

General Description

The AGM1405C1 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

This device is ideal for load switch and battery protection applications.

Features

- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance
- 100% Avalanche tested
- 100% DVDS tested

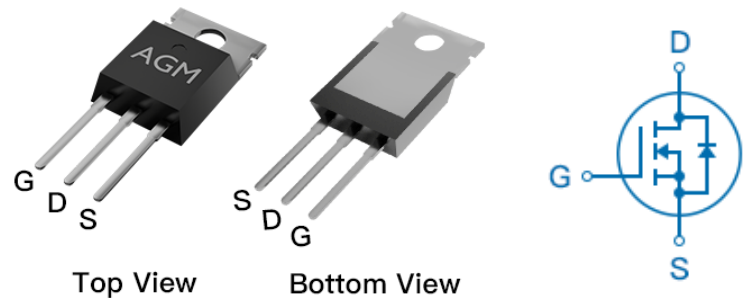
Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Product Summary

BVDSS	$R_{DS(ON)}$	ID
40V	3.2mΩ	130A

TO-220 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM1405C	AGM1405C1	TO-220	----	----	1000

Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	40	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	130	A
	Drain Current-Continuous(Tc=100°C)	100	A
IDM (pulse)	Drain Current-Pulsed (Note 2)	400	A
PD	Maximum Power Dissipation(Tc=25°C)	96	w
	Maximum Power Dissipation(Tc=100°C)	38	w
EAS	Avalanche energy (Note 3)	462	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	°C

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) ¹	---	62	°C/W
RθJC	Thermal Resistance Junction-Case ¹	---	1.3	°C/W

Table 3. Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	40	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=40V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.2	1.5	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=15A	--	23	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=30A	--	3.2	4.6	mΩ
		VGS=4.5V, ID=20A	--	4.0	7.0	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=20V,VGS=0V ,F=1MHZ	--	2400	--	pF
Coss	Output Capacitance		--	250	--	pF
Crss	Reverse Transfer Capacitance		--	200	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	2	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, RGEN=3.3Ω RL=0.75Ω	--	25	--	nS
tr	Turn-on Rise Time		--	10	--	nS
td(off)	Turn-Off Delay Time		--	128	--	nS
tf	Turn-Off Fall Time		--	34	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=12A	--	26	--	nC
Qgs	Gate-Source Charge		--	9	--	nC
Qgd	Gate-Drain Charge		--	12	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)	VG=VD=0V,Force Current	--	--	130	A
VSD	Forward on Voltage	VGS=0V,IS=30A	--	--	1.2	V
trr	Reverse Recovery Time	IF=30A , dl/dt=100A/μs , TJ=25℃	--	--	18	ns
Qrr	Reverse Recovery Charge		--	--	40	nc

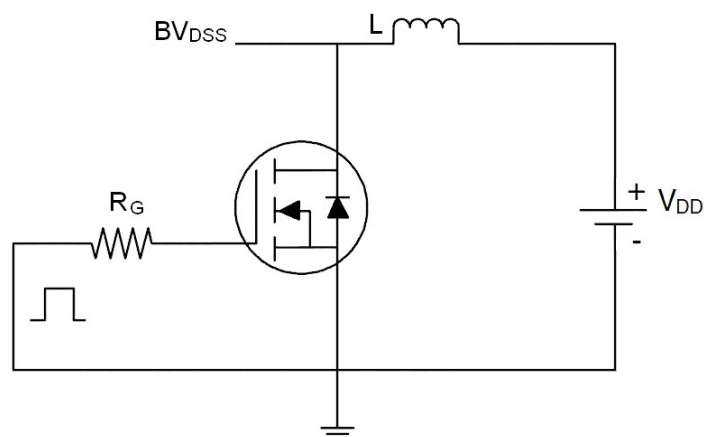
Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

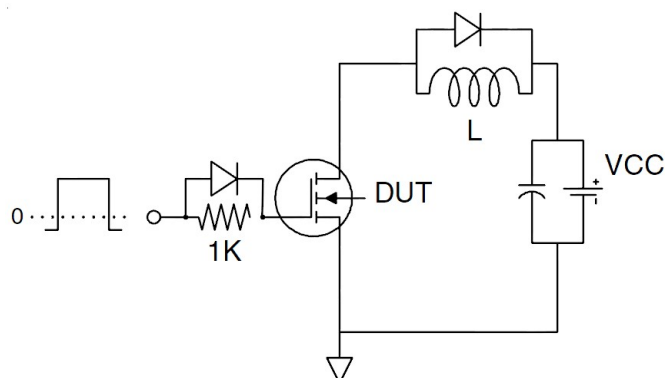
Notes 3.EAS condition: TJ=25℃, VDD=25V, Vgs=10V, ID=43A, L=0.5mH, RG=25ohm

