

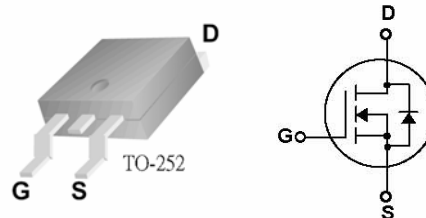
#### 1 Description

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

- 800V / 3A
- $R_{DS(on)} = 3.6\Omega(\text{typ})$ ,  $V_{GS} = 10V$ ,  $I_D = 1.5A$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability..



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

Symbol	Parameter	APQ03SN80AB-XXM0	Units
		APQ03SN80AB-XXM1	
		APQ03SN80AB-XXJ1	
		TO-252	
$V_{DSS}$	Drain-Source Voltage	800	V
$I_D$	Drain Current - Continuous ( $T_C = 25^\circ\text{C}$ ) - Continuous ( $T_C = 100^\circ\text{C}$ )	3	A
		1.9	A
$I_{DM}$	Drain Current – Pulsed ①	12	A
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy ②	320	mJ
$I_{AR}$	Avalanche Current	3	A
$E_{AR}$	Repetitive Avalanche Energy	10.7	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.5	V/ns
$P_D$	Power Dissipation ( $T_C = 25^\circ\text{C}$ ) - De-rate above $25^\circ\text{C}$	107	W
		0.85	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_L$	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

\* note :

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ②  $V_{DD} = 50V$ , starting  $T_J = 25^\circ\text{C}$ ,  $L = \text{TBD}$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 3A$
- ③  $ISD \leq 3A$ ,  $di/dt \leq 200A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq 150^\circ\text{C}$ .



# DEVICE SPECIFICATION

APQ03SN80AB

800V/3A N-Channel MOSFET

## 4 Thermal Characteristics

Symbol	Parameter	APQ03SN80AB-XXM0	Units
		APQ03SN80AB-XXM1	
		APQ03SN80AB-XXJ1	
		TO-252	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.17	$^{\circ}\text{C/W}$
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	$^{\circ}\text{C/W}$

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	800	--	--	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> = 250 μA, Referenced to 25°C	--	1	--	V/°C
I <sub>DSS</sub>	Gate to Source leakage current	V <sub>DS</sub> = 800 V, V <sub>GS</sub> = 0 V	--	--	10	μA
I <sub>GSSF</sub>	Gate-Body Leakage Current, Forward	V <sub>GS</sub> = 30 V, V <sub>DS</sub> = 0 V	--	--	100	nA
I <sub>GSSR</sub>	Gate-Body Leakage Current, Reverse	V <sub>GS</sub> = -30 V, V <sub>DS</sub> = 0 V	--	--	-100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	3.0	--	5.0	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 1.5 A ④	--	3.6	5	Ω
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz	--	550	--	pF
C <sub>oss</sub>	Output Capacitance		--	55	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	6	--	pF
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = 400 V, I <sub>D</sub> = 3A, R <sub>G</sub> = 25 Ω ④	--	20	--	ns
t <sub>r</sub>	Turn-On Rise Time		--	50	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	20	--	ns
t <sub>f</sub>	Turn-Off Fall Time		--	30	--	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = 640 V, I <sub>D</sub> = 3A, V <sub>GS</sub> = 10 V ④	--	14	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	3.5	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	6.0	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current		--	--	3	A
I <sub>SM</sub>	Maximum Pulsed Drain-Source Diode Forward Current		--	--	12	A



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$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 3\text{ A}$	--	--	1.5	V
$t_{rr}$	Reverse Recovery Time	$V_{GS} = 0\text{ V}, I_S = 3\text{ A},$ $dI_F/dt = 100\text{ A}/\mu\text{s}$ ④	--	640	--	ns
$Q_{rr}$	Reverse Recovery Charge		--	4.0	--	$\mu\text{C}$

**Notes:**

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ②  $V_{DD}=50\text{V}$ , starting  $T_J=25^\circ\text{C}$ ,  $L=\text{TBD}$ ,  $R_G=25\Omega$ ,  $I_{AS}=3\text{A}$
- ③  $I_{SD} \leq 3\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V(\text{BR})_{DSS}$ ,  $T_J \leq 150^\circ\text{C}$
- ④ Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ . Depend on FT Test.
- ⑤ CP Test



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800V/3A N-Channel MOSFET

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### Note

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