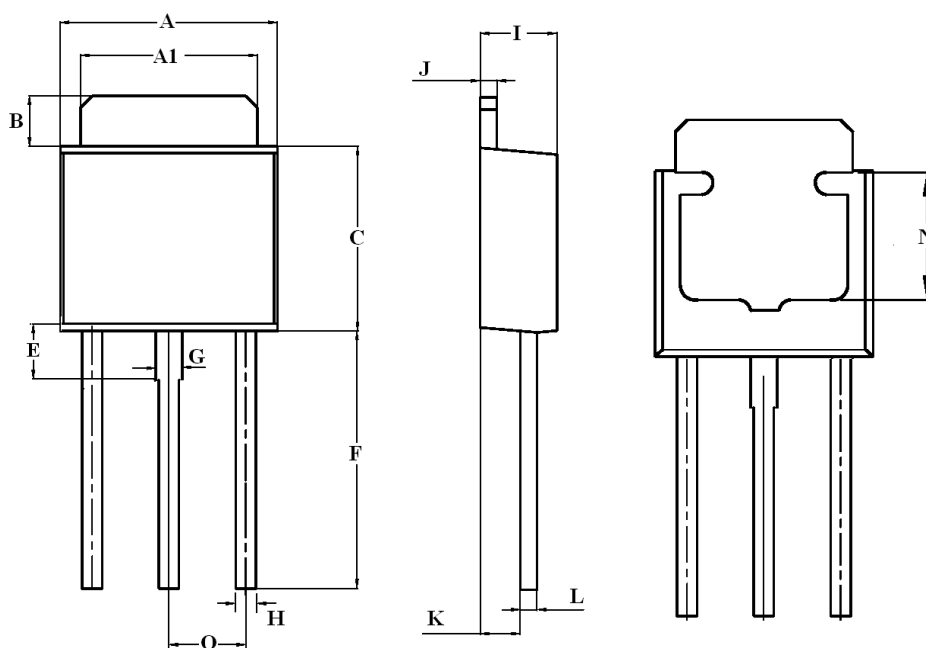
TO-251 DIMENSION							
DIM	MILLIMETERS						
	MIN	MAX	TYP.	DIM	MIN	MAX	TYP.
A	6.35	6.73	6.54	H	0.64	0.89	0.77
A1	4.95	5.46	5.21	I	2.18	2.39	2.29
B	0.89	1.27	1.08	J	0.46	0.89	0.66
C	5.97	6.22	6.10	K	0.89	1.14	1.02
D	1.14	1.52	1.33	L	0.46	0.61	0.54
E	1.91	2.29	2.10	M	4.32	--	--
F	8.89	9.65	9.27	N	5.21	-	-
G	0.84	1.14	0.99	O	2.29 BSC		

