

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_C = +25^\circ C$
30V	8.5mΩ @ $V_{GS} = 10V$	30A
	10.5mΩ @ $V_{GS} = 4.5V$	25A

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

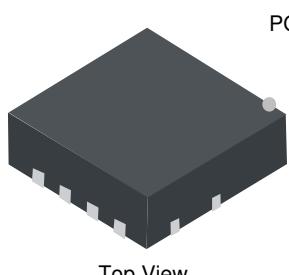
- Backlighting
- DC-DC Converters
- Power Management Functions

Features

- Low $R_{DS(ON)}$ – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- 100% UIS (Avalanche) rated
- 100% R_g tested
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

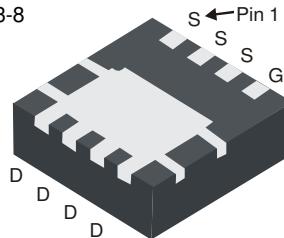
Mechanical Data

- Case: POWERDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208^(e3)
- Weight: 0.072 grams (Approximate)

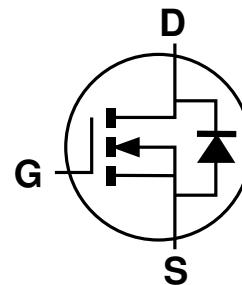


Top View

POWERDI3333-8



Bottom View



Equivalent Circuit

Ordering Information (Note 4)

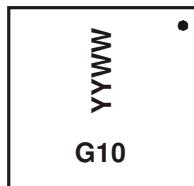
Part Number	Compliance	Case	Packaging
DMN3010LFG-7	Standard	POWERDI3333-8	2,000/Tape & Reel
DMN3010LFG-13	Standard	POWERDI3333-8	3,000/Tape & Reel

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

PowerDI3333-8



G10 = Product Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 15 for 2015)
 WW = Week Code (01 – 53)

POWERDI is a registered trademark of Diodes Incorporated

DMN3010LFG
 Document number: DS36195 Rev. 6 - 2

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Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	11 8.5	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	14 11	A
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	I_D	30 20	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	90	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			I_{AS}	12.7	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			E_{AS}	8.1	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	137	$^\circ\text{C}/\text{W}$
	$t < 10\text{s}$		90	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)		P_D	2.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	52	$^\circ\text{C}/\text{W}$
	$t < 10\text{s}$		35	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)		P_D	26	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	4.8	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

 Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	1	μA	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
		—	—	100	μA	
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(\text{th})}$	1.0	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	6.5	8.5	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 18\text{A}$
		—	8	10.5		$V_{GS} = 4.5\text{V}, I_D = 16\text{A}$
Diode Forward Voltage	V_{SD}	—	0.75	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
On State Drain Current (Note 9)	$I_{D(\text{ON})}$	10	—	—	A	$V_{DS} \leq 5\text{V}, V_{GS} = 4.5\text{V}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2,075	4,150	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	190	380		
Reverse Transfer Capacitance	C_{rss}	—	138	276		
Gate Resistance	R_g	—	2.4	5	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	16.1	32	nC	$V_{DS} = 15\text{V}, I_D = 18\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	37	74		
Gate-Source Charge	Q_{gs}	—	6.1	12		
Gate-Drain Charge	Q_{gd}	—	5.9	12		
Turn-On Delay Time	$t_{D(\text{on})}$	—	4.5	10	ns	$V_{DS} = 15\text{V}, V_{GS} = 10\text{V}, R_L = 0.83\Omega, R_{\text{GEN}} = 3\Omega,$
Turn-On Rise Time	t_r	—	19.6	35		
Turn-Off Delay Time	$t_{D(\text{off})}$	—	31	50		
Turn-Off Fall Time	t_f	—	10.7	21		
Reverse Recovery Time	t_{rr}	—	13.7	27	ns	$I_F = 15\text{A}, di/dt = 500\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{rr}	—	18.3	37	nC	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.

7. UIS in production with $L = 1\text{mH}, T_J = +25^\circ\text{C}$.

8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to production testing.

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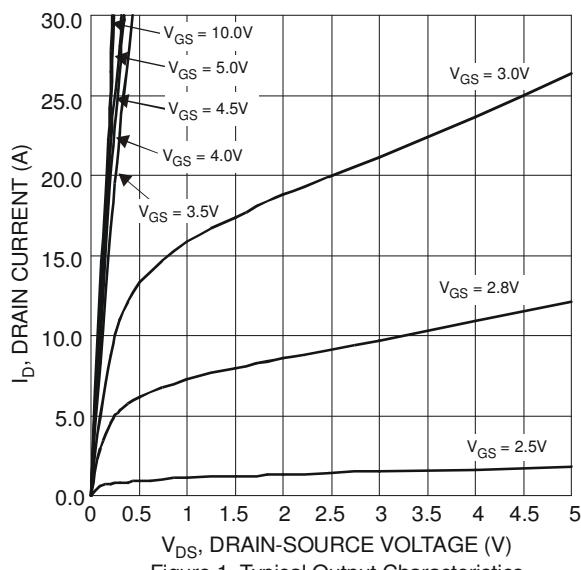