Test circuit

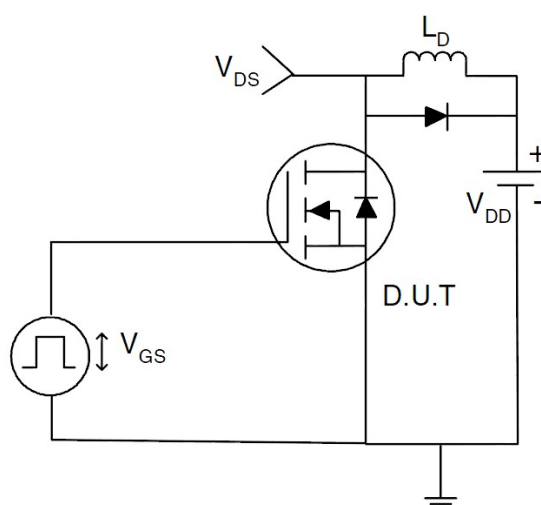
(1) E_{AS} test circuits



(2) Gate charge test circuit



(3) Switch time test circuit



Typical Characteristics

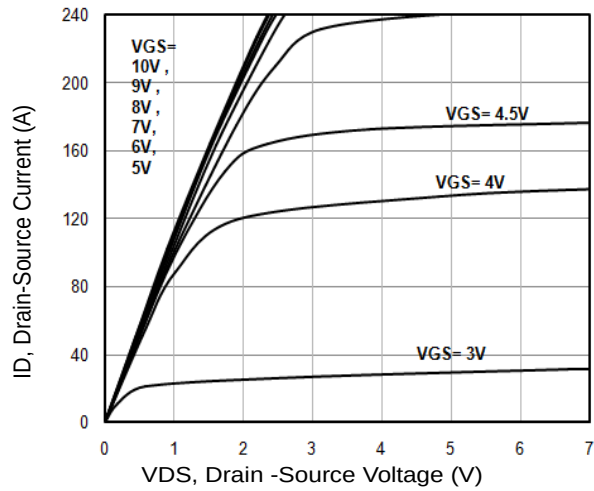


Fig1. Typical Output Characteristics

