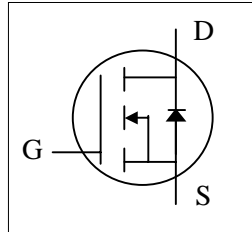
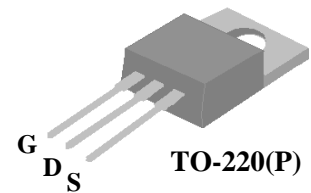




- ▼ 100% Avalanche Test
- ▼ Fast Switching Characteristic
- ▼ Simple Drive Requirement



$BV_{DSS}$	400V
$R_{DS(ON)}$	5 $\Omega$
$I_D$	1.6A



## Description

AP02N40 uses rugged design with the best combination of fast switching and cost-effectiveness.

The TO-220 package is widely preferred for commercial-industrial applications. The good thermal performance and low package cost, Contribute to its wide industry application.

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	400	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	1.6	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	1	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	3	A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	33	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	5	mJ
$I_{AR}$	Avalanche Current	1	A
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Unit
$R_{thj-c}$	Maximum Thermal Resistance, Junction-case	3.8	$^\circ C/W$
$R_{thj-a}$	Maximum Thermal Resistance, Junction-ambient	62	$^\circ C/W$



**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> =1mA	400	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>3</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.7A	-	-	5	Ω
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2	-	4	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =1A	-	1.5	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =400V, V <sub>GS</sub> =0V	-	-	25	uA
	Drain-Source Leakage Current (T <sub>j</sub> =125°C)	V <sub>DS</sub> =320V, V <sub>GS</sub> =0V	-	-	250	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>3</sup>	I <sub>D</sub> =1A	-	6.4	10	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =320V	-	1.2	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	3.2	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>3</sup>	V <sub>DD</sub> =200V	-	8	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =1A	-	9	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =50Ω, V <sub>GS</sub> =10V	-	21	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =200Ω	-	12	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	180	300	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	22	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	5.6	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>3</sup>	I <sub>S</sub> =1.6A, V <sub>GS</sub> =0V	-	-	1.5	V
t <sub>rr</sub>	Reverse Recovery Time <sup>3</sup>	I <sub>S</sub> =1A, V <sub>GS</sub> =0V,	-	150	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	680	-	nC

**Notes:**

- 1.Pulse width limited by Max. junction temperature.
- 2.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=50V , L=10mH , R<sub>G</sub>=25Ω
- 3.Pulse test

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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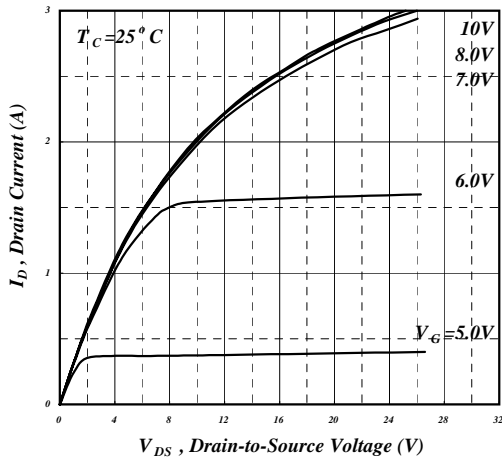


