



Description

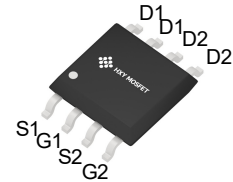
The AP3A020M uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

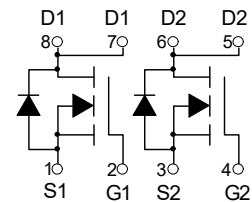
$V_{DS} = 30V$ $I_D = 10A$
 $R_{DS(ON)} < 12m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 18m\Omega$ @ $V_{GS}=4.5V$

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)
AP3A020M	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	10	A
$I_D@T_A=70^\circ C$	Drain Current, V_{GS} @ 4.5V ³	8	A
I_{DM}	Pulsed Drain Current ¹	55	A
$P_D@T_A=25^\circ C$	Total Power Dissipation	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 Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =250 μ A, V _{GS} =0V	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μ A
		V _{DS} =30V, V _{GS} =0V, T _J =55°C			5	
Gate-Body Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} = $\pm$ 20V			$\pm$ 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250 μ A	1.5		2.5	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =10A			12	m Ω
		V _{GS} =10V, I _D =10A T _J =125°C			18	
		V _{GS} =4.5 V, I _D =8A			16.5	
On State Drain Current	I _{D(ON)}	V _{GS} =10V, V _{DS} =5V	55			A
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =10A		43		S
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =15V, f=1MHz	610		910	pF
Output Capacitance	C _{oss}		88		160	
Reverse Transfer Capacitance	C _{rss}		40		100	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.8		2.4	Ω
Total Gate Charge (10V)	Q _g	V _{GS} =10V, V _{DS} =15V, I _D =10A	11		17	nC
Total Gate Charge (4.5V)			5		8	
Gate Source Charge	Q _{gs}			2.4		
Gate Drain Charge	Q _{gd}			3		
Turn-On DelayTime	t _{d(on)}	V _{GS} =10V, V _{DS} =15V, R _L =1.5 Ω , R _{GEN} =3 Ω		4.4		ns
Turn-On Rise Time	t _r			9		
Turn-Off DelayTime	t _{d(off)}			17		
Turn-Off Fall Time	t _f			6		
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10A, dI/dt= 500A/us	5.6		8	nC
Body Diode Reverse Recovery Charge	Q _{rr}		6.4		9.6	
Maximum Body-Diode Continuous Current	I _S				2.5	A
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V			1	V

Note.The static characteristics in Figures 1 to 6 are obtained using <300us pulses, duty cycle 0.5% max.



Typical Characteristics

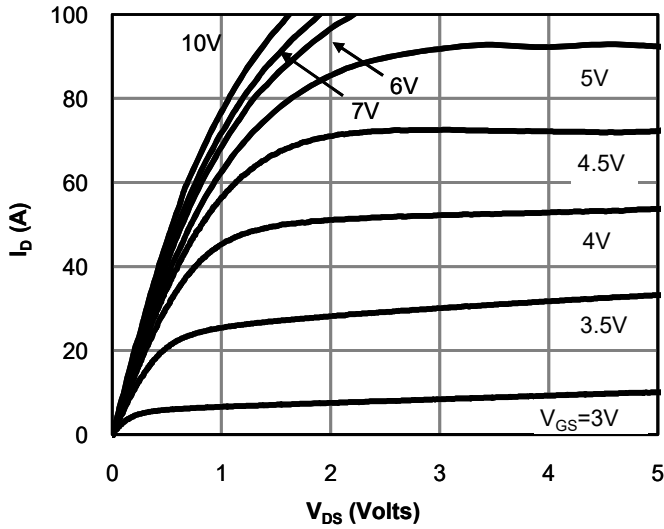


Fig 1: On-Region Characteristics (Note E)