APQ39SN04AA-XXJ0
TO-251



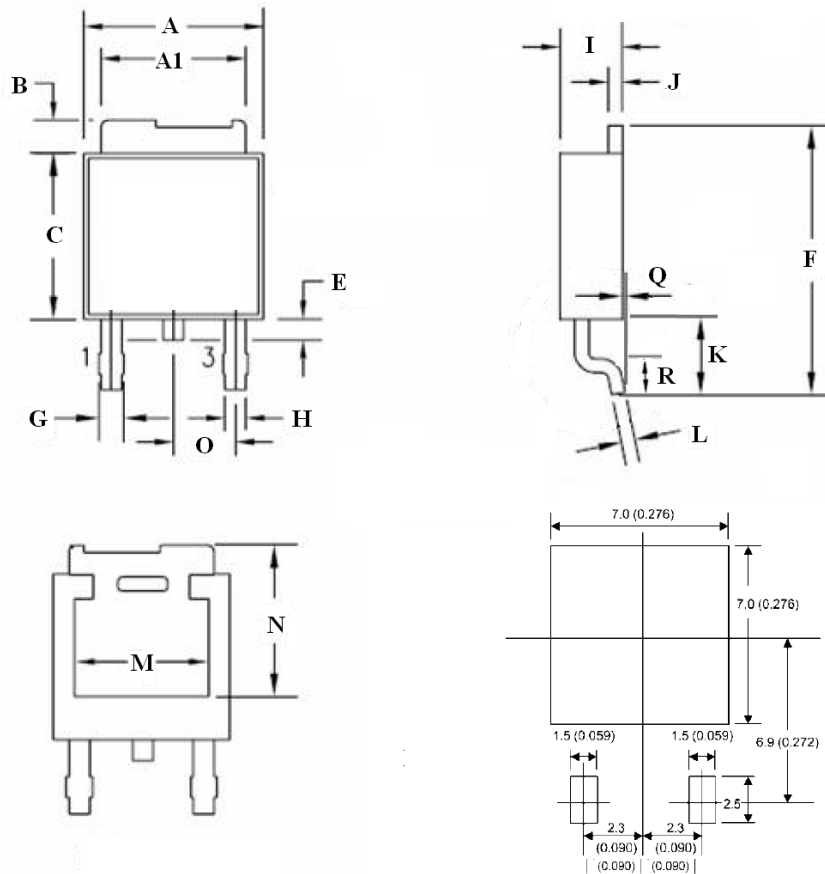
TO-251 DIMENSION							
DIM	MILLIMETERS						
	MIN	MAX	TYP.	DIM	MIN	MAX	TYP.
A	6.350	6.650	6.50	H	0.500	0.700	0.600
A1	5.200	5.400	5.300	I	2.200	2.400	2.300
B	1.350	1.650	1.500	J	0.430	0.580	0.505
C	5.400	5.700	5.550	K	1.050	1.350	1.2
E	1.91	2.29	2.100	L	0.430	0.580	0.505
F	7.500	7.900	7.700	N	3.800 REF.		
G	0.700	0.900	0.800	O	2.300 Typ.		

APQ39SN04AA-XXF0
TO-251



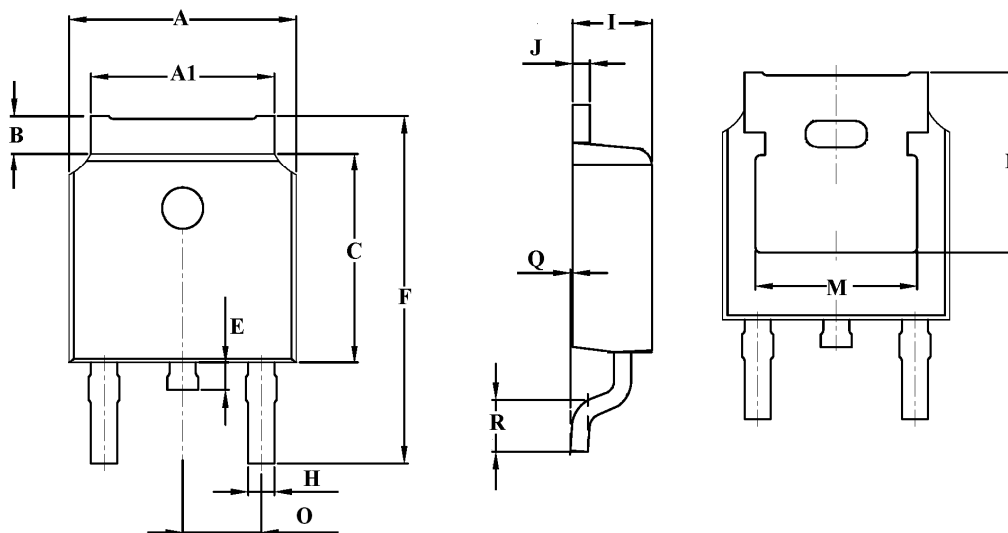
TO-251 DIMENSION							
DIM	MILLIMETERS						
	MIN	MAX	TYP.	DIM	MIN	MAX	TYP.
A	6.30	6.74	6.50	H	0.40	0.88	0.64
A1	4.80	5.46	5.13	I	2.10	2.50	2.30
B	1.30	1.70	1.50	J	0.40	0.60	0.50
C	5.30	6.23	5.76	K	1.10	1.30	1.20
E	0.91	1.80	1.35	L	0.43	0.58	0.50
F	6.98	8.00	7.50	N	3.800 REF.		
G	0.60	1.14	0.87	O	2.300 Typ.		