Fig 1. Typical Output Characteristics

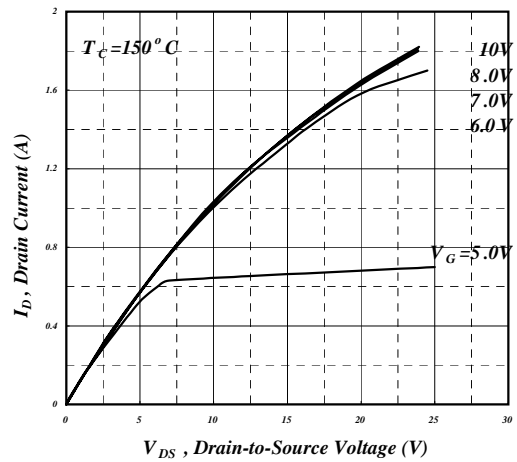


Fig 2. Typical Output Characteristics

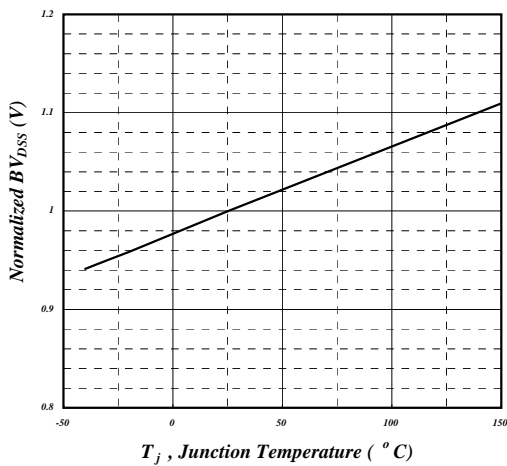


Fig 3. Normalized  $BV_{DS}$  v.s. Junction Temperature

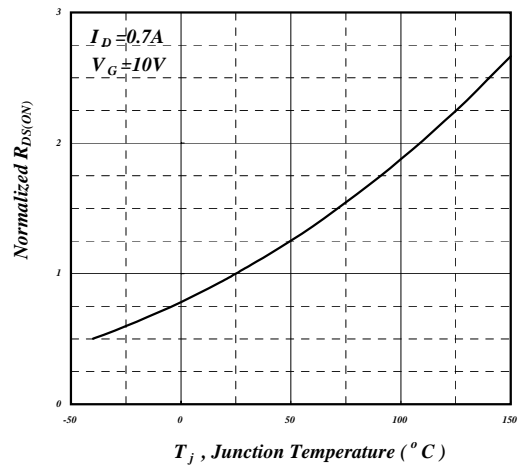


Fig 4. Normalized On-Resistance v.s. Junction Temperature

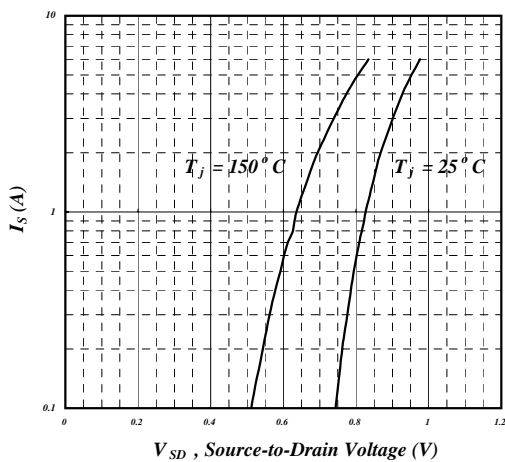


