



Description

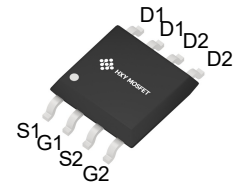
The AP4224GM uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

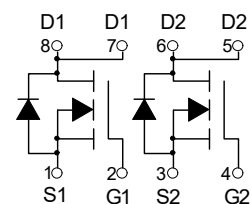
$V_{DS} = 30V$ $I_D = 11.5A$
 $R_{DS(ON)} < 30m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 42m\Omega$ @ $V_{GS}=4.5V$

Application

Battery protection
Load switch
Uninterruptible power supply



SOP-8



Dual N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
AP4224GM	SOP-8	HXY MOSFET	3000

Absolute Maximum Ratings@ $T_J=25^{\circ}C$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^{\circ}C$	Drain Current, V_{GS} @ 4.5V ³	11.5	A
$I_D@T_A=70^{\circ}C$	Drain Current, V_{GS} @ 4.5V ³	7.8	A
I_{DM}	Pulsed Drain Current ¹	42	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation	3.2	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	62.5	$^{\circ}C/W$



Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =10A	-	10	13	mΩ
		V _{GS} =4.5V, I _D =5A	-	16	22.5	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz	-	633	-	pF
C _{oss}	Output Capacitance		-	120	-	pF
C _{rss}	Reverse Transfer Capacitance		-	99	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =10A, V _{GS} =10V	-	15	-	nC
Q _{gs}	Gate-Source Charge		-	4.7	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	3.6	-	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} =30V,I _D =18A, R _{GEN} =3Ω, V _{GS} =10V	-	5	-	ns
t _r	Turn-on Rise Time		-	8	-	ns
t _{d(off)}	Turn-off Delay Time		-	21	-	ns
t _f	Turn-off Fall Time		-	7	-	ns
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	11.5	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	72	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =18A	-	-	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F =18A,dI/dt=100A/μs	-	7	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	5.9	-	nC

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $V_{DS}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=20A$
4. The power dissipation is limited by 150 $^{\circ}\text{C}$ junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Electrical And Thermal Characteristics