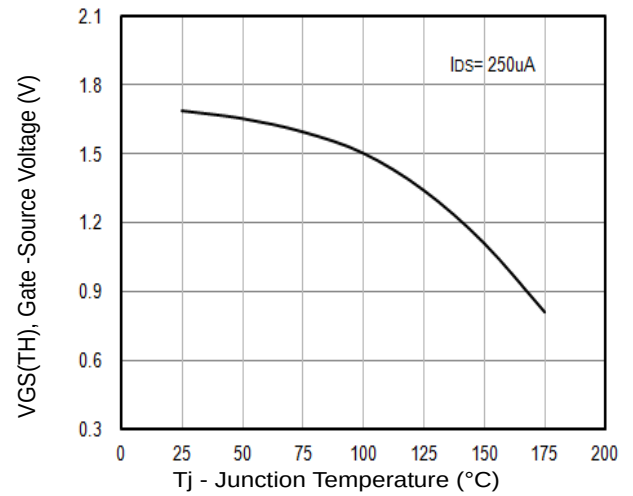


Fig2. $V_{GS(TH)}$ Gate-Source Voltage Vs. T_j

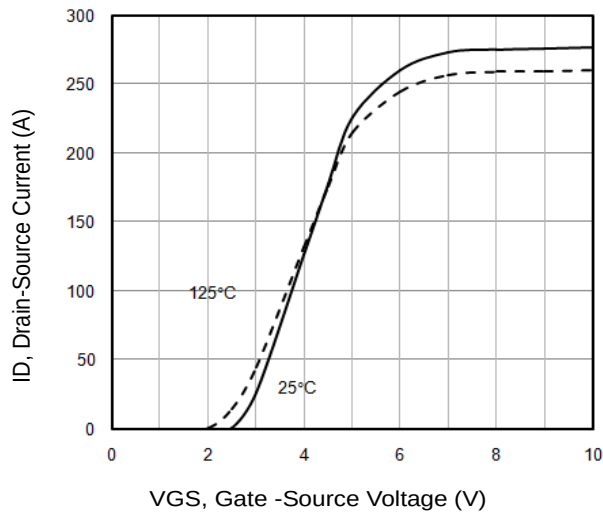


Fig3. Typical Transfer Characteristics

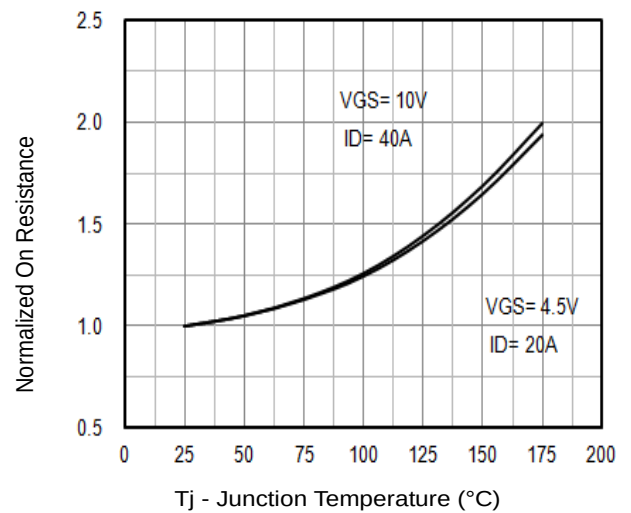


Fig4. Normalized On-Resistance Vs. Temperature

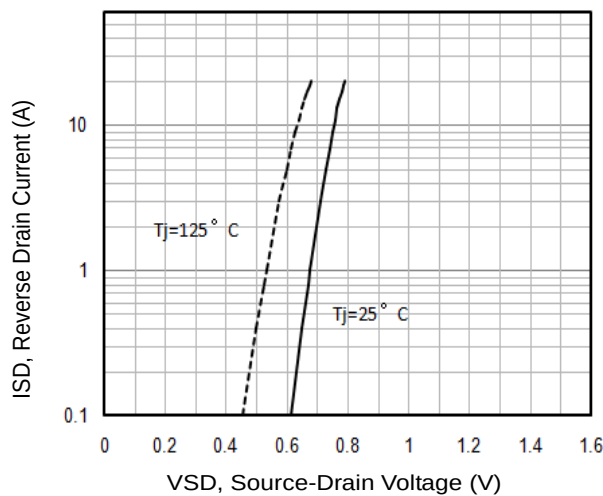


