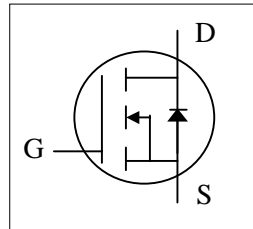




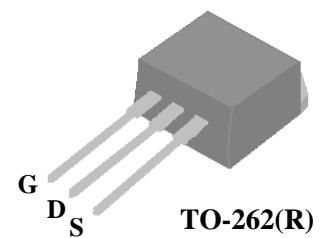
- ▼ Lower Gate Charge
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



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

### Description

AP9972 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.



### 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	+25	V
$I_D@T_C=25^\circ\text{C}$	Drain Current, $V_{GS}$ @ 10V	60	A
$I_D@T_C=100^\circ\text{C}$	Drain Current, $V_{GS}$ @ 10V	38	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	230	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation	89	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>3</sup>	45	mJ
$I_{AR}$	Avalanche Current <sup>3</sup>	30	A
$T_{STG}$	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	1.4	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	62	$^\circ\text{C}/\text{W}$



**Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =35A	-	-	18	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A	-	-	22	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	-	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =35A	-	55	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V	-	-	25	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =35A	-	32	51	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =48V	-	8	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	20	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =30V	-	11	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =35A	-	58	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	45	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	80	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	3170	5070	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	280	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	230	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	1.7	-	Ω

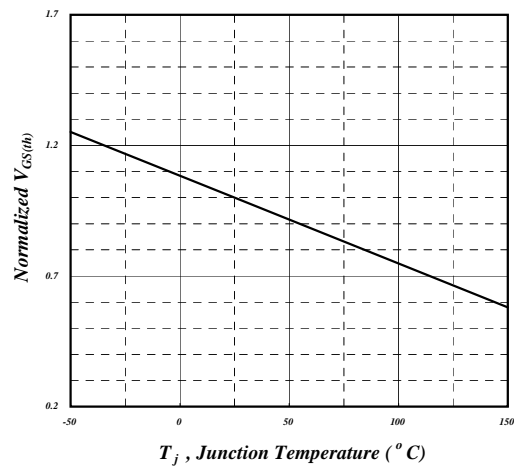
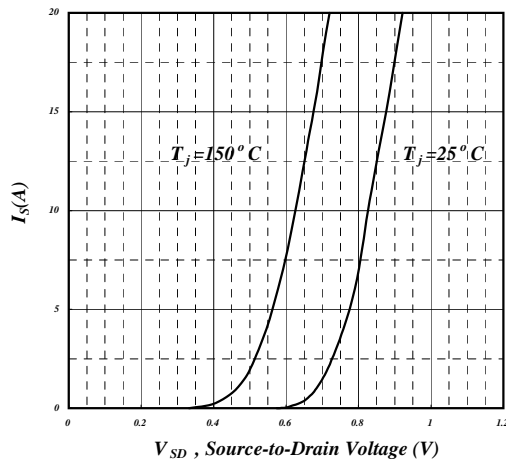
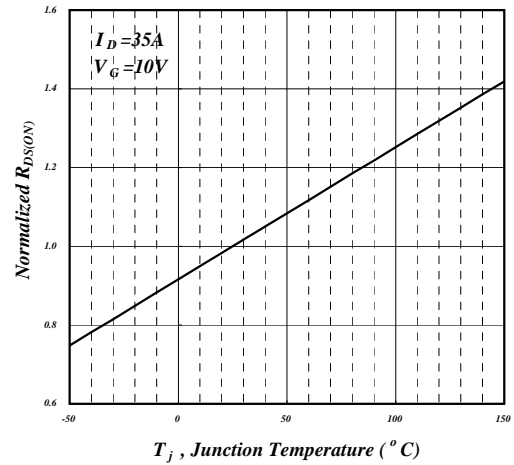
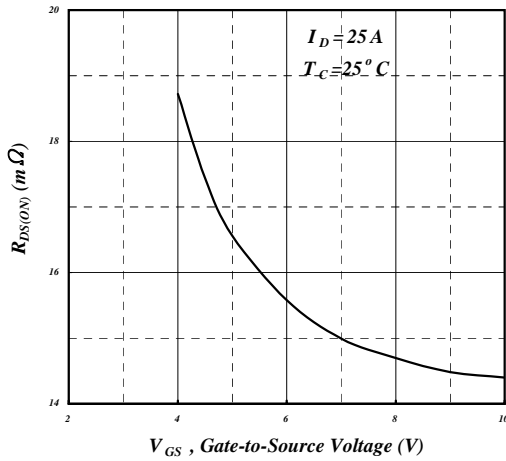
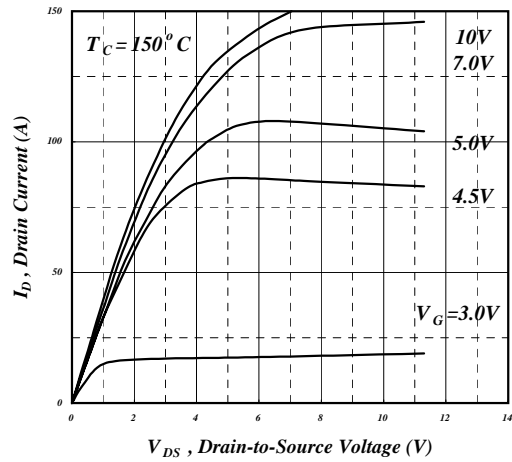
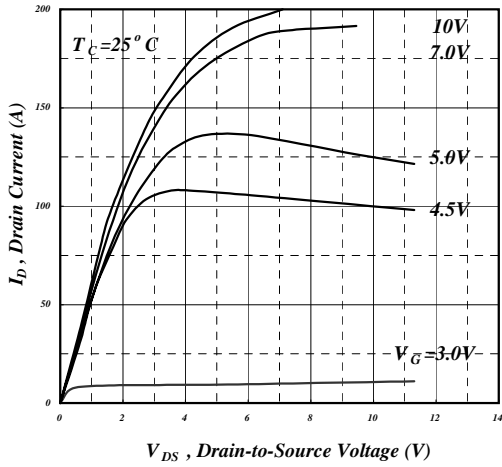
**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =35A, V <sub>GS</sub> =0V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =35A, V <sub>GS</sub> =0V,	-	50	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	48	-	nC

