Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

▼ **Low On-resistance**

▼ **Simple Drive Requirement**

▼ **Surface Mount Package**

▼ **RoHS Compliant**
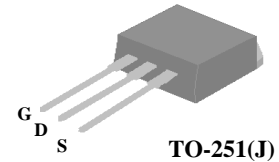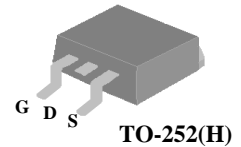
BV_{DSS}	60V
$R_{DS(ON)}$	36mΩ
I_D	25A

Description

AP9971 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. The through-hole version (AP9971GJ) are available for low-profile applications.

G D S   **TO-252(H)**

G D S   **TO-251(J)**

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	$\pm$20	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	25	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	16	A
I_{DM}	Pulsed Drain Current[1]	80	A
P_D@T_C=25℃	Total Power Dissipation	39	W
	Linear Derating Factor	0.31	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	3.2	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount)[3]	62.5	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	℃/W

Data and specifications subject to change without notice

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=18A	-	-	36	mΩ
		V_{GS}=4.5V, I_D=12A	-	-	50	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=18A	-	17	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=60V, V_{GS}=0V	-	-	1	uA
	Drain-Source Leakage Current (T_j=125°C)	V_{DS}=48V ,V_{GS}=0V	-	-	250	uA
I_{GSS}	Gate-Source Leakage	V_{GS}= $\pm$20V, V_{DS}=0V	-	-	$\pm$100	nA
Q_g	Total Gate Charge[2]	I_D=18A	-	18	30	nC
Q_{gs}	Gate-Source Charge	V_{DS}=48V	-	6	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=4.5V	-	11	-	nC
$t_{d(on)}$	Turn-on Delay Time[2]	V_{DS}=30V	-	9	-	ns
t_r	Rise Time	I_D=18A	-	24	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=3.3Ω	-	26	-	ns
t_f	Fall Time	V_{GS}=10V	-	7	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1700	2700	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	160	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	110	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=18A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[2]	I_S=18A, V_{GS}=0V,	-	37	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	38	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

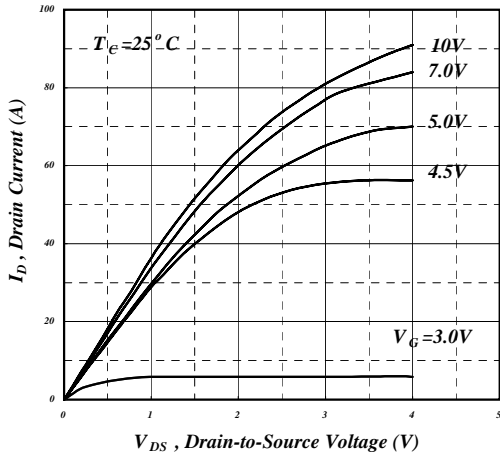3.Surface mounted on 1 in^2 copper pad of FR4 board

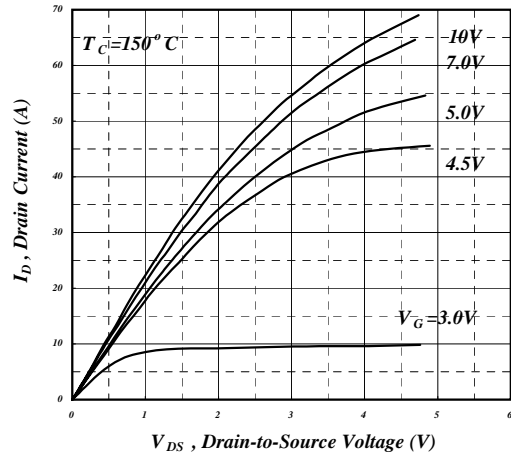Fig 1. Typical Output Characteristics
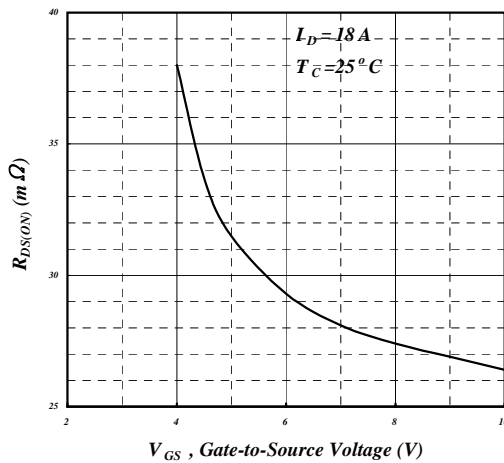