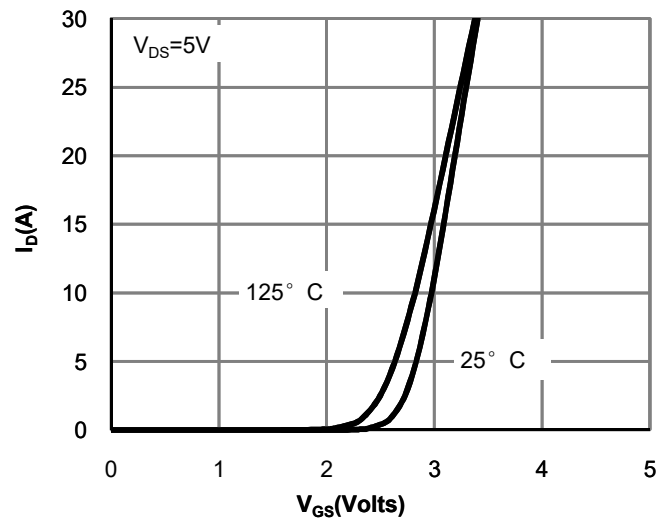


Figure 2: Transfer Characteristics (Note E)

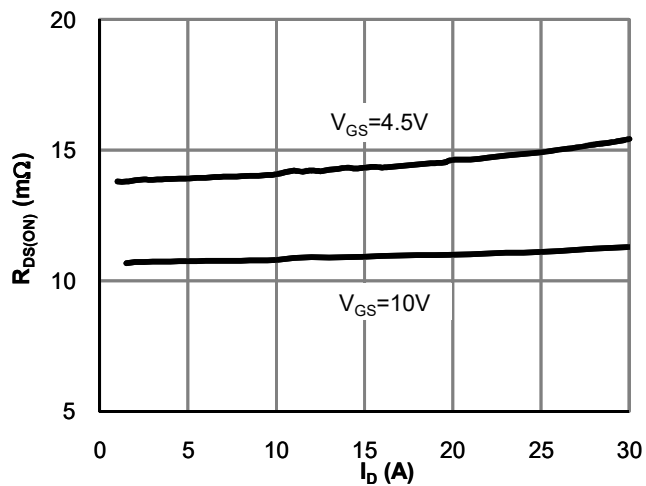


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

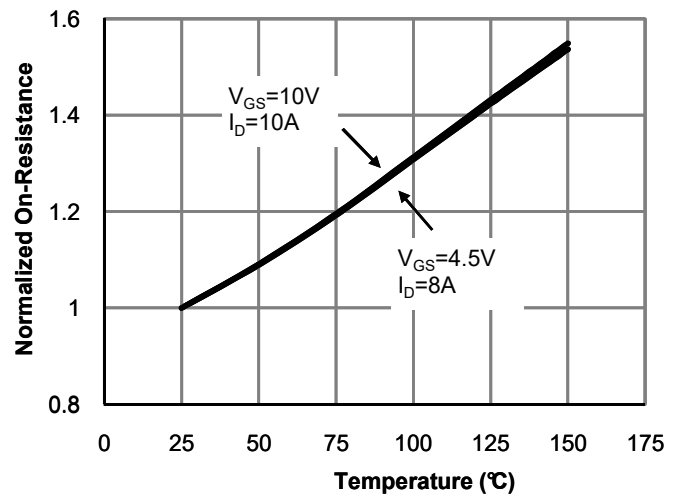


Figure 4: On-Resistance vs. Junction Temperature (Note E)

