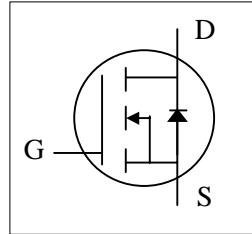




- ▼ Simple Drive Requirement
- ▼ Lower Gate Charge
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

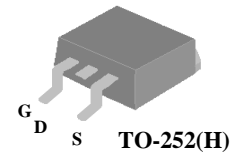


BV_{DSS}	60V
$R_{DS(ON)}$	42m Ω
I_D	18A

Description

AP9870 series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The TO-252 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for high current application due to the low connection resistance.



Absolute Maximum Ratings @ $T_J=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	+20	V
$I_D@T_C=25^\circ\text{C}$	Drain Current, V_{GS} @ 10V	18	A
$I_D@T_C=100^\circ\text{C}$	Drain Current, V_{GS} @ 10V	11.5	A
I_{DM}	Pulsed Drain Current ¹	60	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation	27.8	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	4.5	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) ³	62.5	$^\circ\text{C}/\text{W}$



AP9870GH-HF

Electrical Characteristics @T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units	
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	60	-	-	V	
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =12A	-	-	42	mΩ	
		V _{GS} =4.5V, I _D =8A	-	-	60	mΩ	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	1	-	3	V	
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =15A	-	18	-	S	
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V	-	-	25	uA	
I _{GSS}	Gate-Source Leakage	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA	
Q _g	Total Gate Charge ²	I _D =15A	-	8	12.8	nC	
Q _{gs}	Gate-Source Charge		V _{DS} =48V	-	2	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge		V _{GS} =4.5V	-	5	-	nC
t _{d(on)}	Turn-on Delay Time ²	V _{DS} =30V	-	6	-	ns	
t _r	Rise Time	I _D =15A	-	23	-	ns	
t _{d(off)}	Turn-off Delay Time	R _G =3.3Ω	-	16	-	ns	
t _f	Fall Time	V _{GS} =10V	-	3.6	-	ns	
C _{iss}	Input Capacitance	V _{GS} =0V	-	545	870	pF	
C _{oss}	Output Capacitance	V _{DS} =25V	-	75	-	pF	
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	55	-	pF	

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ²	I _S =12A, V _{GS} =0V	-	-	1.3	V
t _{rr}	Reverse Recovery Time ²	I _S =15A, V _{GS} =0V	-	29	-	ns
Q _{rr}	Reverse Recovery Charge		di/dt=100A/μs	-	30	-

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in² copper pad of FR4 board

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

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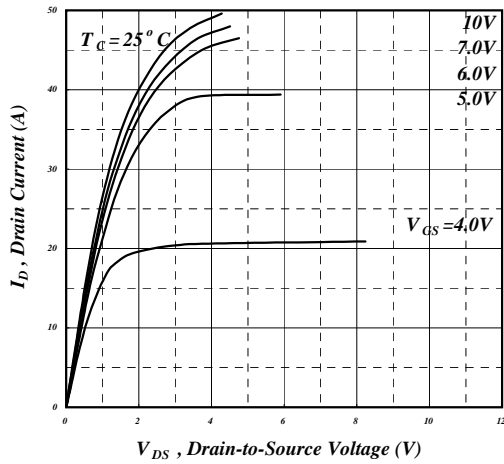