**Notes:**

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=30V , L=100uH , R<sub>G</sub>=25Ω , I<sub>AS</sub>=30A.

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.  
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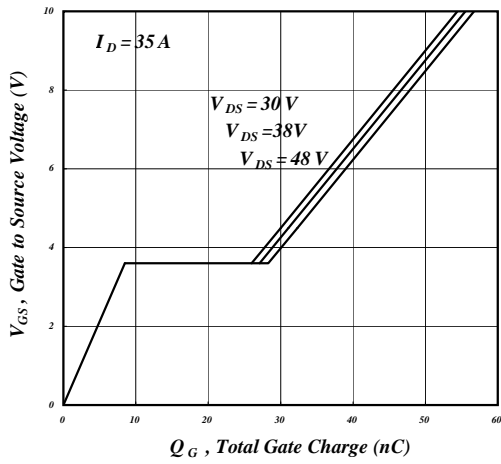


Fig 7. Gate Charge Characteristics

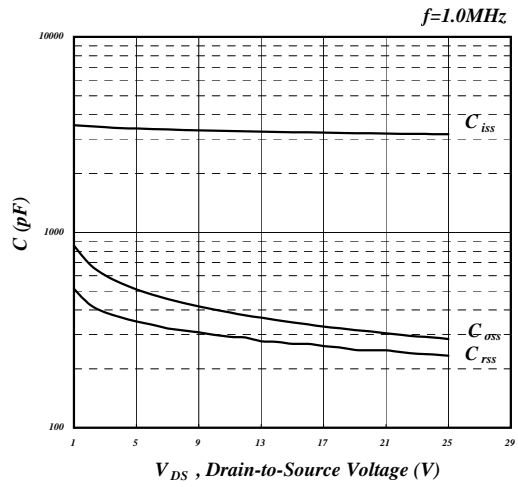


Fig 8. Typical Capacitance Characteristics

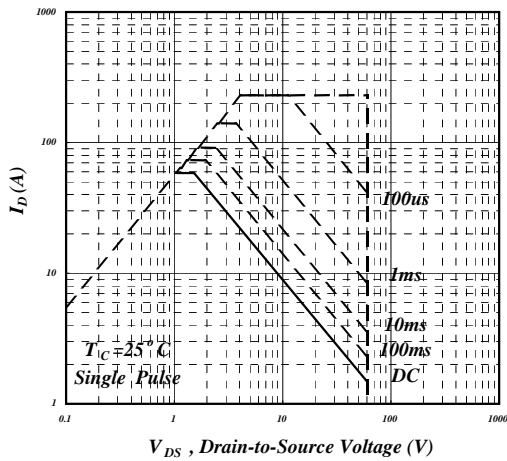


Fig 9. Maximum Safe Operating Area

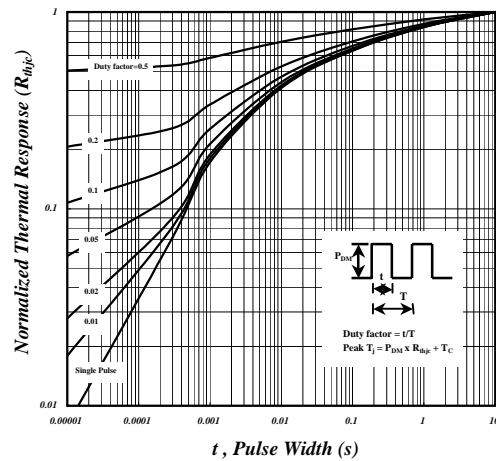


Fig 10. Effective Transient Thermal Impedance

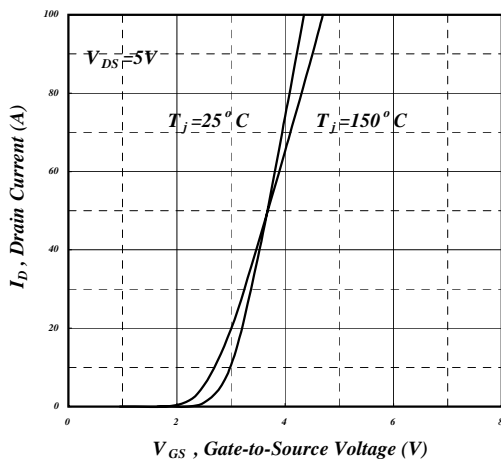


Fig 11. Transfer Characteristics

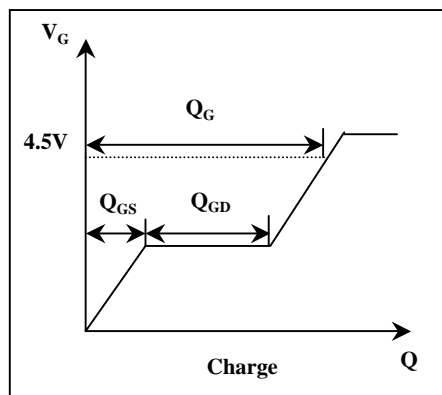
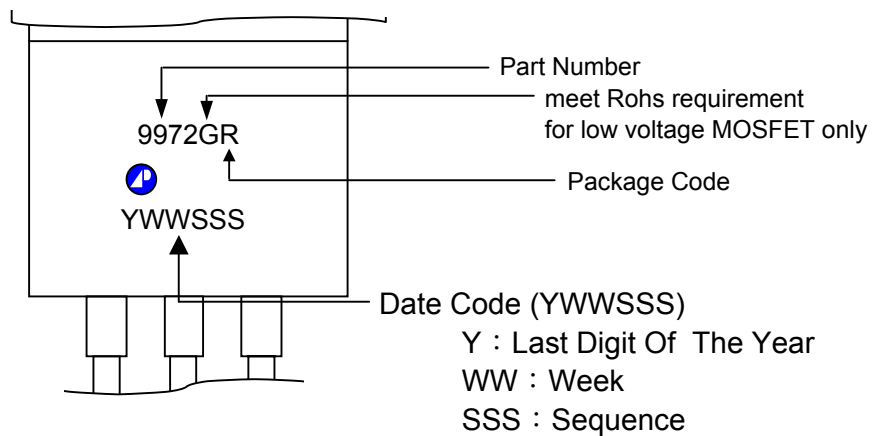


