

● General Description

The AGM405AP1 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

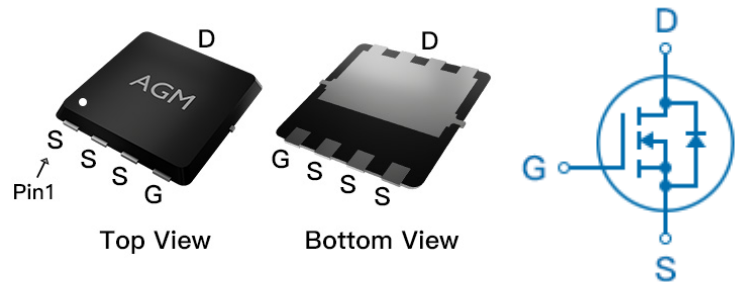
● Application

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

Product Summary

BVDS	RDSON	ID
40V	5.7mΩ	45A

PDFN3.3*3.3 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM405AP1	AGM405AP1	PDFN3.3*3.3	330mm	12mm	5000

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)	45	A
	Drain Current-Continuous(Tc=100°C)	29	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	62	A
PD	Maximum Power Dissipation(Tc=25°C)	27	w
	Maximum Power Dissipation(Tc=100°C)	11	w
EAS	Avalanche energy (Note 3)	100	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	---	60	°C/W
RθJC	Thermal Resistance Junction-Case ¹	---	4.5	°C/W

Table 3. Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V ID=250μA	40	--	--	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =40V, V _{GS} =0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , ID=250μA	1.2	1.6	2.2	V
g _{FS}	Forward Transconductance	V _{DS} =5V, ID=10A	--	20	--	S
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =10V, ID=15A	--	5.7	8.0	mΩ
		V _{GS} =4.5V, ID=10A	--	9.5	14	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, F=1MHZ	--	685	--	pF
C _{oss}	Output Capacitance		--	190	--	pF
C _{rss}	Reverse Transfer Capacitance		--	37	--	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	--	1.7	--	Ω
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, R _I =0.75Ω, R _{GEN} =3.3Ω	--	13.9	--	nS
t _r	Turn-on Rise Time		--	5.7	--	nS
t _{d(off)}	Turn-Off Delay Time		--	20	--	nS
t _f	Turn-Off Fall Time		--	11	--	nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =25V, ID=12A	--	5.7	--	nC
Q _{gs}	Gate-Source Charge		--	3	--	nC
Q _{gd}	Gate-Drain Charge		--	1.2	--	nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)		--	--	45	A
V _{SD}	Forward on Voltage	V _{GS} =0V, I _S =15A	--	--	1.2	V
t _{rr}	Reverse Recovery Time	I _F =15A , dI/dt=100A/μs , T _J =25°C	--	--	--	ns
Q _{rr}	Reverse Recovery Charge		--	--	--	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: T_J=25°C, V_{DD}=25V, V_{gs}=10V, I_D=20A, L=0.5mH, R_G=25ohm