Figure1: Output Characteristics

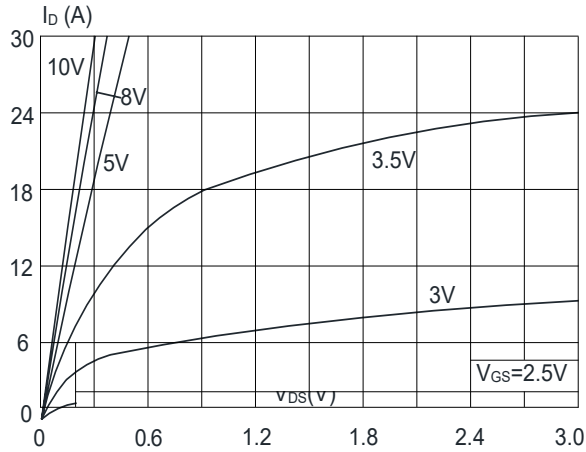


Figure 2: Typical Transfer Characteristics

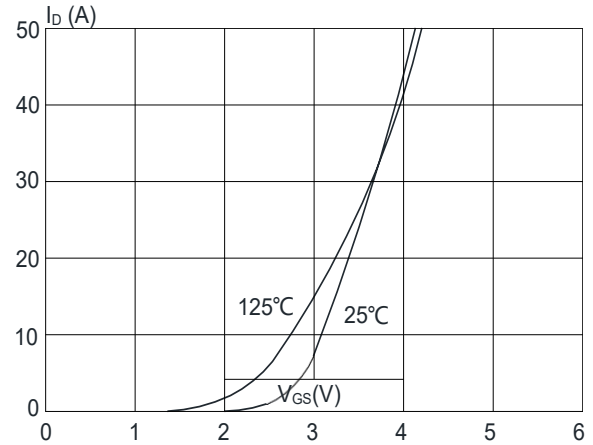


Figure 3: On-resistance vs. Drain Current

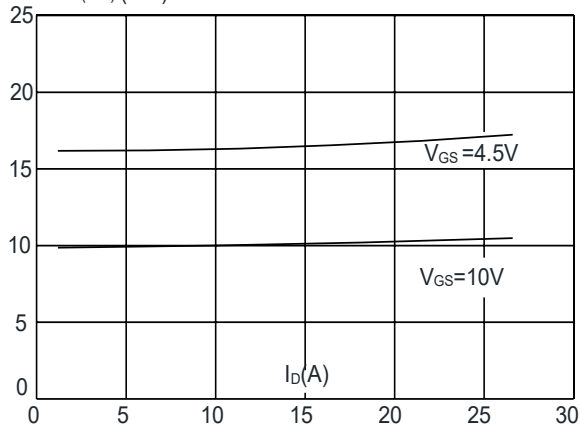


Figure 4: Body Diode Characteristics

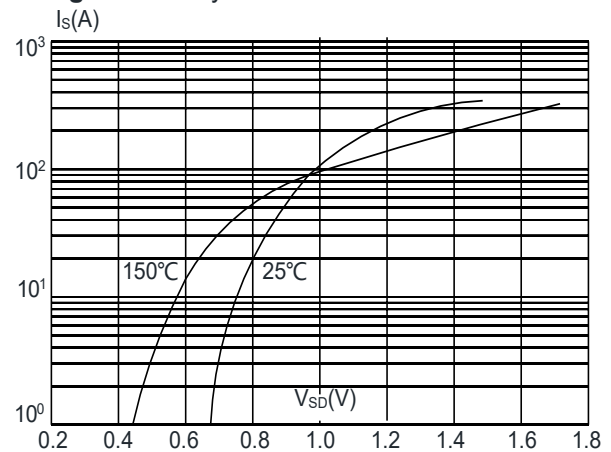


Figure 5: Gate Charge Characteristics

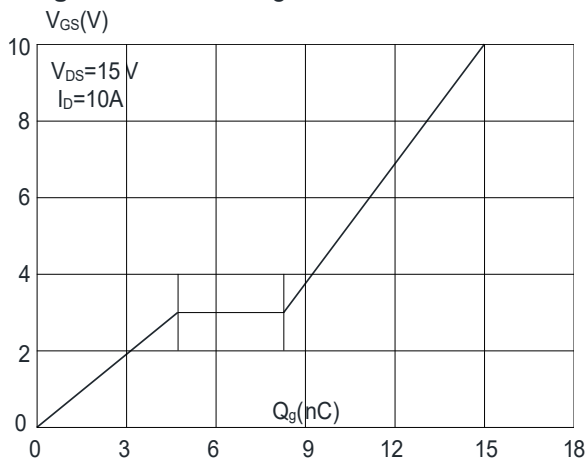


Figure 6: Capacitance Characteristics

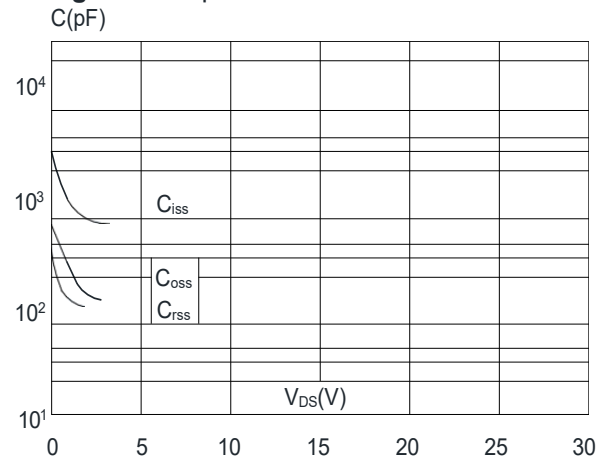




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

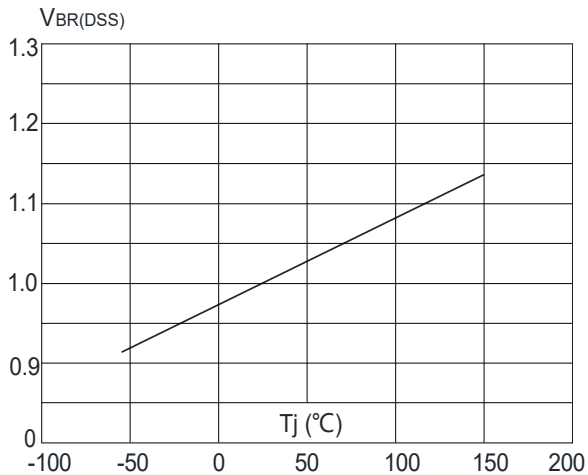


Figure 8: Normalized on Resistance vs. Junction Temperature

