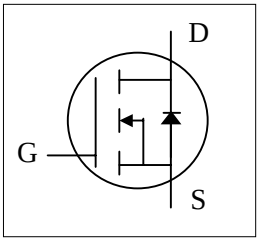
AP4002S/P

RoHS-compliant Product

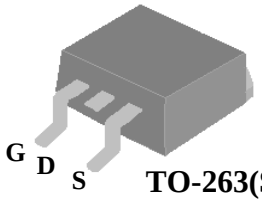
Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

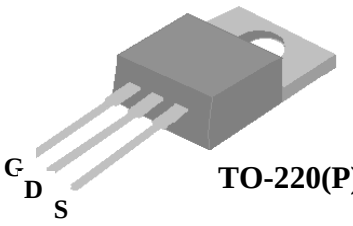
- ▼ **100% Avalanche Test**
- ▼ **Fast Switching Characteristics**
- ▼ **Simple Drive Requirement**



BV_{DSS}	600V
$R_{DS(ON)}$	5Ω
I_D	2A



TO-263(S)



TO-220(P)

Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-263 package is widely preferred for commercial-industrial surface mount applications and suited for power applications.The through-hole version (AP4002P) are available for low-profile applications.

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	±30	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	2	A
I_{DM}	Pulsed Drain Current[1]	8	A
P_D@T_C=25℃	Total Power Dissipation	20	W
	Linear Derating Factor	0.16	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	20	mJ
I_{AR}	Avalanche Current	2	A
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	6.25	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient	62	℃/W

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=1mA	600	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=1.0A	-	-	5	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=2.0A	-	1.5	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=600V, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±30V	-	-	±1	uA
Q_g	Total Gate Charge[3]	I_D=2A	-	12	19	nC
Q_{gs}	Gate-Source Charge	V_{DS}=480V	-	2	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	5.5	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=200V	-	10	-	ns
t_r	Rise Time	I_D=1A	-	12	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=50Ω,V_{GS}=10V	-	52	-	ns
t_f	Fall Time	R_D=200Ω	-	19	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	375	600	pF
C_{oss}	Output Capacitance	V_{DS}=10V	-	170	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	45	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[3]	I_S=2A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time[3]	I_S=2A, V_{GS}=0V,	-	340	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	2.2	-	μC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Starting T_j=25°C , V_{DD}=50V , L=10mH , R_G=25Ω

3.Pulse test

THIS PRODUCT IS AN ELECTROSTATIC SENSITIVE, PLEASE HANDLE WITH CAUTION.

THIS PRODUCT HAS BEEN QUALIFIED FOR CONSUMER MARKET. APPLICATIONS OR USES AS CRITERIAL COMPONENT IN LIFE SUPPORT DEVICE OR SYSTEM ARE NOT AUTHORIZED.