Fig 5. Forward Characteristic of Reverse Diode

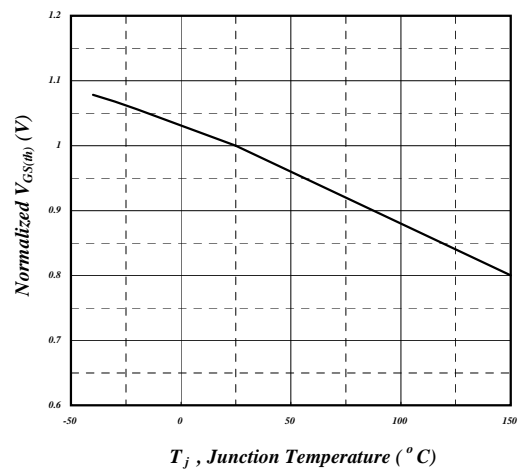


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

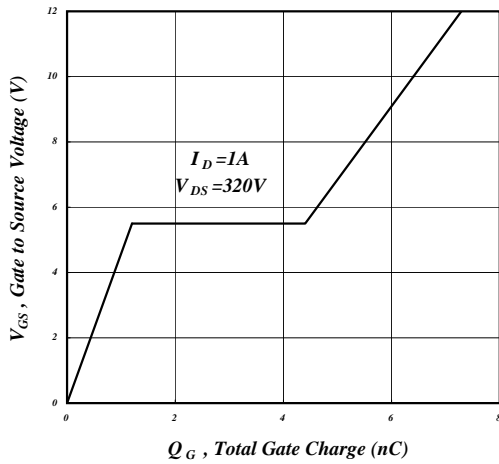


Fig 7. Gate Charge Characteristics

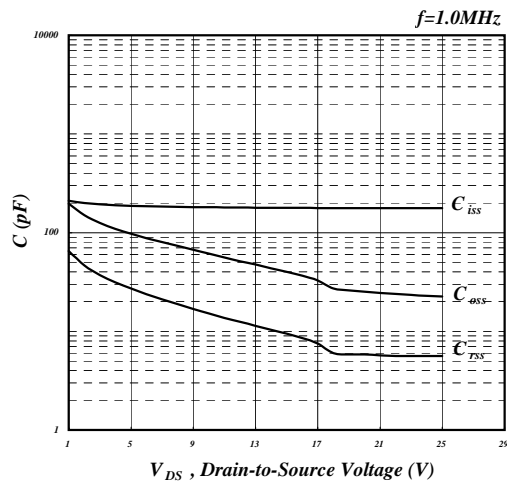


Fig 8. Typical Capacitance Characteristics

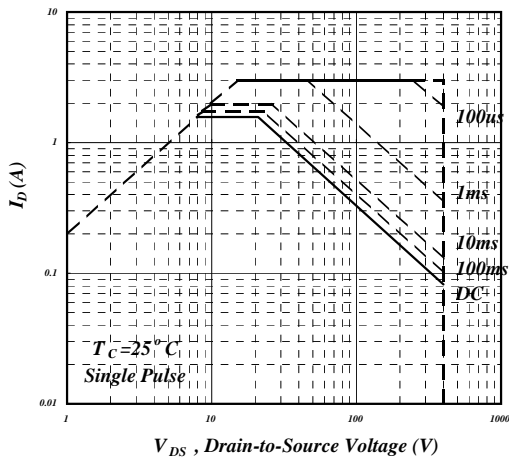