Typical Characteristics

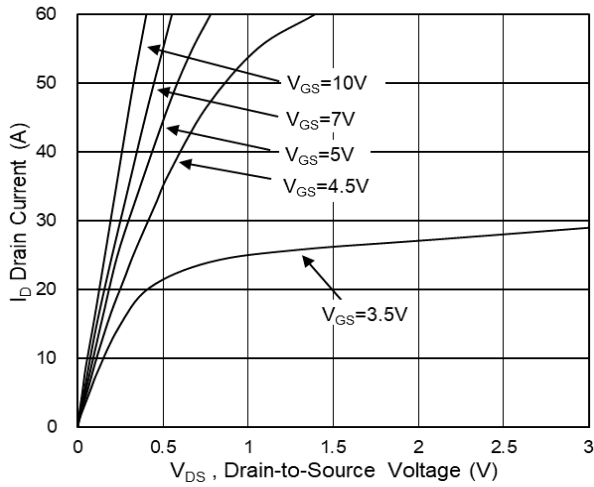


Fig.1 Typical Output Characteristics

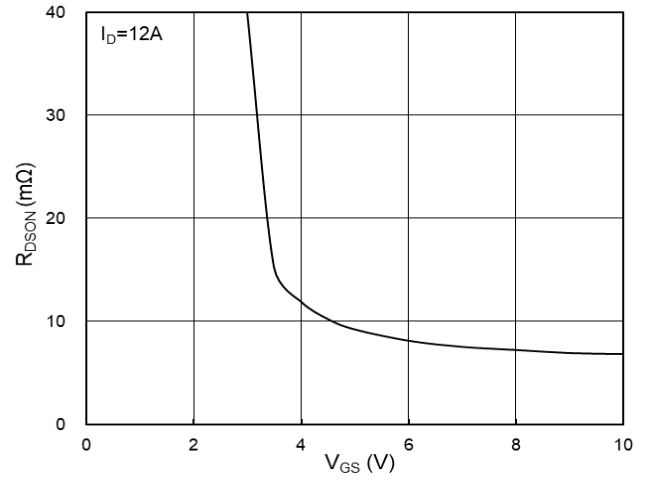


Fig.2 On-Resistance vs. G-S Voltage

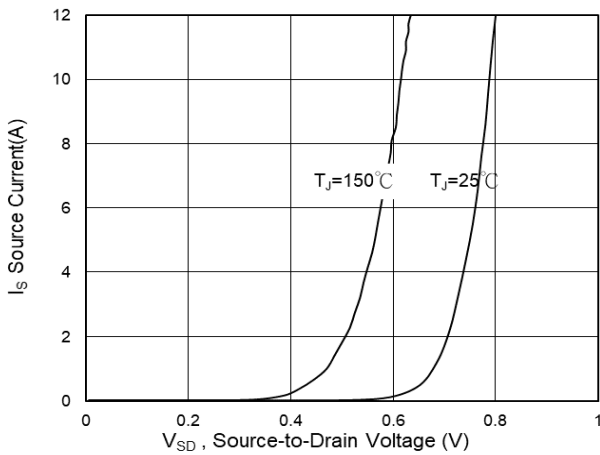


Fig.3 Source Drain Forward Characteristics

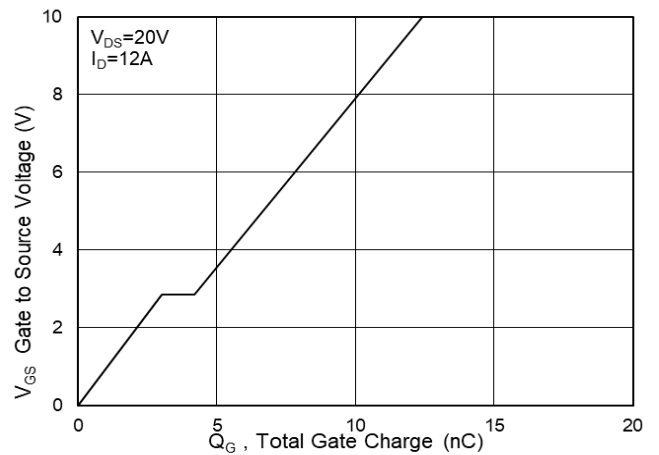


Fig.4 Gate-Charge Characteristics