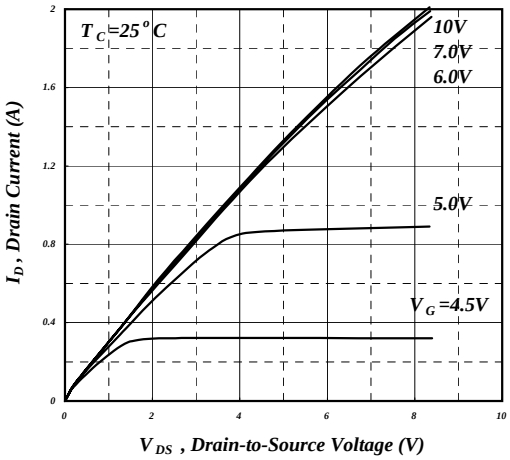


Fig 1. Typical Output Characteristics

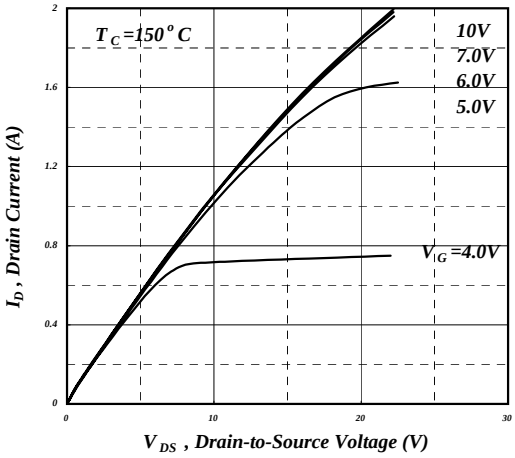


Fig 2. Typical Output Characteristics

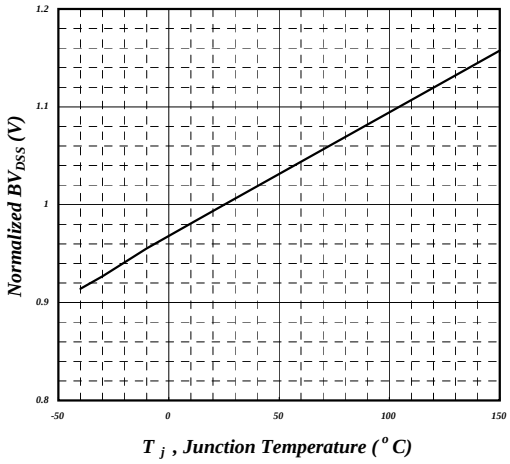


Fig 3. On-Resistance v.s. Gate Voltage

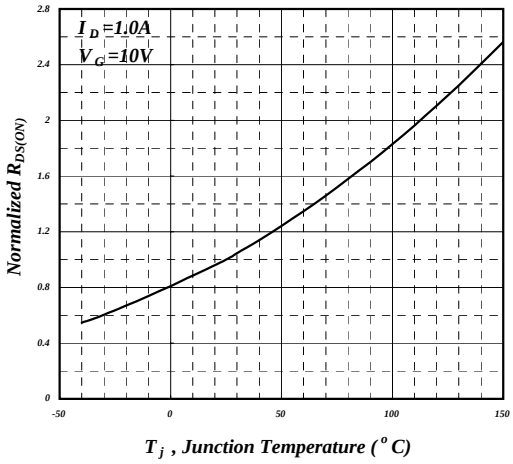


Fig 4. Normalized On-Resistance v.s. Junction Temperature

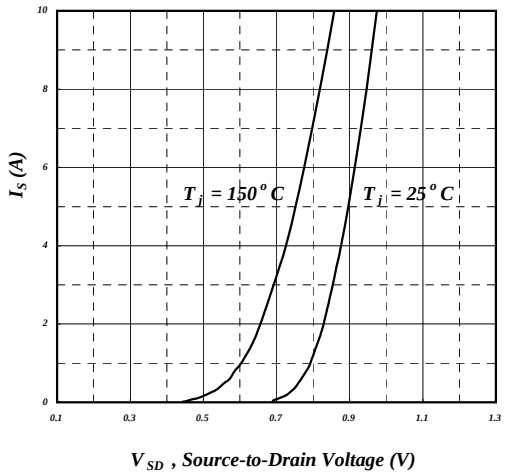


Fig 5. Forward Characteristic of Reverse Diode

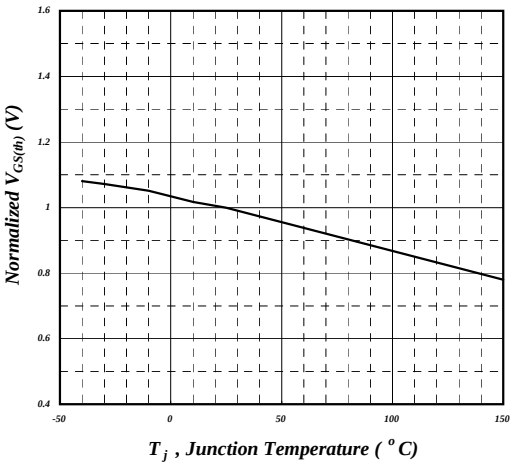