Fig 2. Typical Output Characteristics

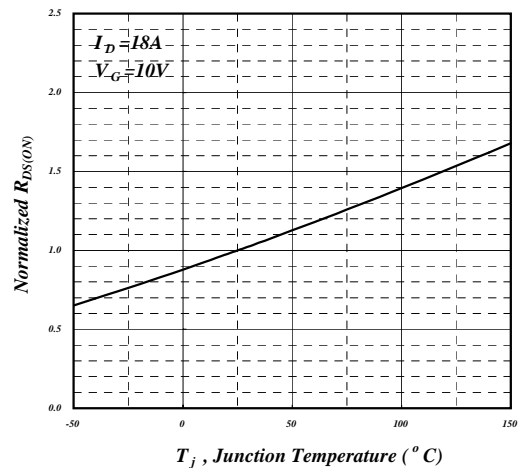Fig 3. On-Resistance v.s. Gate Voltage

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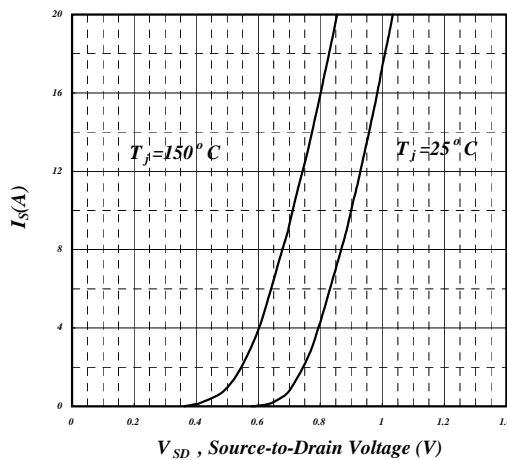v.s. Junction Temperature
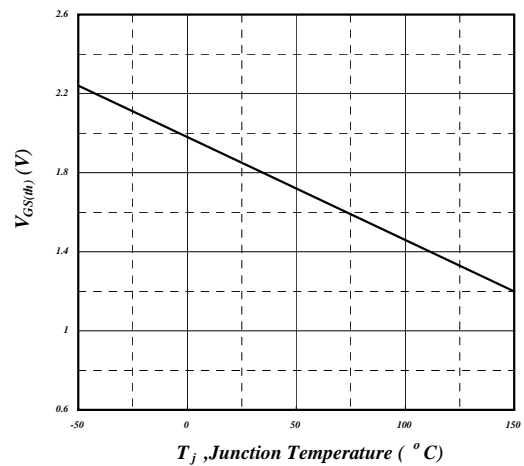

Fig 5. Forward Characteristic of
Reverse Diode

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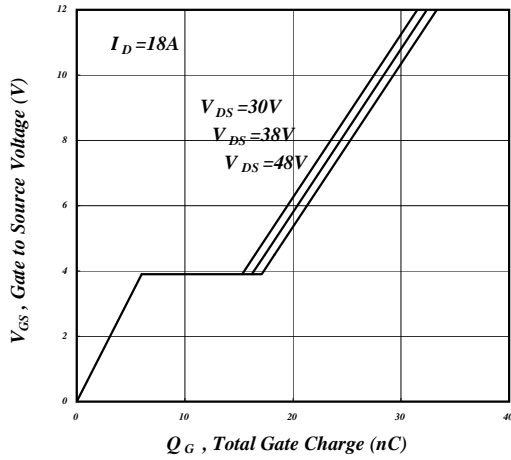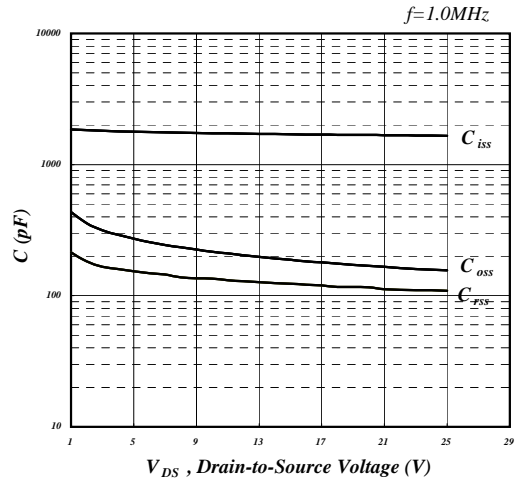Junction Temperature

