

# AP4024EJB

**Halogen-Free Product**

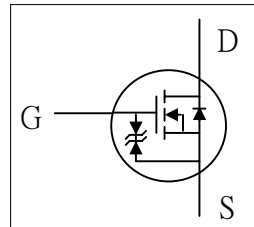


**Advanced Power  
Electronics Corp.**

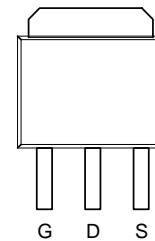
*N-CHANNEL ENHANCEMENT MODE*

*POWER MOSFET*

- ▼ Low On-resistance
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



$BV_{DSS}$	30V
$R_{DS(ON)}$	6m $\Omega$
$I_D$	60A



**TO-251S(JB)**

## Description

AP4024 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-251S short lead package is preferred for all commercial-industrial through-hole applications without lead-cuttred.

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	+20	V
$I_D@T_C=25^\circ C$	Drain Current, $V_{GS}$ @ 10V	60	A
$I_D@T_C=100^\circ C$	Drain Current, $V_{GS}$ @ 10V	38	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	160	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	36.7	W
$P_D@T_A=25^\circ C$	Total Power Dissipation	1.13	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	3.4	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	110	$^\circ C/W$



# AP4024EJB

## 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	30	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	-	6	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	-	9	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> =30A	-	120	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	10	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±30	uA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =20A	-	17	27	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =24V	-	2	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	11	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V	-	8	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =30A	-	65	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	22	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	7	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	1500	2400	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	260	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	180	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	1.3	2.6	Ω

## Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I <sub>S</sub>	Source Current ( Body Diode )		-	-	60	A
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =30A, V <sub>GS</sub> =0V,	-	15	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs	-	6	-	nC

### Notes:

- 1.Pulse width limited by max. junction temperature
- 2.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.

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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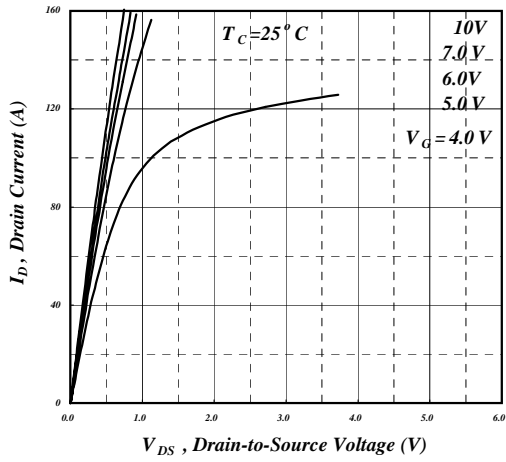