Fig5. Typical Source-Drain Diode Forward Voltage

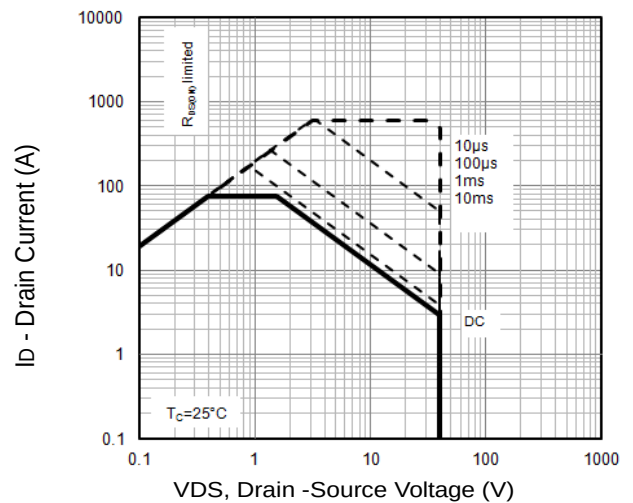
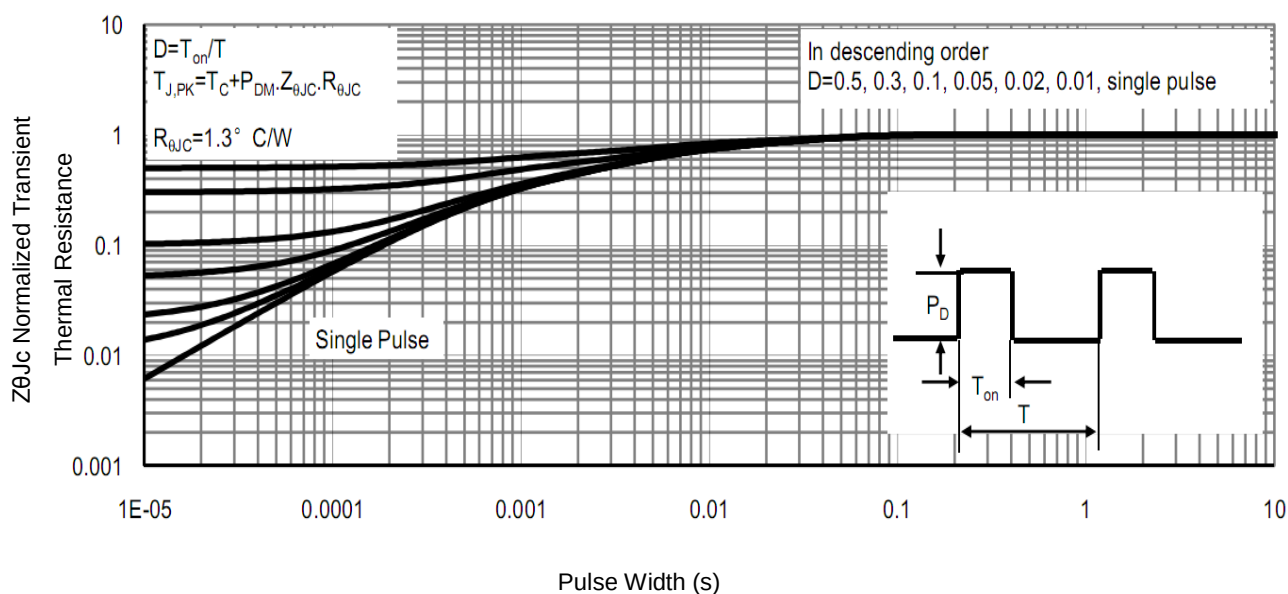
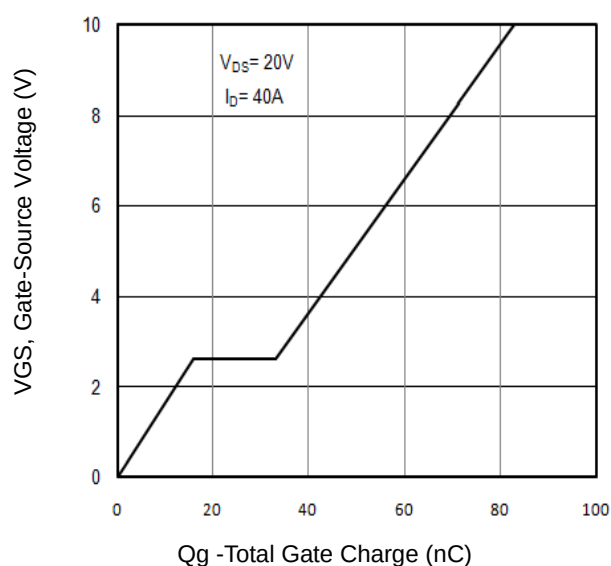
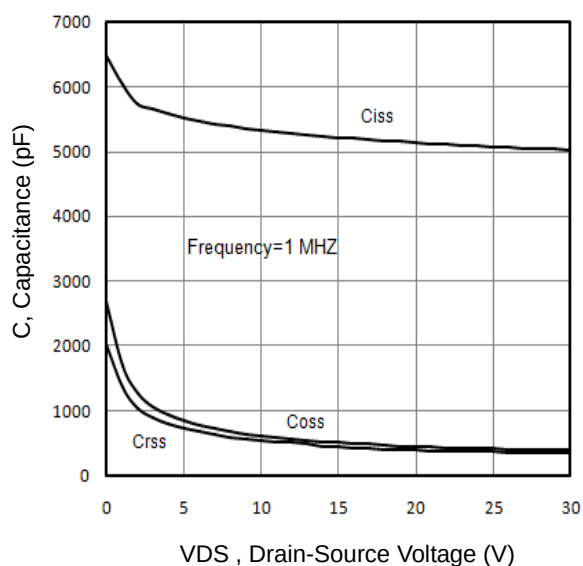
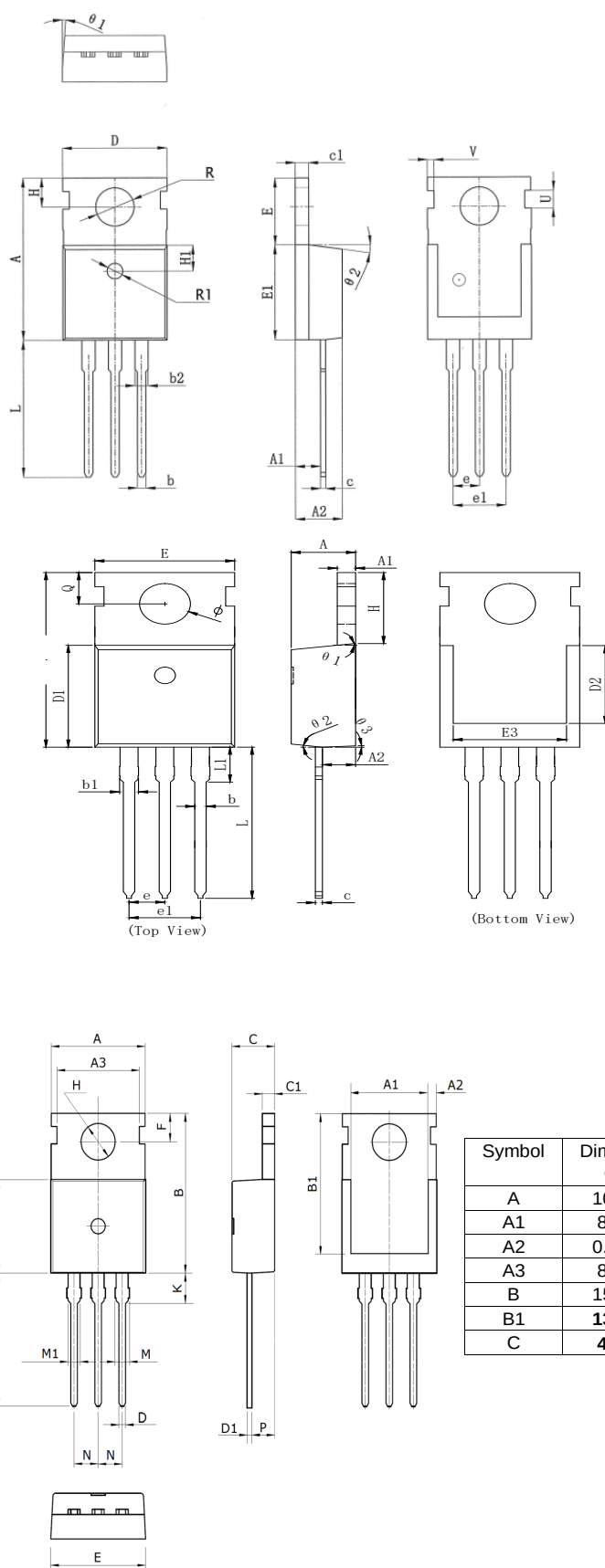