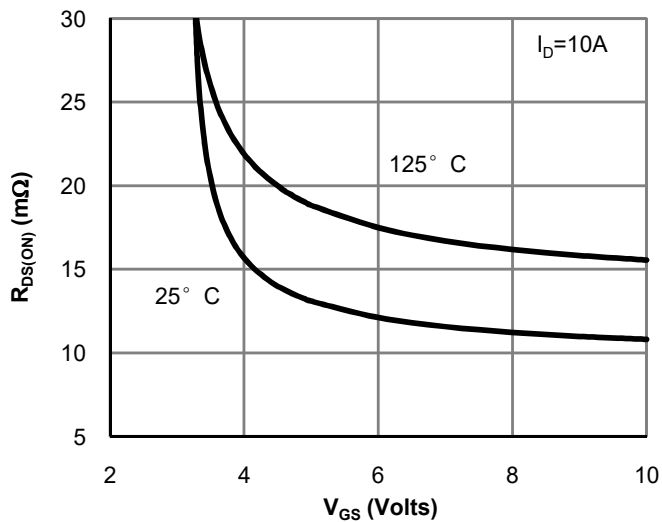


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

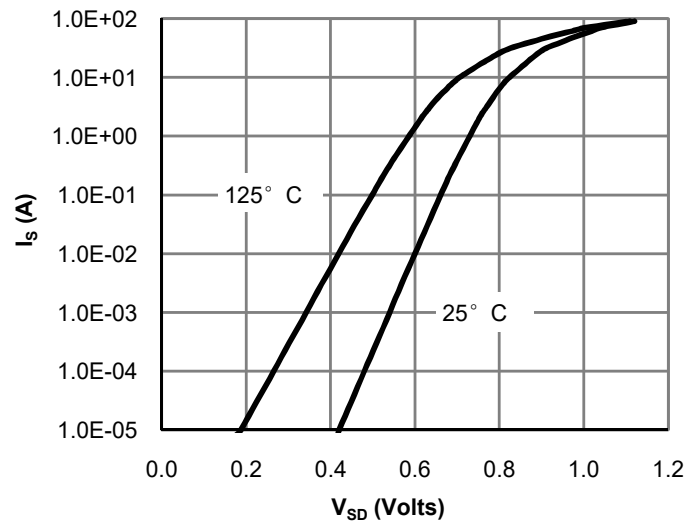


Figure 6: Body-Diode Characteristics (Note E)

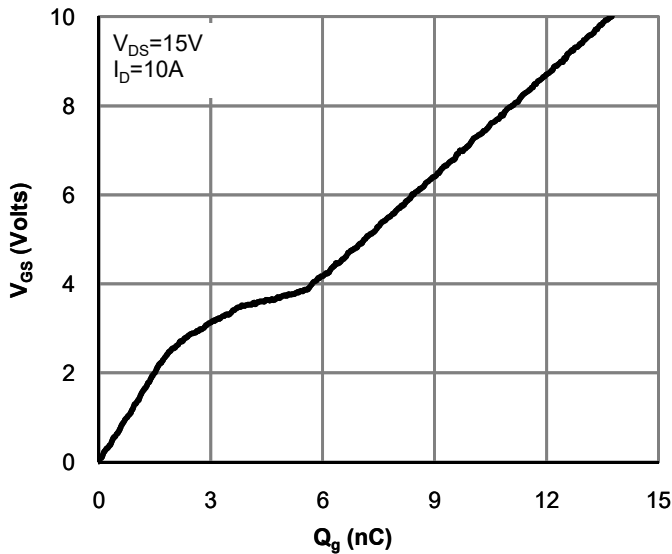


Figure 7: Gate-Charge Characteristics

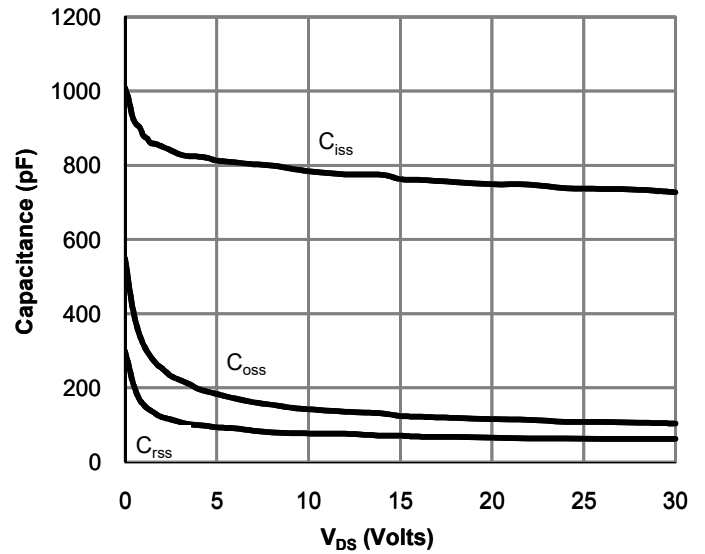


Figure 8: Capacitance Characteristics

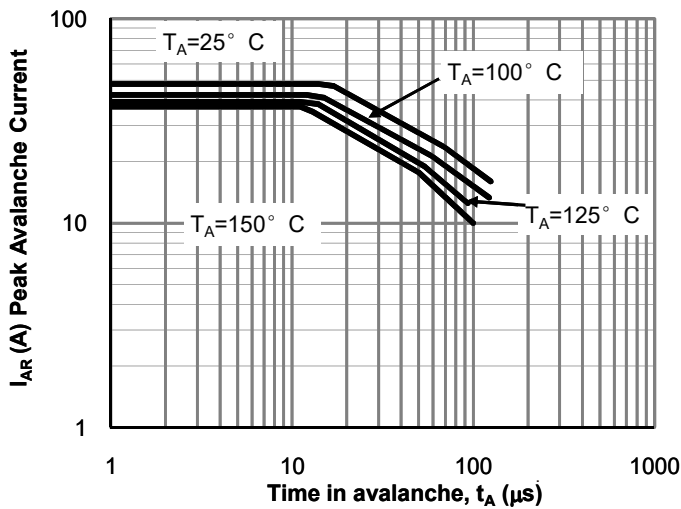


Figure 9: Single Pulse Avalanche capability (Note C)