Fig 1. Typical Output Characteristics

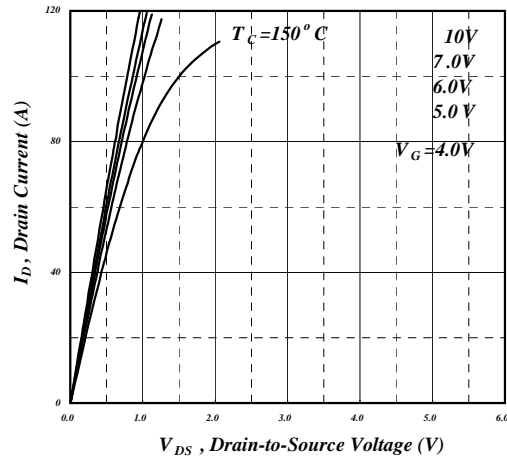


Fig 2. Typical Output Characteristics

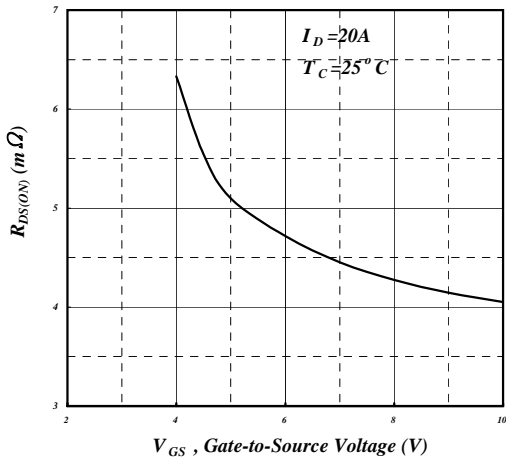


Fig 3. On-Resistance v.s. Gate Voltage

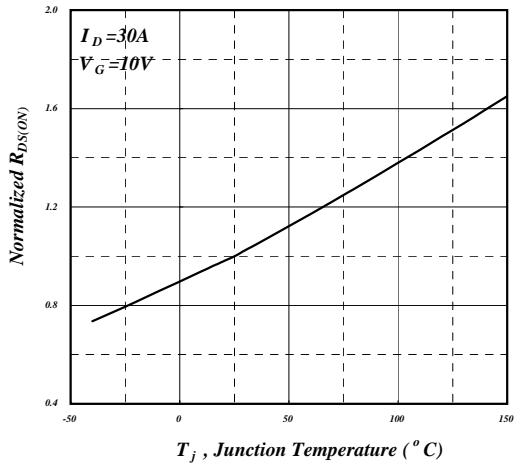


Fig 4. Normalized On-Resistance v.s. Junction Temperature

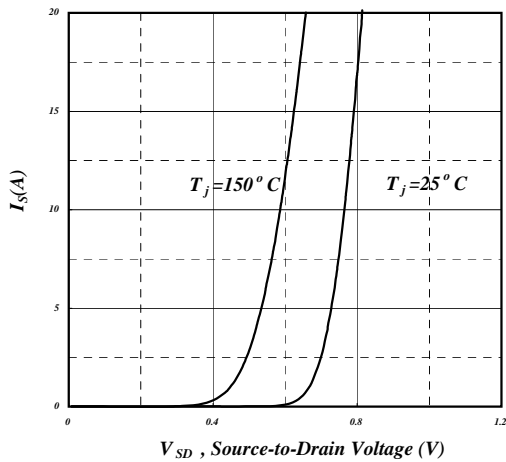


Fig 5. Forward Characteristic of Reverse Diode

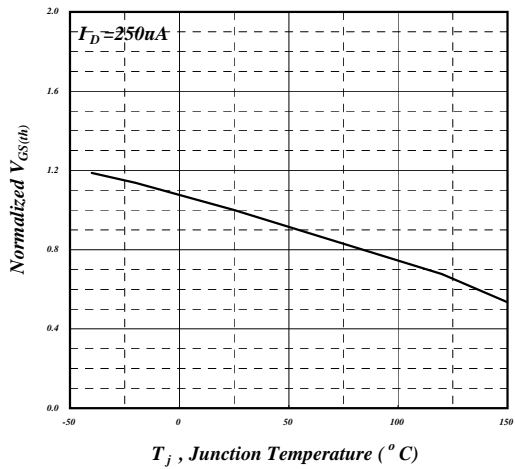


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

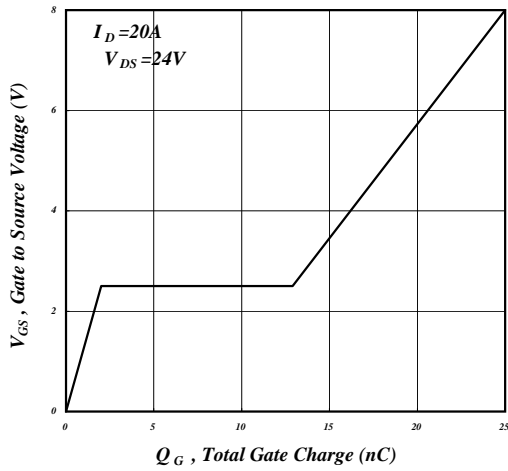


Fig 7. Gate Charge Characteristics

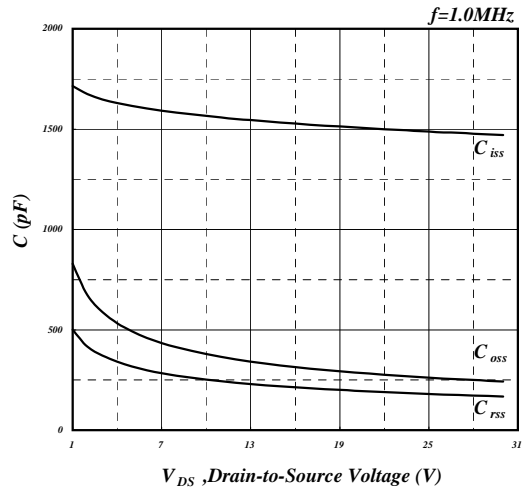