APQ39SN04AB-XXM0
TO-252



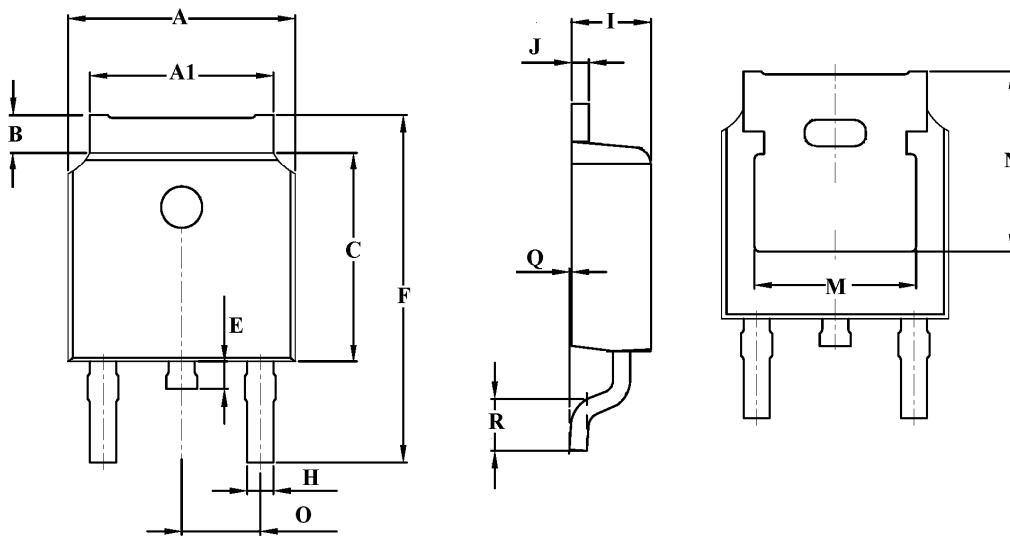
TO-252 DIMENSION							
DIM	MILLIMETERS						
	MIN	MAX	TYP.	DIM	MIN	MAX	TYP.
A	6.35	6.73	6.54	J	0.46	0.61	0.535
A1	5.21	5.46	5.335	K	2.550	2.900	2.725
B	0.89	1.27	1.08	L	0.46	0.61	0.535
C	5.97	6.22	6.095	M	4.83	--	
E	0.64	1.01	0.825	N	5.21	--	
F	9.65	10.14	9.895	O	2.29 BSC		
G	0.84	1.14	0.99	P	0.51 BSC		
H	0.64	0.89	0.765	Q	0	0.130	0.065
I	2.19	2.38	2.285	R	1.40	1.780	1.590

APQ39SN04AB-XXJ1 TO-252



TO-252 DIMENSION							
DIM	MILLIMETERS						
	MIN	MAX	TYP.	DIM	MIN	MAX	TYP
A	6.50	6.70	6.60	J	0.46	0.56	0.51
A1	5.12	5.46	5.29	K	2.9 REF		
B	0.89	1.27	1.08	L	0.56	0.46	0.51
C	6.00	6.20	6.10	M	4.83 REF		
E	0.6	1.0	0.80	N	5.35 REF		
F	9.80	10.4	10.00	O	2.19	2.39	2.29
H	0.71	0.81	0.76	Q	0	0.10	0.05
I	2.20	2.38	2.29	R	1.40	1.70	1.55

APQ39SN04AB-XXF0
TO-252



TO-252 DIMENSION							
DIM	MILLIMETERS						
	MIN	MAX	TYP.	DIM	MIN	MAX	TYP
A	6.30	6.80	6.55	J	0.40	0.60	0.50
A1	4.50	5.50	5.00				
B	0.89	1.70	1.30				
C	5.20	6.23	5.70	M	4.83 REF		
E	0.50	1.10	0.80	N	5.35 REF		
F	9.40	10.50	10.00	O	2.19	2.39	2.29
H	0.50	0.88	0.70	Q	0	0.30	0.15
I	2.00	2.50	2.25	R	0.90	1.77	1.34



DEVICE SPECIFICATION

APQ39SN04AA
APQ39SN04AB

40V/39A N-Channel MOSFET

Note

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