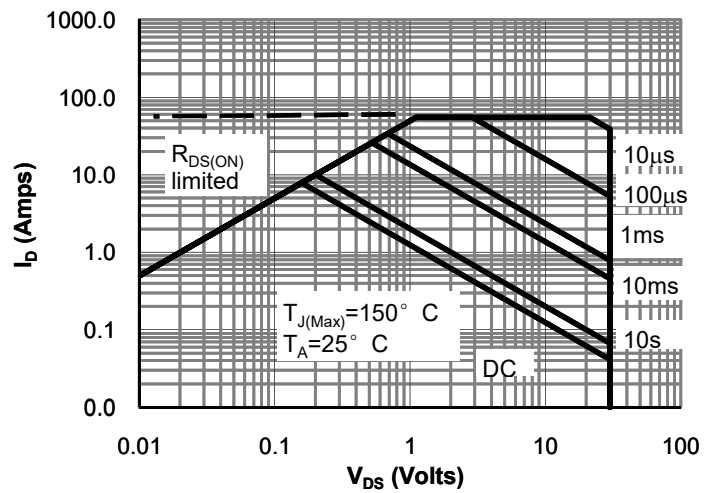


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

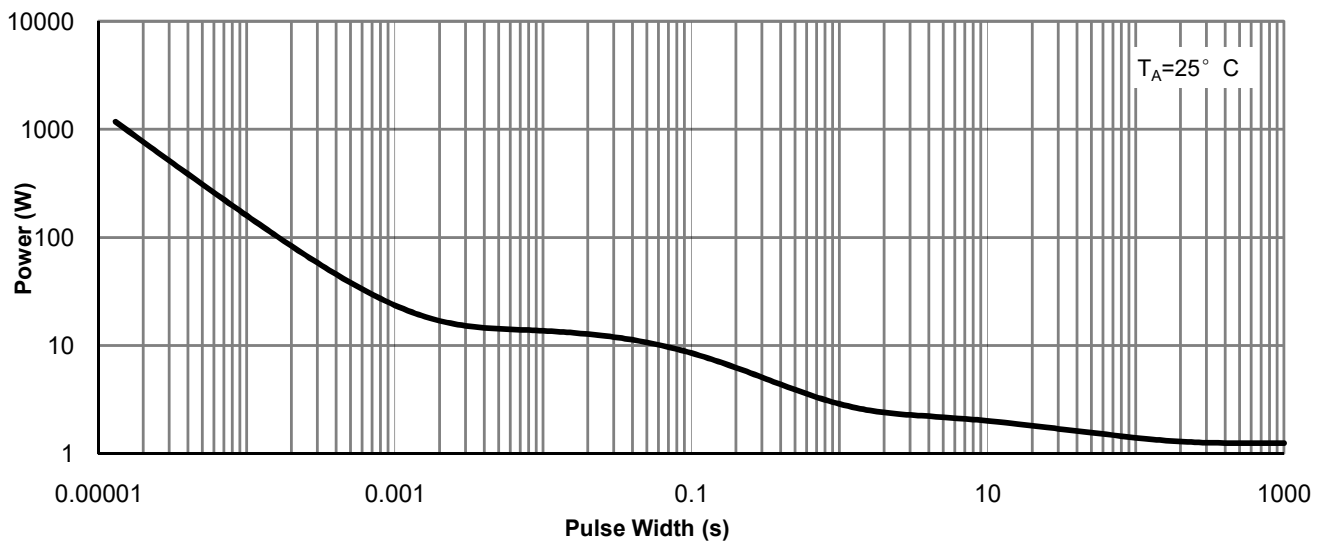


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

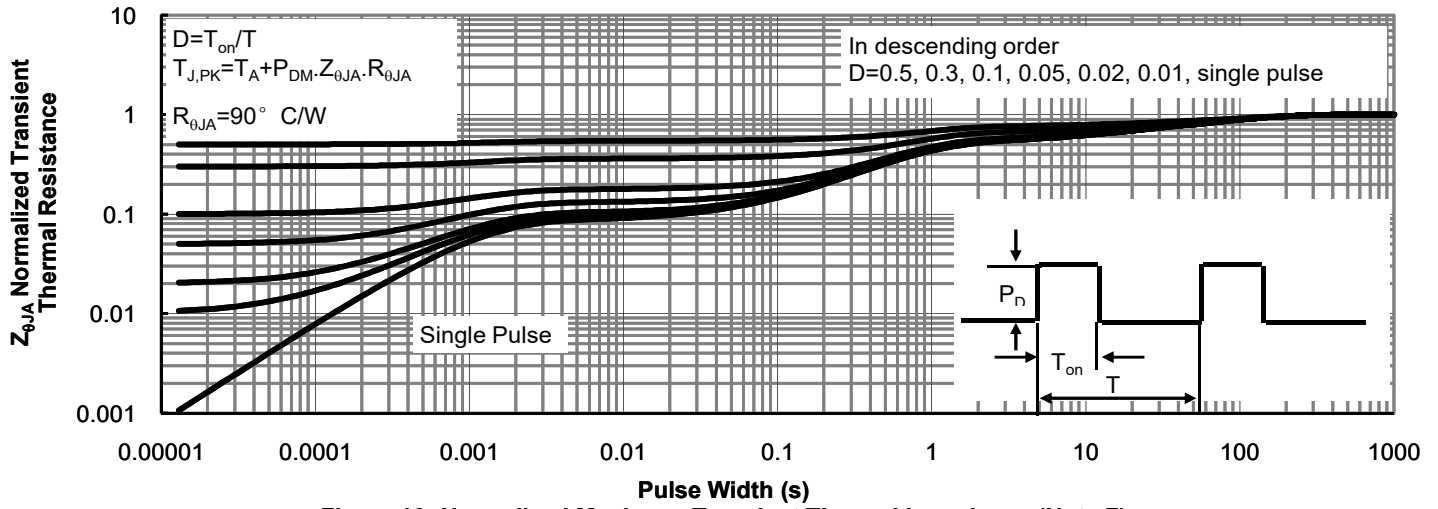