Fig 8. Typical Capacitance Characteristics

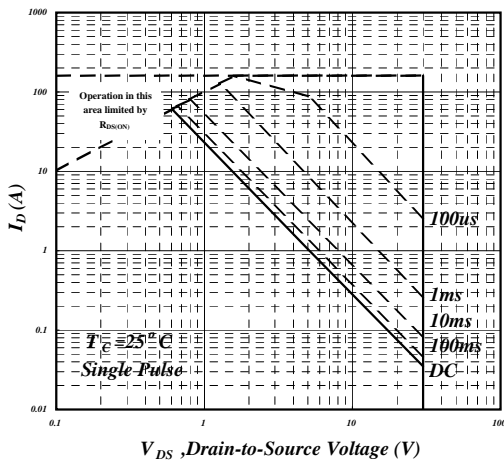


Fig 9. Maximum Safe Operating Area

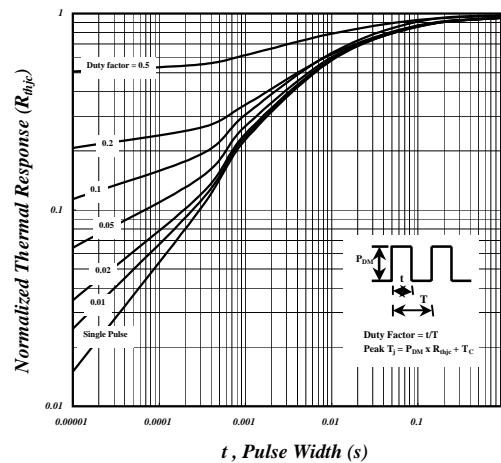


Fig 10. Effective Transient Thermal Impedance

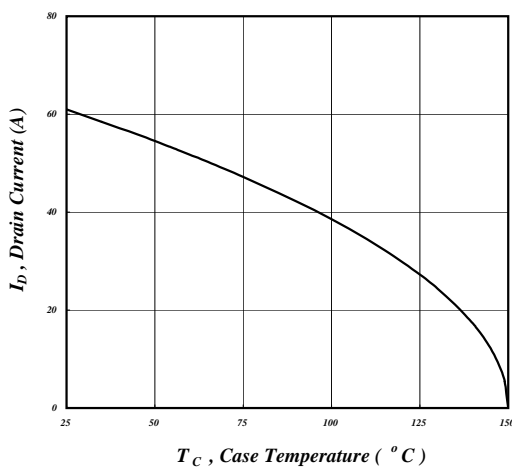


Fig 11. Drain Current v.s. Case Temperature

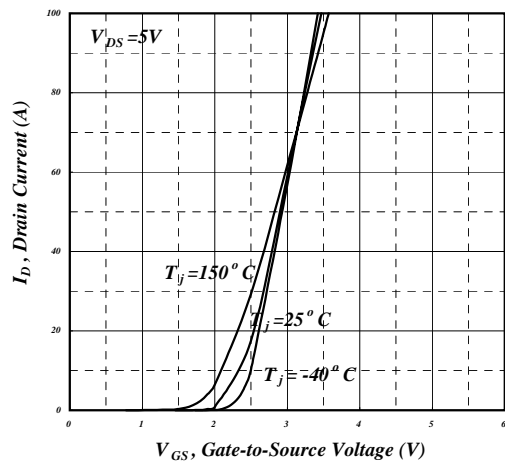


Fig 12. Transfer Characteristics

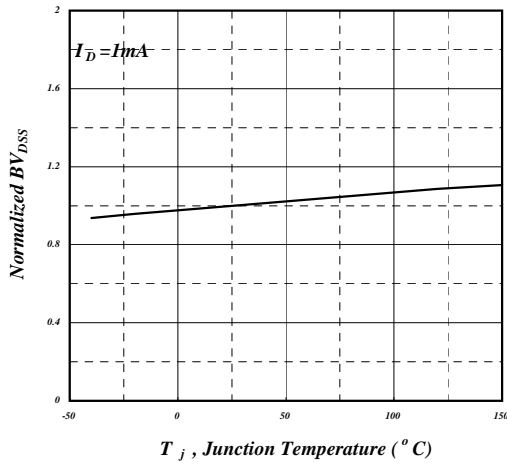


Fig 13. Normalized  $BV_{DSS}$  v.s. Junction

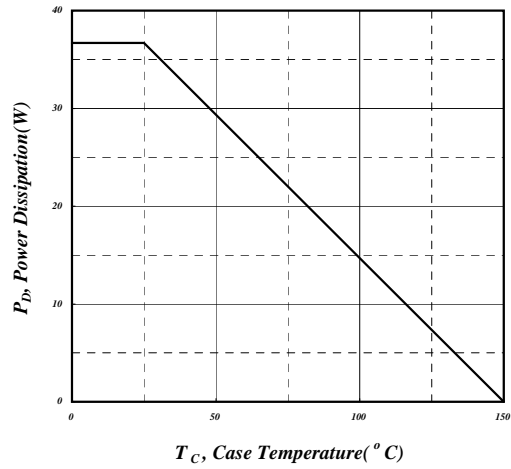


Fig 14. Total Power Dissipation

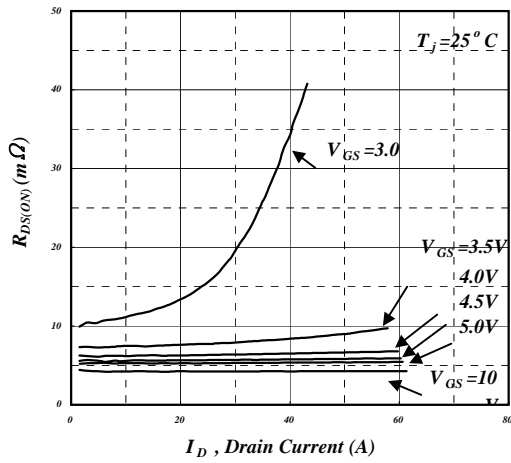


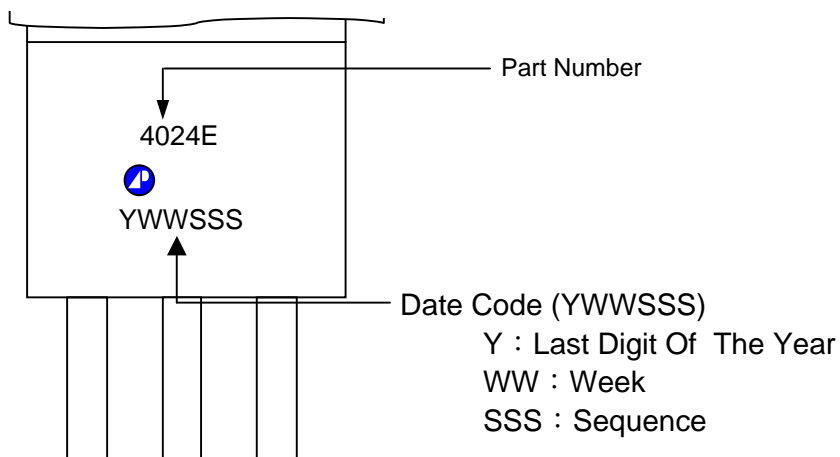