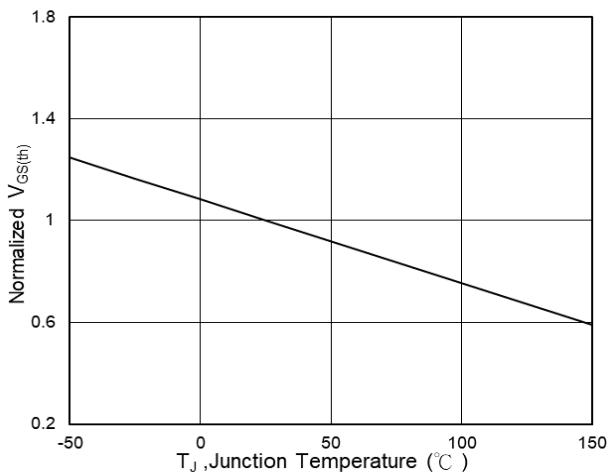


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

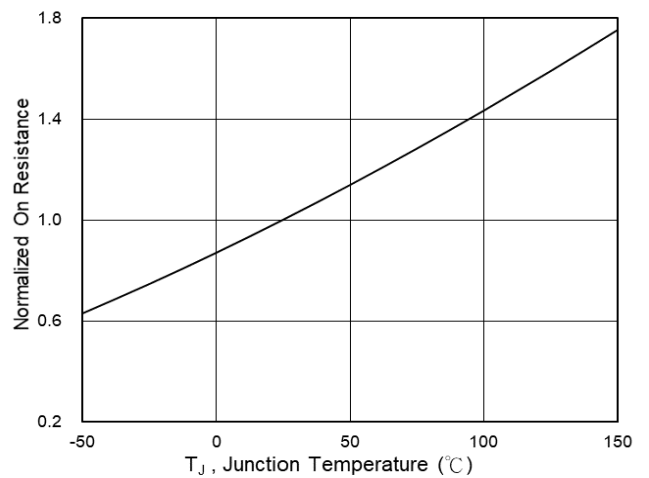


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

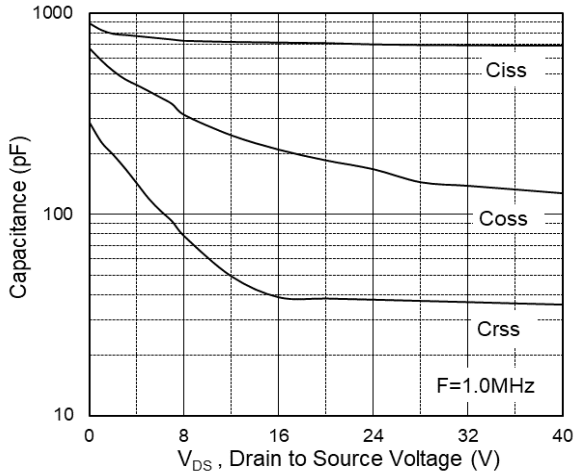


Fig.7 Capacitance

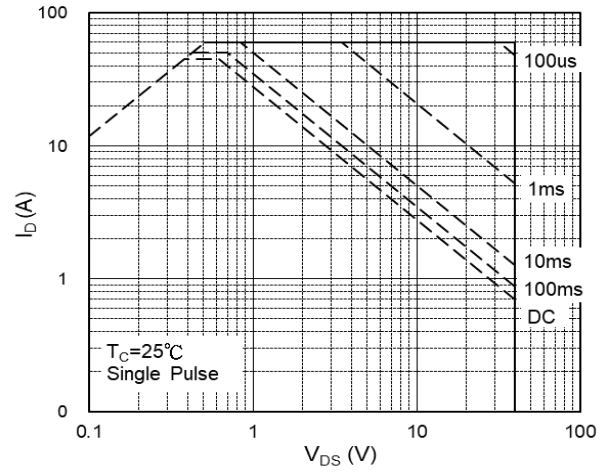


Fig.8 Safe Operating Area

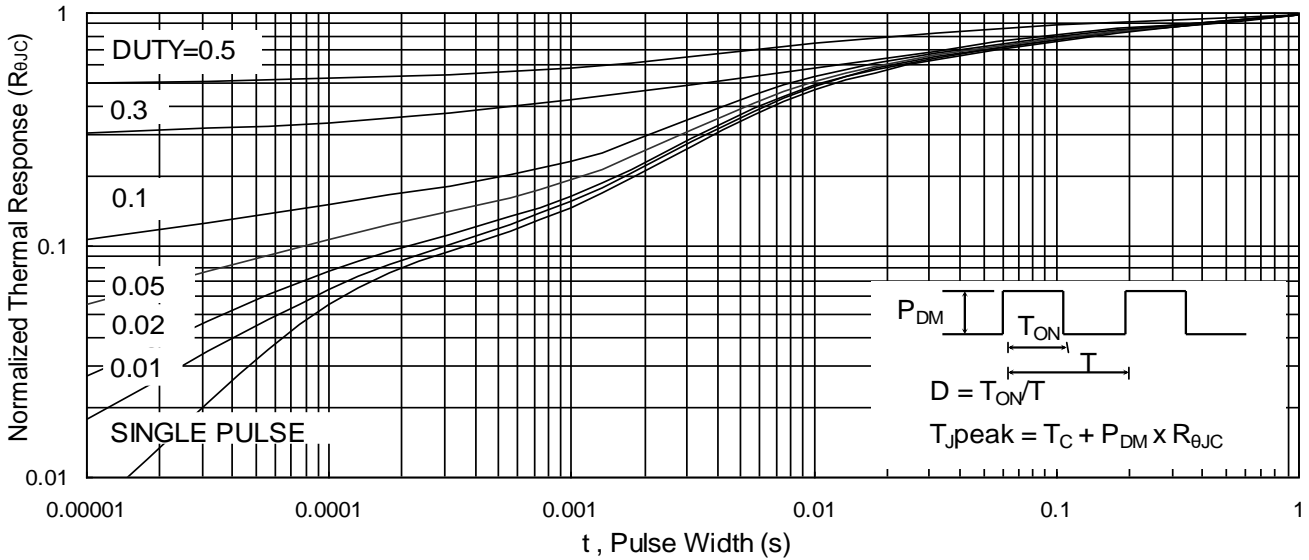