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

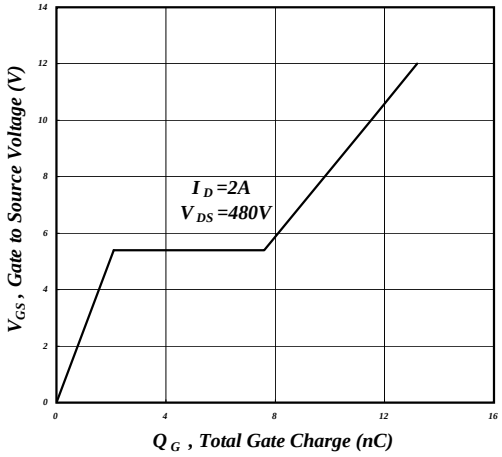


Fig 7. Gate Charge Characteristics

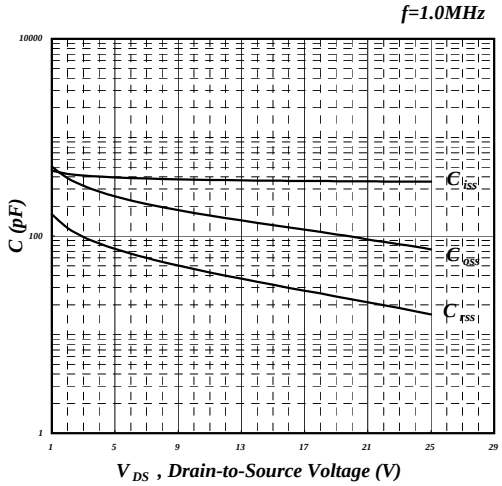


Fig 8. Typical Capacitance Characteristics

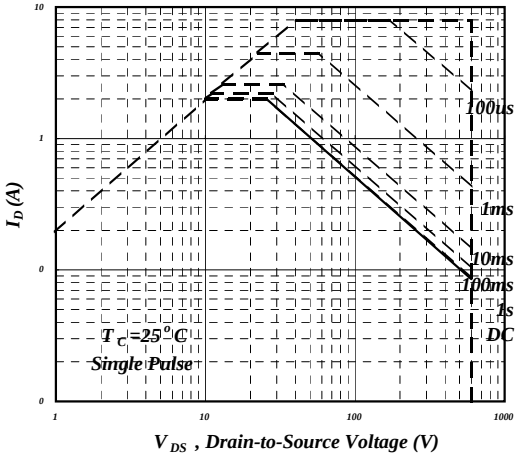


Fig 9. Maximum Safe Operating Area

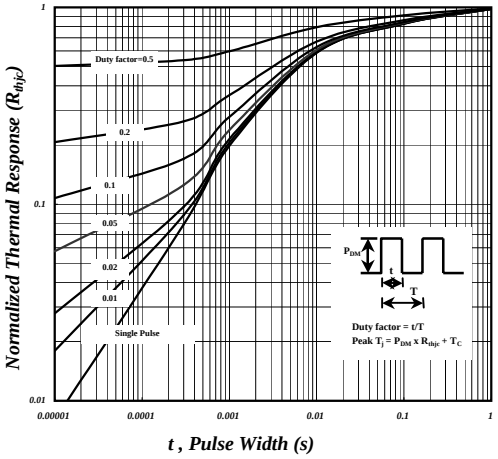


Fig 10. Effective Transient Thermal Impedance

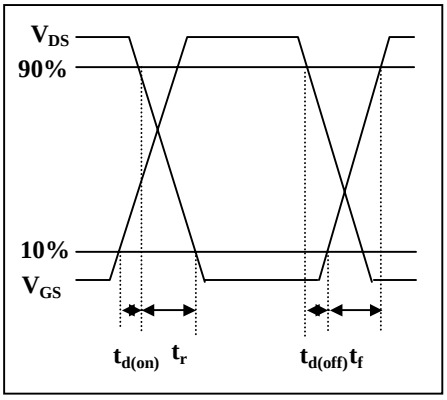


Fig 11. Switching Time Waveform

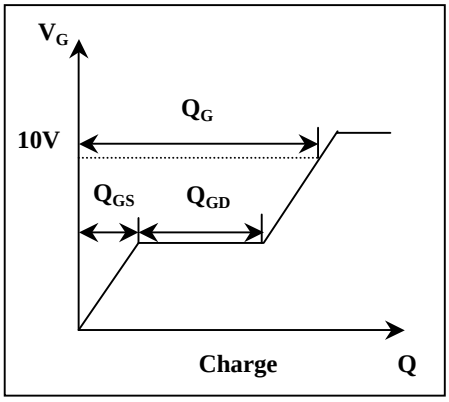