Fig 12. Gate Charge Waveform

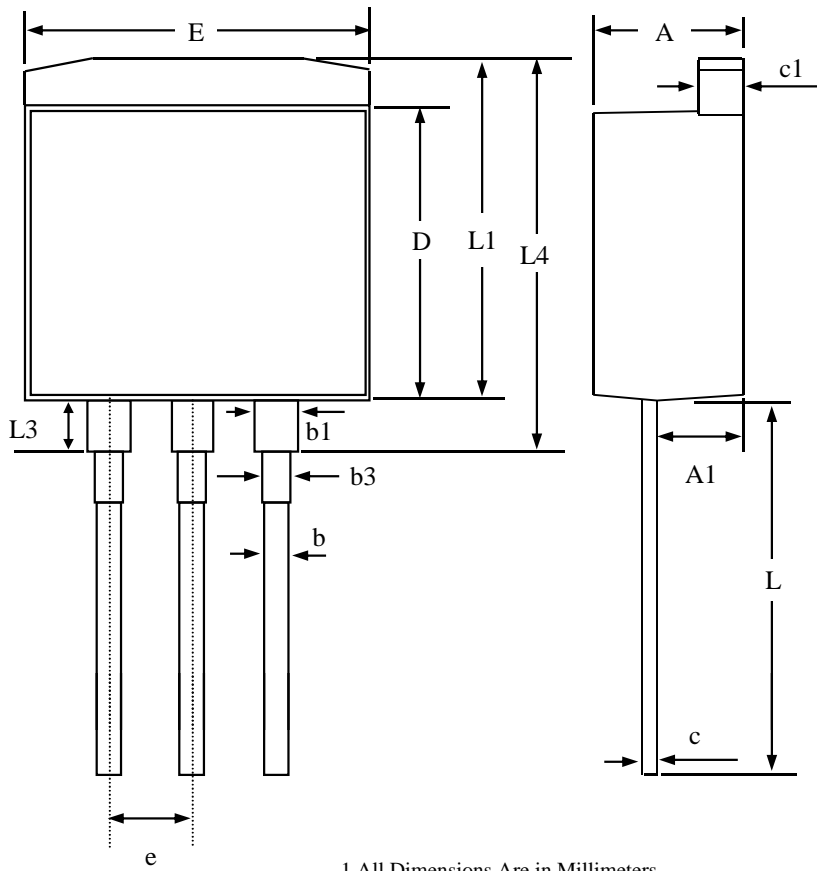


# MARKING INFORMATION





## Package Outline : TO-262



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.24	4.54	4.84
A1	2.10	2.50	2.90
b	0.65	0.85	1.05
b1	0.63	1.08	1.53
b3	0.75	1.08	1.40
c	0.30	0.45	0.60
c1	1.15	1.3	1.45
D	8.30	8.9	9.50
E	9.50	10	10.50
e	2.04	2.54	3.04
L	10.50	12.5	14.50
L1	8.50	10	11.50
L3	1.3 ~ 4.8 (ref)		

1. All Dimensions Are in Millimeters.
2. Dimension Does Not Include Mold Protrusions.



**TO-262 FOOTPRINT :**