Fig 1. Typical Output Characteristics

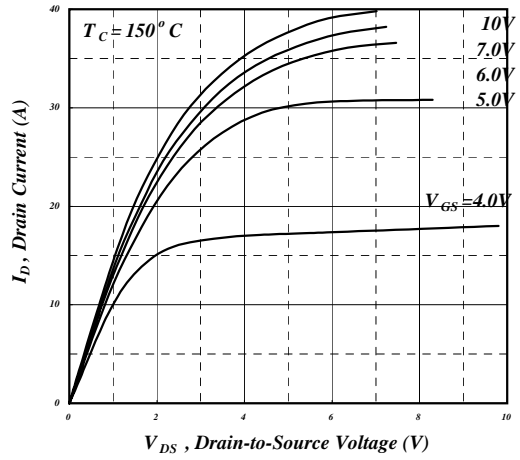


Fig 2. Typical Output Characteristics

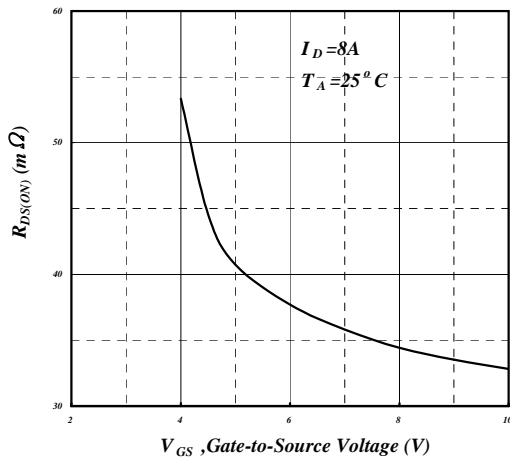


Fig 3. On-Resistance v.s. Gate Voltage

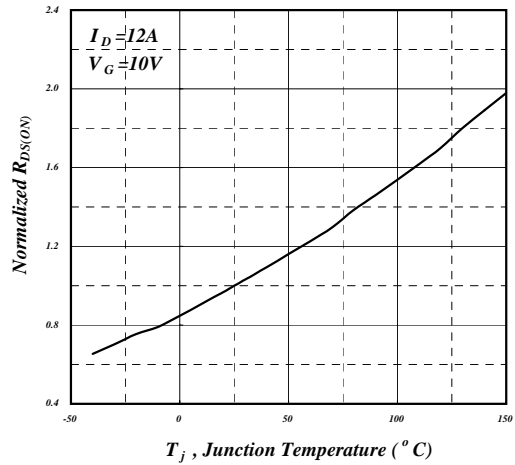


Fig 4. Normalized On-Resistance v.s. Junction Temperature

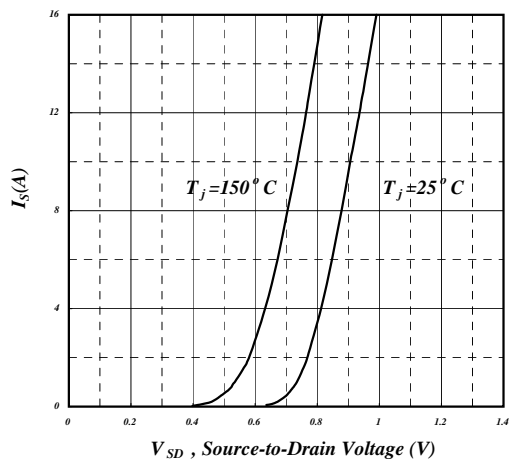


Fig 5. Forward Characteristic of Reverse Diode

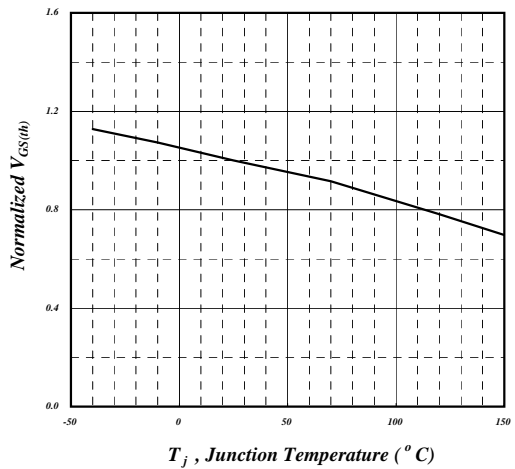


Fig 6. Gate Threshold Voltage v.s. Junction Temperature



AP9870GH-HF

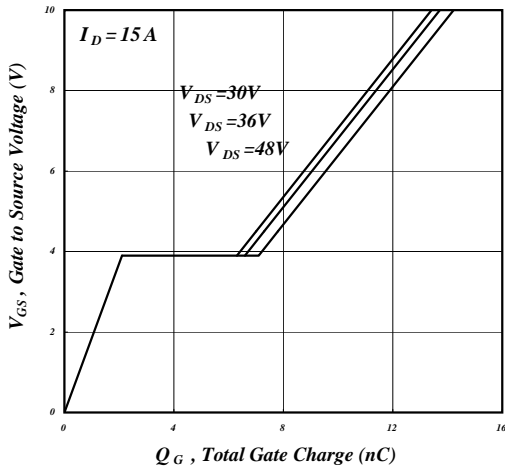


Fig 7. Gate Charge Characteristics

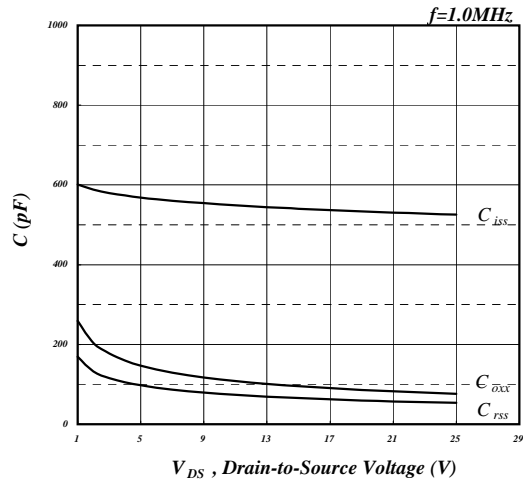


Fig 8. Typical Capacitance Characteristics

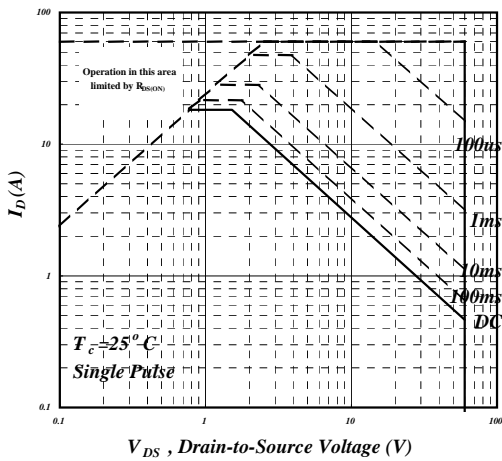


Fig 9. Maximum Safe Operating Area

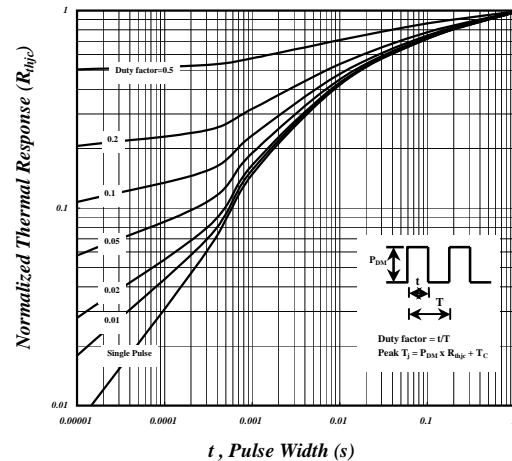