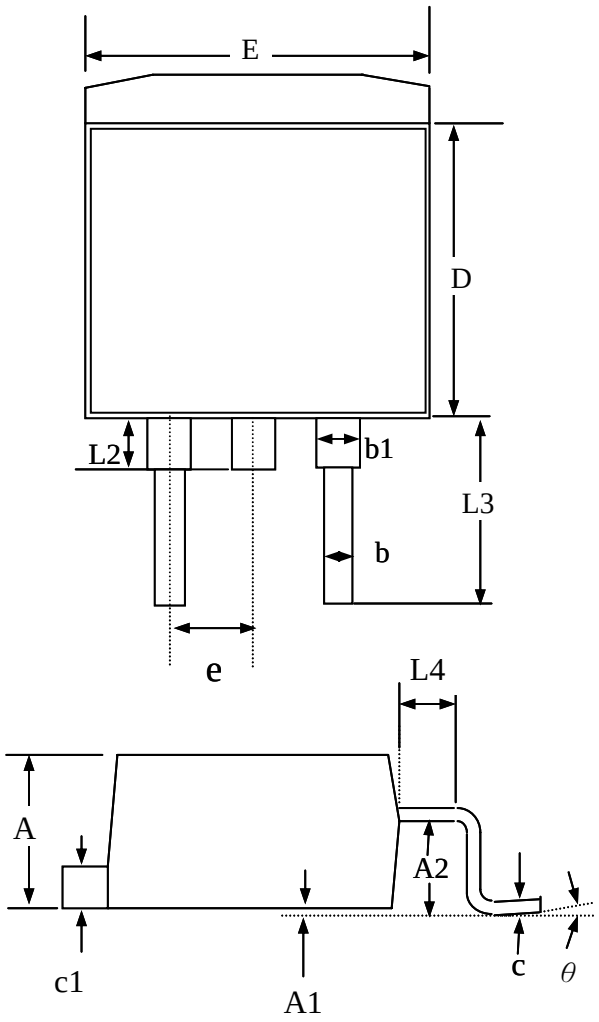


Fig 12. Gate Charge Waveform

Package Outline : TO-263

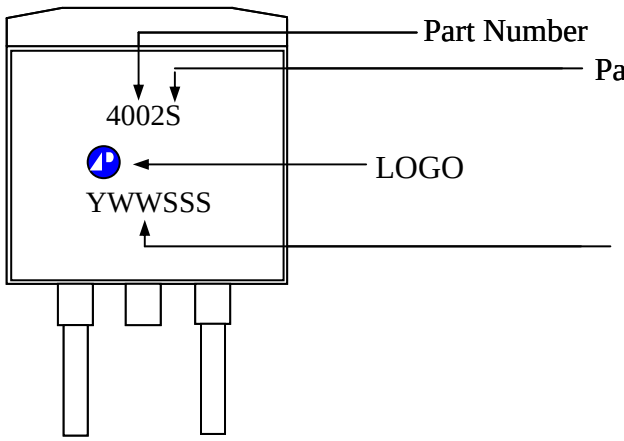


SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.25	4.75	5.20
A1	0.00	0.15	0.30
A2	2.20	2.45	2.70
b	0.70	0.90	1.10
b1	1.07	1.27	1.47
c	0.30	0.45	0.60
c1	1.15	1.30	1.45
D	8.30	8.90	9.40
E	9.70	10.10	10.50
e	2.04	2.54	3.04
L2	-----	1.50	-----
L3	4.50	4.90	5.30
L4	-----	1.50	----

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Part Marking Information & Packing : TO-263

