DEVICE SPECIFICATION

apQ84SN06A

60V/84A N-Channel MOSFET

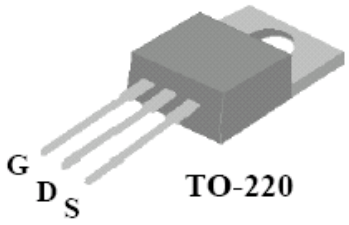
1 Description

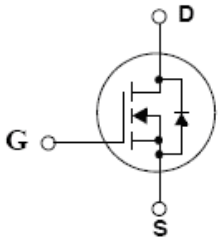
These N-Channel enhancement mode power field effect transistors are produced using planar stripe, DMOS technology.

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

- 60V / 84A, $R_{DS(on)}$ =12㎜Ω(typ) @
- V_{GS} =10V, I_D =50.4A
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability..





3 Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	apQ84SN06A	Units
V_{DSS}	Drain-Source Voltage	60	V
I_D	Drain Current - Continuous (T_C= 25°C)	84	A
	- Continuous (T_C= 100°C)	50.4	A
I_{DM}	Drain Current – Pulsed ①	336	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy ②	320	mJ
I_{AR}	Avalanche Current	50	A
E_{AR}	Repetitive Avalanche Energy	17	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.0	V/ns
P_D	Power Dissipation (T_C= 25°C)	200	W
	- De-ate above 25°C	1.4	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	soldering temperature for 10 seconds	300	°C

* note :

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

② V_{DD}=30V, starting T_J=25℃, L=TBD, RG=0Ω, I_{AS}=84A

③ I_{SD} ≤ 84A, di/dt ≤ 100A/μs, VDD ≤ $V_{(BR)DSS}$, T_J ≤ 150℃.

4 Thermal Characteristics

Symbol	Parameter	apQ84SN06A		Units
		Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	0.75	°C/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	--	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	62.5	°C/W

5 Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0 V, I_D= 250 μA	60	--	--	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D= 1mA, Referenced to 25°C	--	0.064	--	V/°C
I_{DSS}	Gate to Source leakage current	V_{DS}= 60 V, V_{GS} = 0 V	--	--	25	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS}= 20 V, V_{DS}= 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS}= -20 V, V_{DS}= 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D= 250 μA	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS}= 10 V, I_D= 50.4 A ④	--	9	12	mΩ
g_{FS}	Forward Transconductance	V_{DS}= 10 V, I_D = 32.5 A ①	--	--	100	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}= 30 V, V_{GS}= 0 V, f = 1.0 MHz	--	3200	--	pF
C_{oss}	Output Capacitance		--	687	--	pF
C_{rss}	Reverse Transfer Capacitance		--	135	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}= 30 V, I_D= 30A, R_G= 4.7 Ω ,R_D=1 Ω V_{GS}=10V ④	--	11	--	ns
t_r	Turn-On Rise Time		--	75	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	45	--	ns
t_f	Turn-Off Fall Time		--	50	--	ns
Q_g	Total Gate Charge	V_{DS}= 30 V, I_D= 30A, V_{GS}= 10 V ④	--	--	125	nC
Q_{gs}	Gate-Source Charge		--	--	25	nC
Q_{gd}	Gate-Drain Charge		--	--	40	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	84	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	336	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}= 0 V, I_S=25 A	--	--	1.5	V

t_{rr}	Reverse Recovery Time	V_{GS}= 0 V, I_F= 30 A,	--	71	--	ns
Q_{rr}	Reverse Recovery Charge	dI_F/dt = 100 A/μs ④	--	215	--	μC

Notes:

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

② V_{DD}=30V, starting T_J=25℃, L=TBD, R_G=0Ω, I_{AS}=84A

③ I_{SD} ≤ 84A, di/dt ≤ 100A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150℃

④ Pulse Test: Pulse width ≤300μs, Duty cycle ≤ 2%. Depend on FT Test.

⑤ CP Test

Note

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