Fig 15. Typ. Drain-Source on State Resistance



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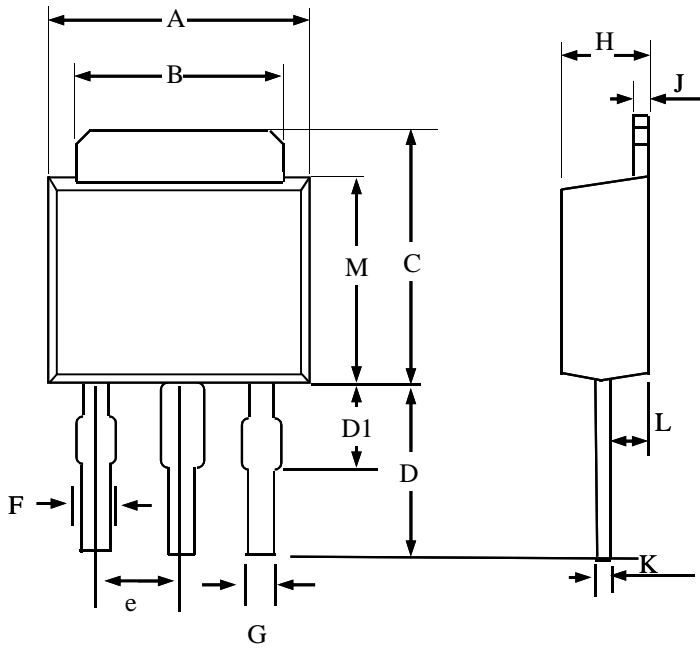
## MARKING INFORMATION

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## Package Outline : TO-251S



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	6.30	6.55	6.80
B	4.90	5.20	5.50
C	6.80	7.30	7.80
D	3.00		4.50
e	2.30 REF.		
F	0.60	0.90	1.20
G	0.50	0.70	0.90
H	2.10	2.25	2.40
J	0.40	0.50	0.60
K	0.40	0.50	0.60
L	0.90	1.20	1.50
M	5.40	5.90	6.40
D1	0.90	1.35	1.80

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



**TO-251S FOOTPRINT :**