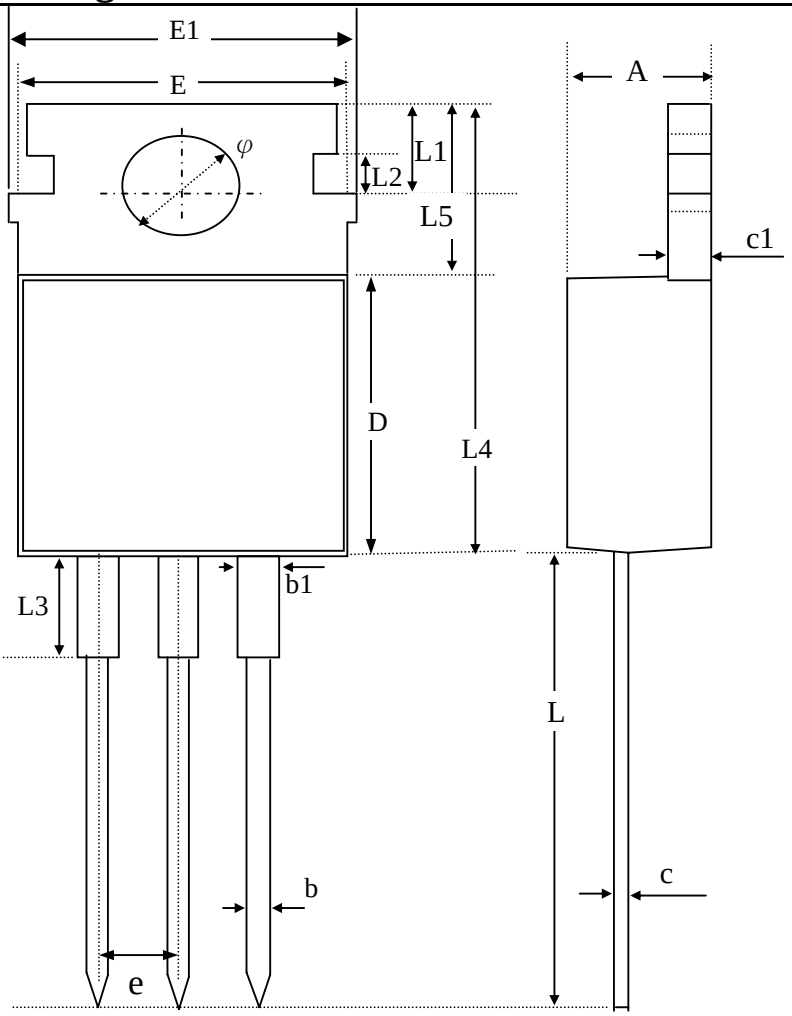


Y：Last Digit Of The Year

WW：Week

SSS：Sequence

Package Outline : TO-220

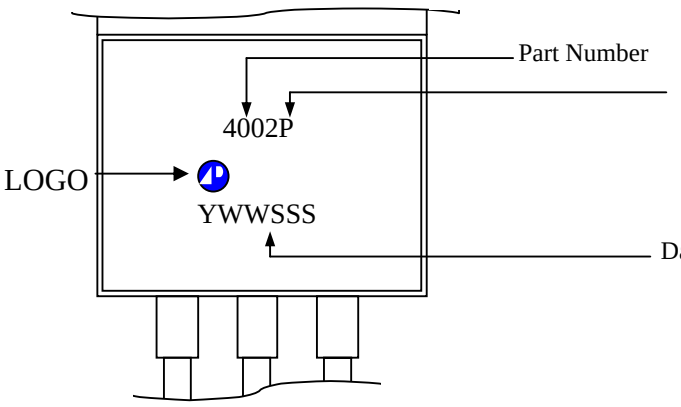


SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.25	4.48	4.70
b	0.65	0.80	0.90
b1	1.15	1.38	1.60
c	0.40	0.50	0.60
c1	1.00	1.20	1.40
E	9.70	10.00	10.40
E1	---	---	11.50
e	----	2.54	----
L	12.70	13.60	14.50
L1	2.60	2.80	3.00
L2	1.00	1.40	1.80
L3	2.6	3.10	3.6
L4	14.70	15.50	16
L5	6.30	6.50	6.70
φ	3.50	3.60	3.70
D	8.40	8.90	9.40

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

Part Marking Information & Packing : TO-220



Y：Last Digit Of The Year

WW：Week

SSS：Sequence