Fig 7. Gate Charge Characteristics
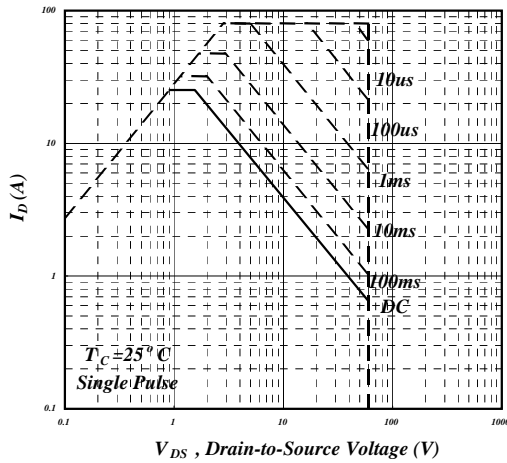

Fig 8. Typical Capacitance Characteristics

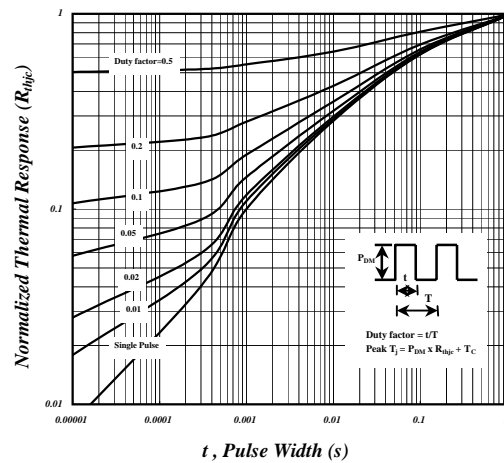**Fig 9. Maximum Safe Operating Area**
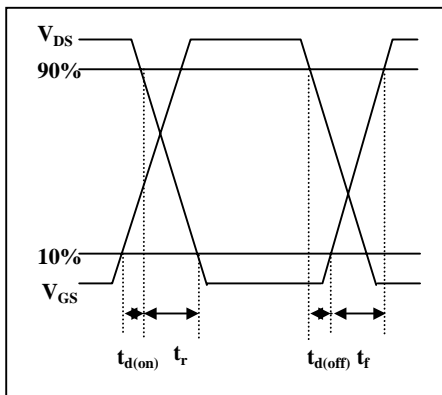

Fig 10. Effective Transient Thermal Impedance

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform

MARKING INFORMATION

TO-251

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                                    ——— Part Number
                                        meet Rohs requirement
            9971GJ                      for low voltage MOSFET only

             ⏺                      ——— Package Code
          YWWSSS

                                    ——— Date Code (YWWSSS)
                                            Y：Last Digit Of  The Year
                                            WW：Week
                                            SSS：Sequence
```

TO-252

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                                    ——— Part Number
                                        meet Rohs requirement
           9971GH                       for low voltage MOSFET only

            ⏺                      ——— Package Code
          YWWSSS

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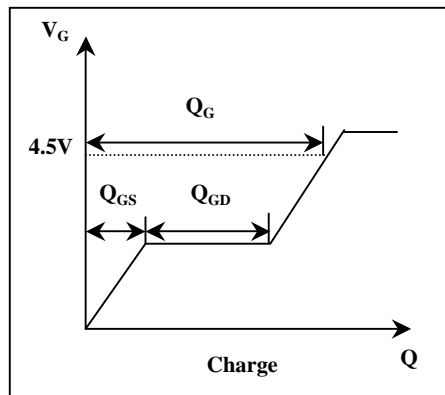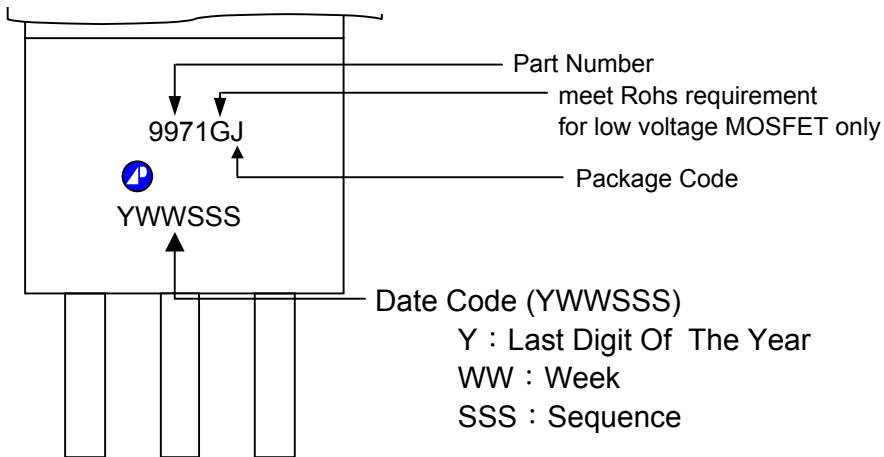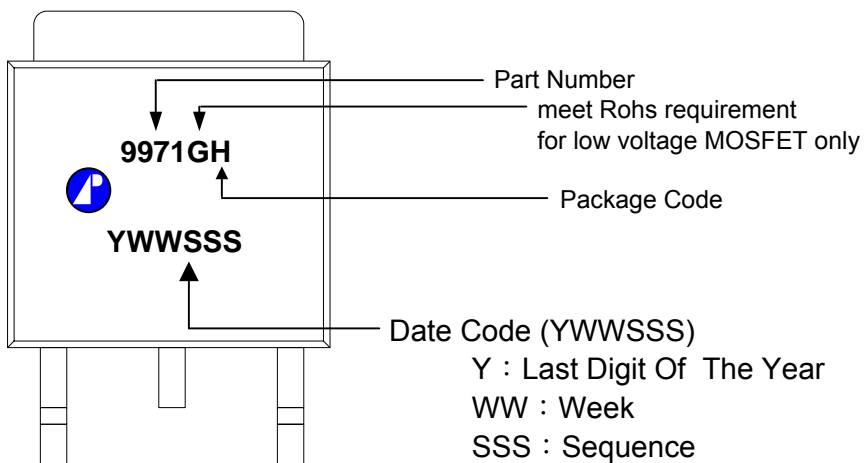
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