Fig.9 Normalized Maximum Transient Thermal Impedance

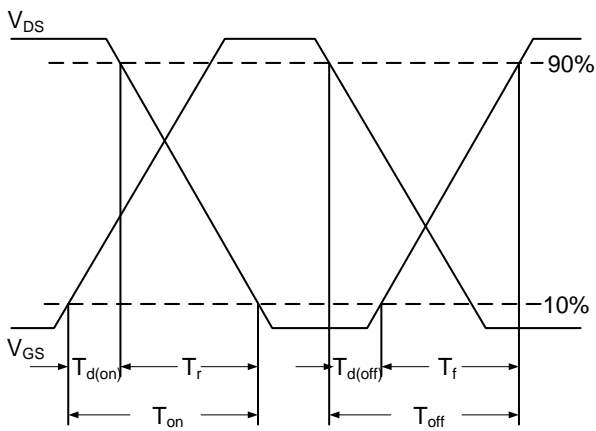


Fig.10 Switching Time Waveform

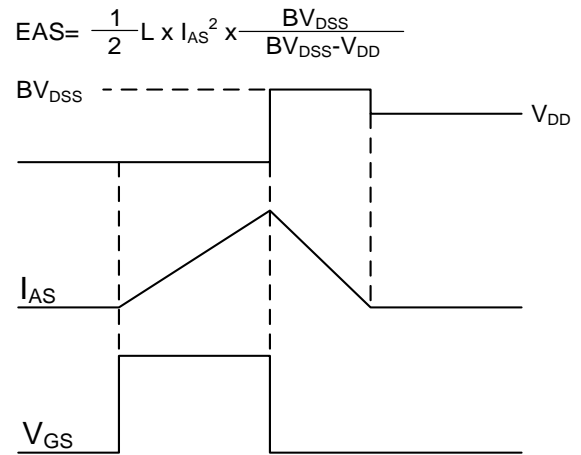
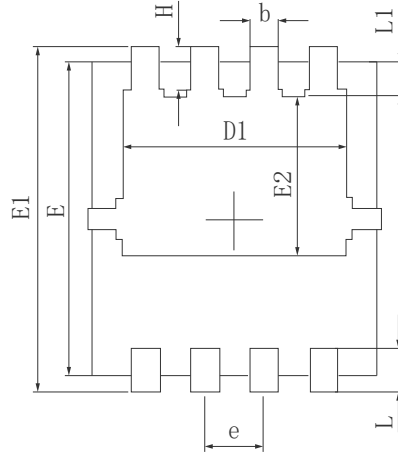
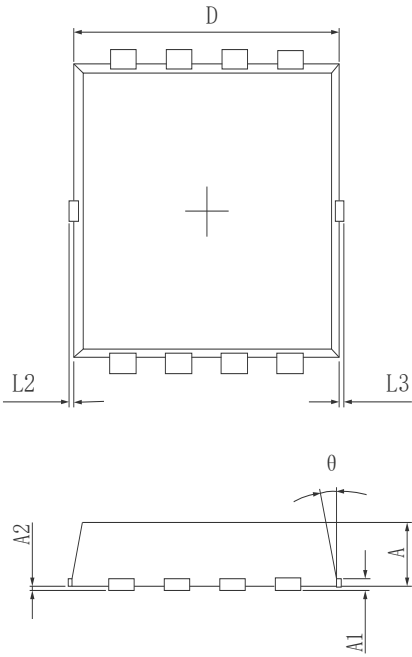
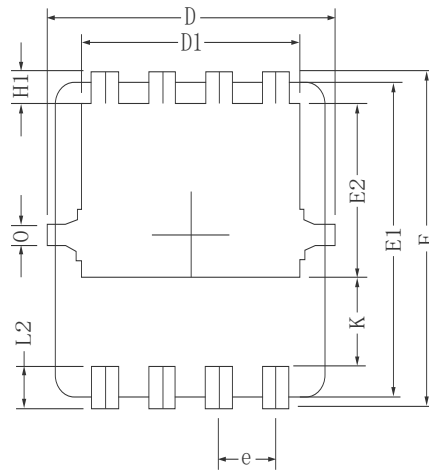
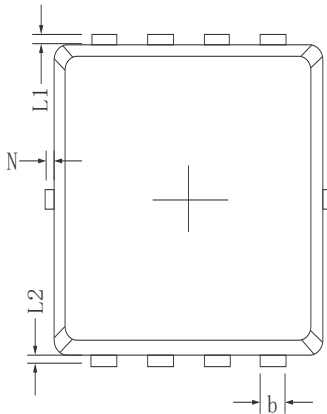