Fig 9. Maximum Safe Operating Area

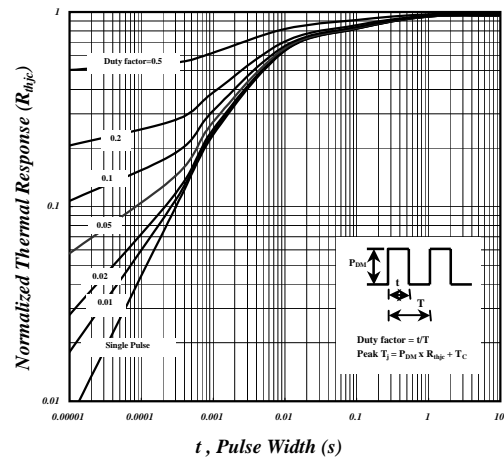


Fig 10. Effective Transient Thermal Impedance



Fig 11. Switching Time Waveform

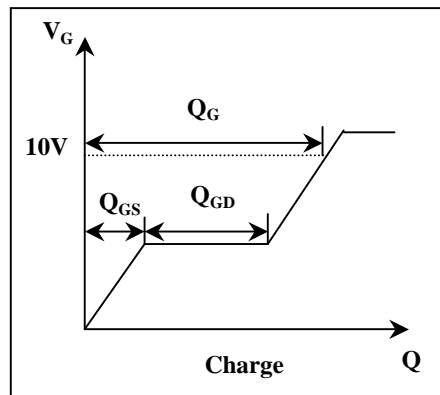
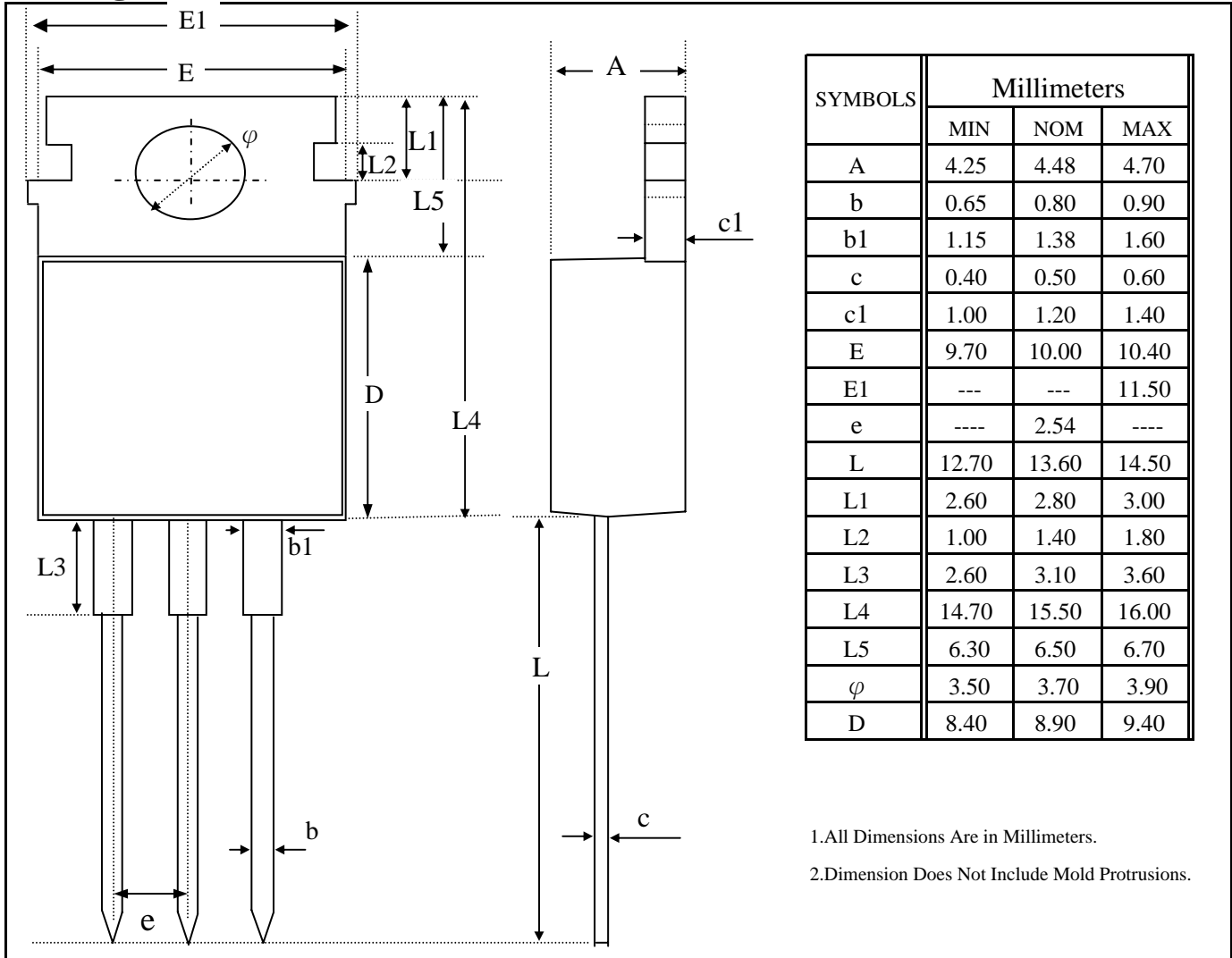


Fig 12. Gate Charge Waveform



**Package Outline : TO-220**



**Part Marking Information & Packing : TO-220**