Fig 10. Effective Transient Thermal Impedance



Fig 11. Switching Time Waveform

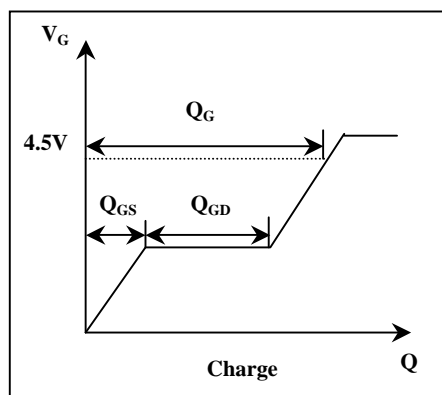
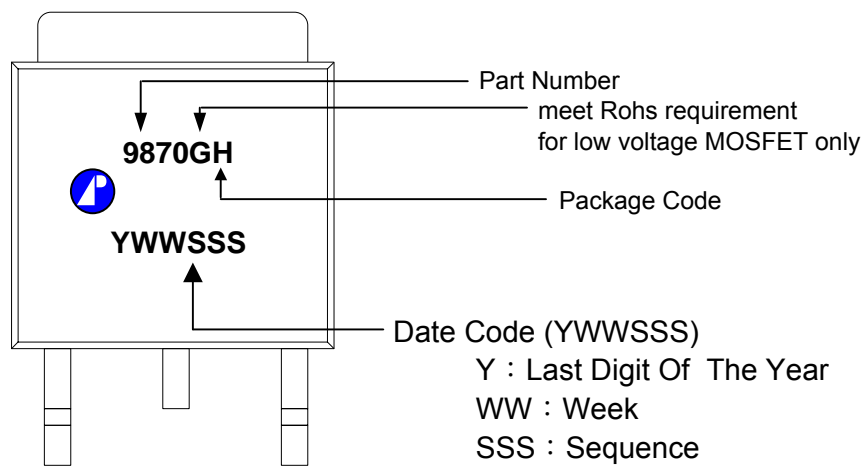


Fig 12. Gate Charge Waveform



MARKING INFORMATION





Package Outline : TO-252



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A2	2.18	2.30	2.40
A3	0.40	0.50	0.65
B	0.40	0.70	1.00
B1	0.50	0.85	1.20
D	6.00	6.50	6.80
D1	4.80	5.35	5.90
E3	4.00 (ref.)		
F	2.00	2.63	3.05
F1	0.50	0.85	1.20
E1	5.00	5.70	6.30
E2	0.50	1.10	1.80
e	2.3 (ref)		
C	0.35	0.525	0.70
A1	0.00	—	0.25
B2	—	—	1.25
L	0.90	1.34	1.78



1. All Dimensions Are in Millimeters.
2. Dimension Does Not Include Mold Protrusions.
3. Thermal PAD, Body and Pin contour is for reference, it may has little difference by option.



TO-252 FOOTPRINT :