Fig6. Maximum Safe Operating Area

Typical Characteristics



TO220 PACKAGE INFORMATION



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	15.400	15.600	15.800
A1	2.350	2.400	2.500
A2	4.400	4.500	4.700
b	0.700	0.800	0.900
b2	1.180	1.310	1.440
c	0.480	0.500	0.560
c1	1.290	1.300	1.320
D	9.800	10.000	10.200
E	6.400	6.500	6.600
E1	9.000	9.100	9.200
e	2.420	2.540	2.660
e1	4.840	5.080	5.320
H	2.730	2.800	2.870
H1	2.400	2.500	2.600
L	13.020	13.370	13.720
R	3.500	3.600	3.730
R1	1.400	1.500	1.600
U	1.650	1.750	1.850
V	0.580	0.680	0.780
θ_1	2°	2.5°	3°
θ_2	6.5°	7°	7.5°

SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	4.370	4.570	4.700
A1	1.250	1.300	1.400
A2	2.150	2.350	2.550
b	0.700	0.800	0.950
b1	1.170	1.270	1.470
c	0.450	0.500	0.600
D	15.100	15.600	16.100
D1	8.800	9.100	9.400
D2	5.500	6.300 REF	
E	9.700	10.000	10.300
E3	7.000	7.600 REF	
e	2.540 BSC		
e1	5.080 BSC		
L	13.200	13.500	13.800
L1		3.100	3.400
H	6.250	6.500	6.750
ϕ	3.400	3.600	3.800
Q	2.600	2.800	3.000
θ_1	7° TYP		
θ_2	7° TYP		
θ_3	3° TYP		

Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	10.0±0.3	C1	1.3±0.2	L	13.2±0.4
A1	8.0±0.2	D	0.8±0.2	M	1.38±0.1
A2	0.94±0.1	D1	0.5±0.1	M1	1.28±0.1
A3	8.7±0.1	E	10.0±0.3	N	2.54(typ)
B	15.6±0.4	F	2.8±0.1	P	2.4±0.3
B1	13.2±0.2	H	3.6±0.1	Q	9.15±0.25
C	4.5±0.2	K	3.1±0.2		

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