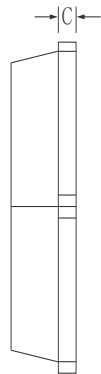
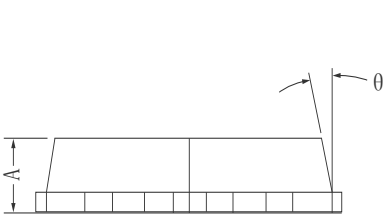
Fig.11 Unclamped Inductive Waveform

●Dimensions (PDFN3.3*3.3)


SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.700	0.800	0.900
A1	0.152REF.		
A2	0~0.05		
D	3.000	3.100	3.200
D1	2.300	2.450	2.600
E	2.900	3.000	3.100
E1	3.150	3.300	3.450
E2	1.320	1.520	1.720
b	0.200	0.300	0.400
e	0.550	0.650	0.750
L	0.300	0.400	0.500
L1	0.180	0.330	0.480
L2	0~0.100		
L3	0~0.100		
H	0.315	0.415	0.515
θ	8°	10°	12°

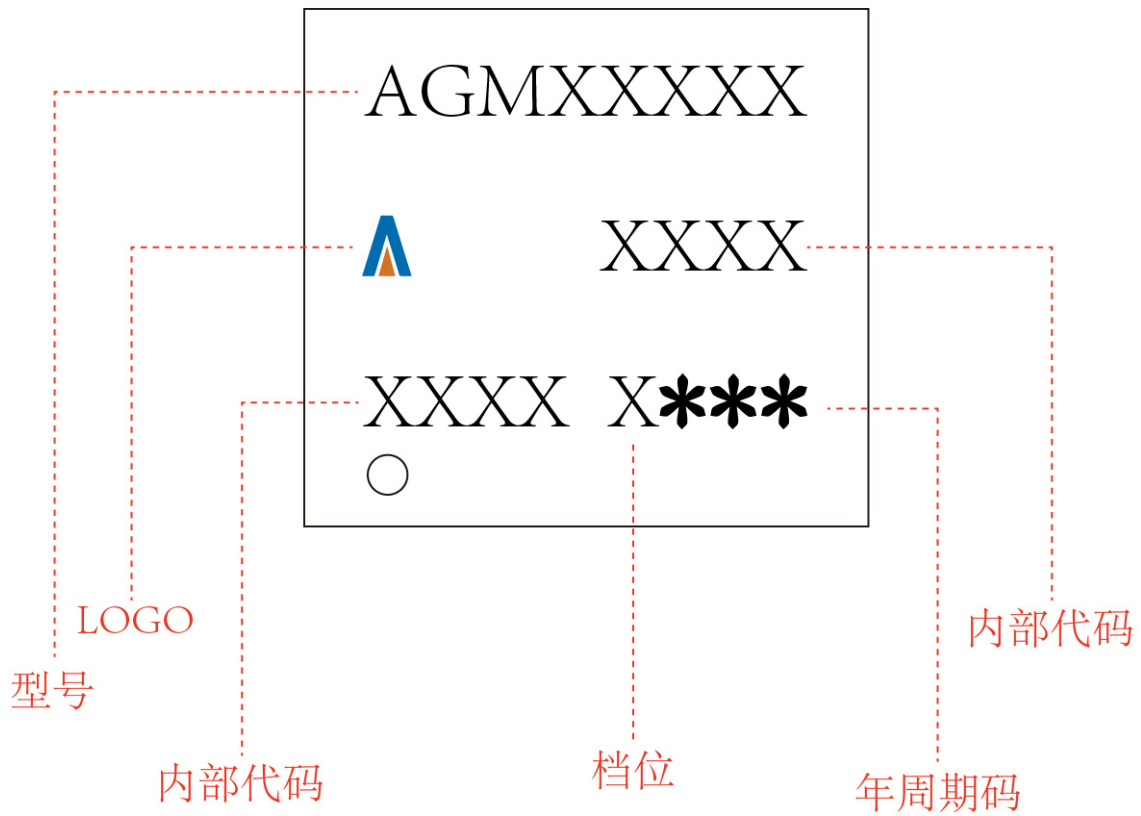


Symbols	Millimeters		
	MIN.	NOM.	MAX.
A	0.65	0.75	0.85
b	0.25	0.30	0.35
C	0.15	0.20	0.25
D	3.00	3.10	3.20
D1	2.40	2.50	2.60
E	3.20	3.30	3.40
E1	3.00	3.10	3.20
E2	1.60	1.70	1.80
e	0.65 BSC.		
H1	0.21	0.31	0.41
H2	0.30	0.40	0.50
K	0.78	0.88	0.98
L1/L2	0.10 REF.		
θ	11°	12°	13°
N	0	-	0.15
0	0.2 REF.		



PDFN3.3*3.3

Marking Instructions:



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