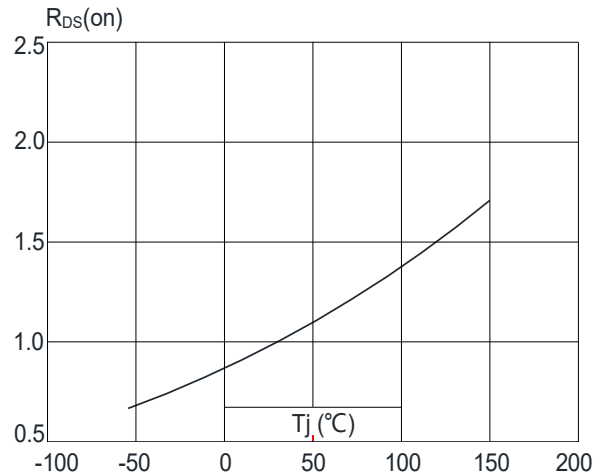


Figure 9: Maximum Safe Operating Area

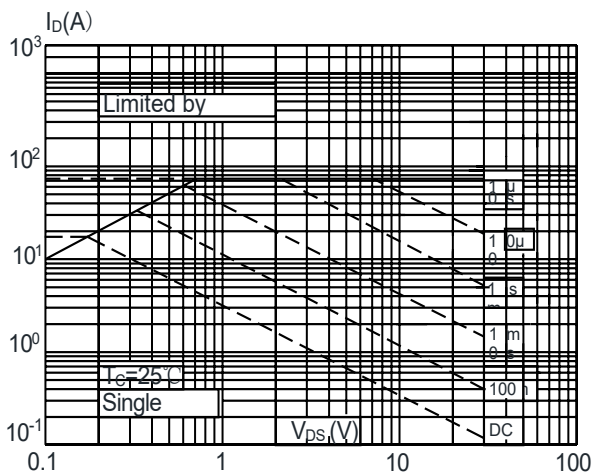


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

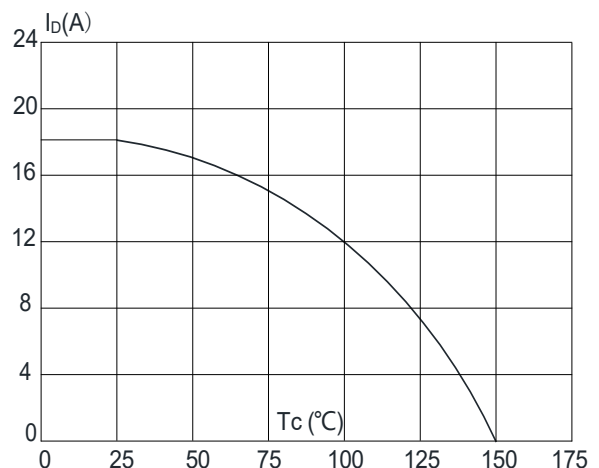
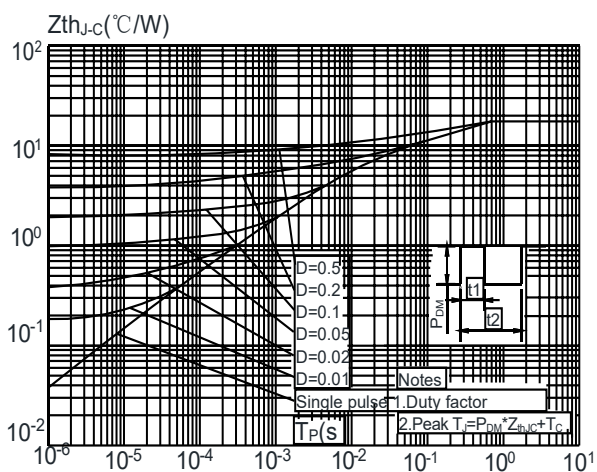
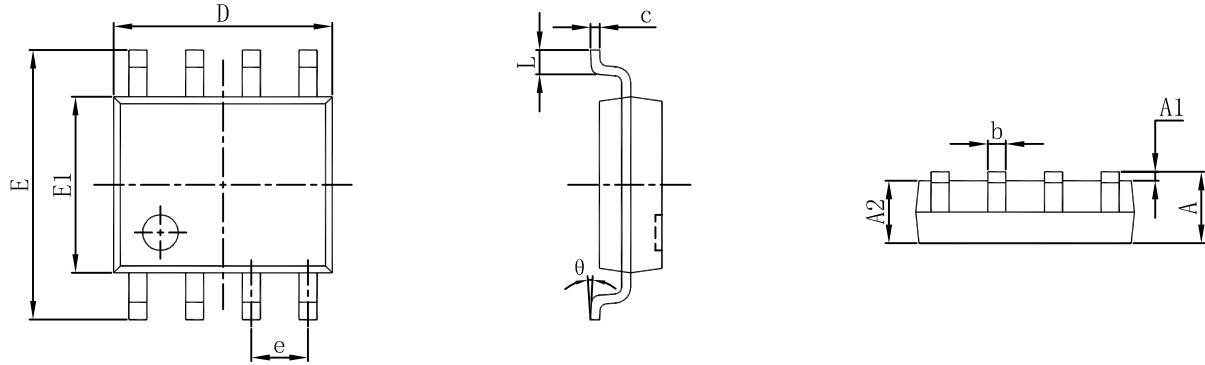


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

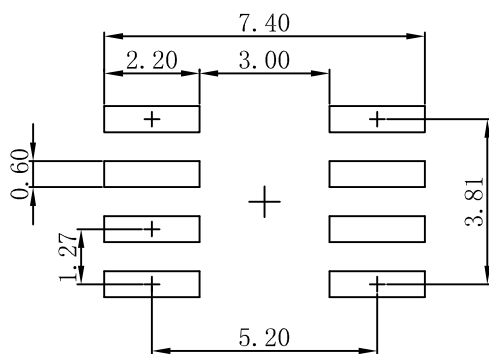




SOP-8 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Note:
1. Controlling dimension; in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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