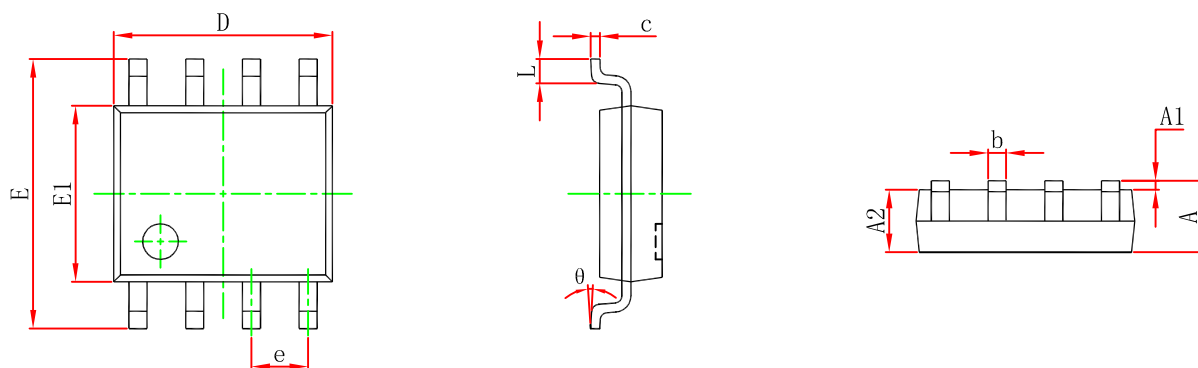


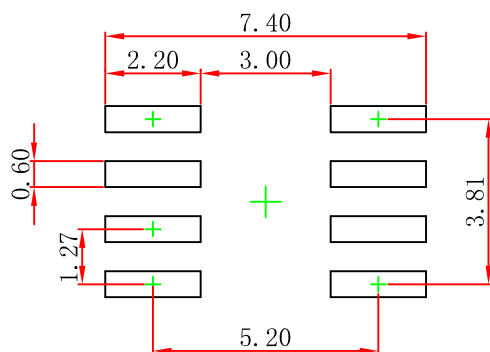
Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)



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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