Figure 1 Typical Output Characteristics

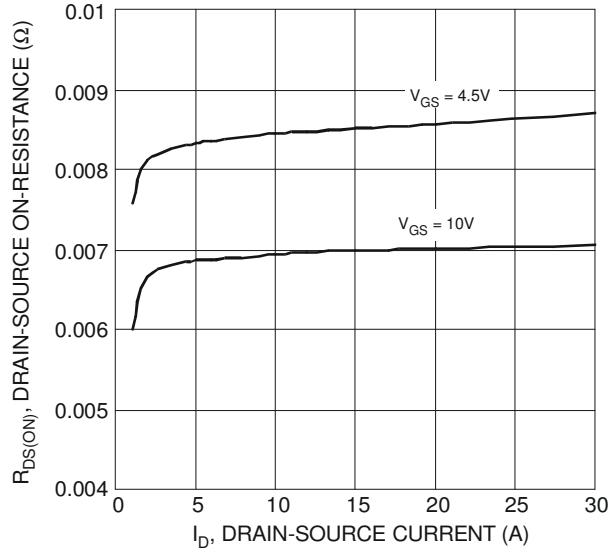
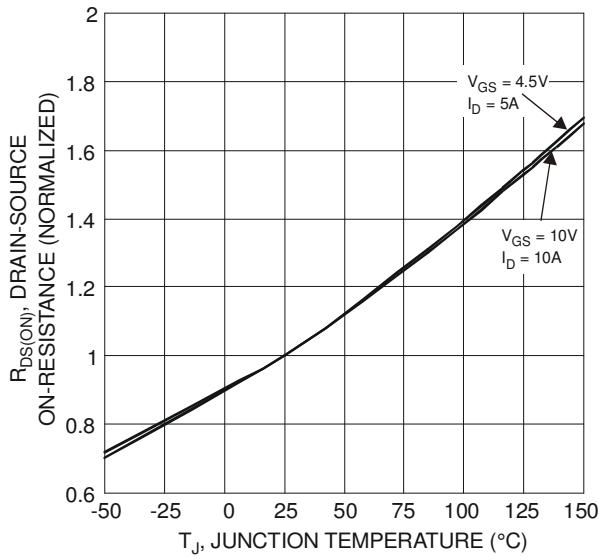
Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

Figure 5 On-Resistance Variation with Temperature

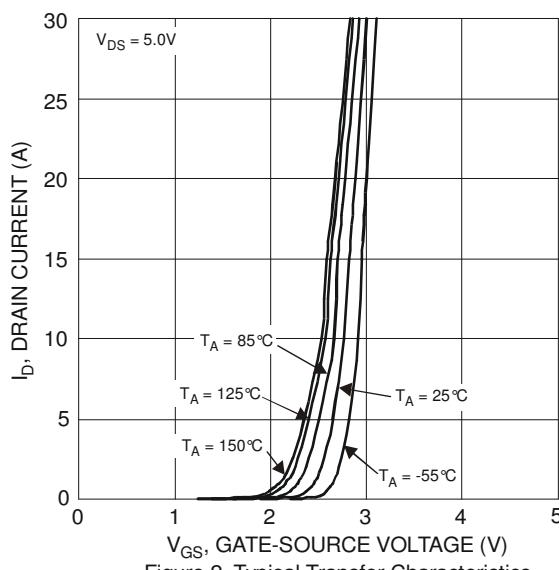


Figure 2 Typical Transfer Characteristics

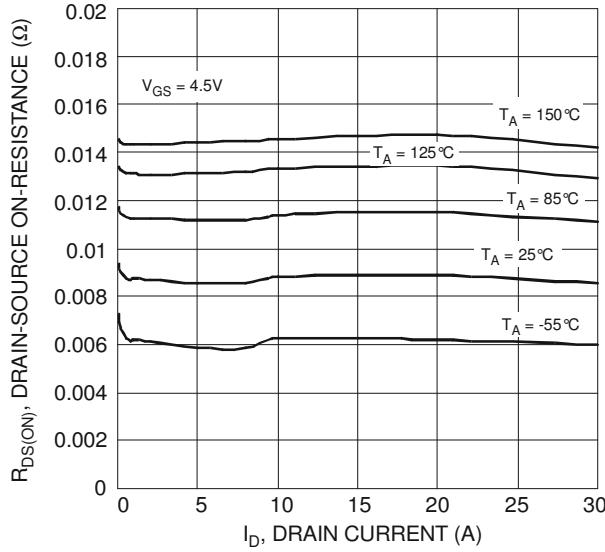
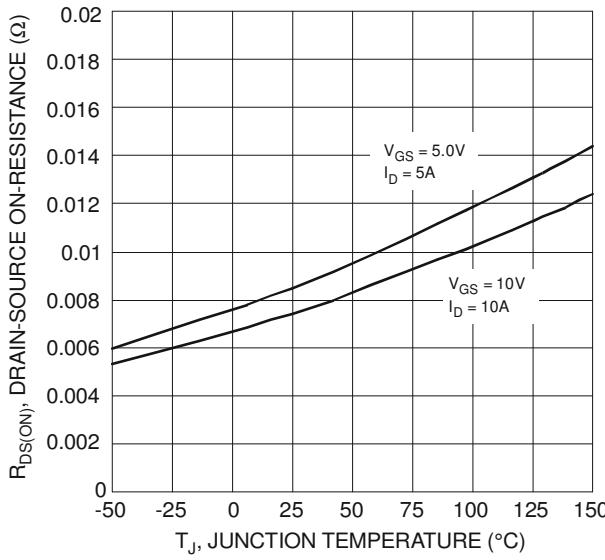
Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

Figure 6 On-Resistance Variation with Temperature

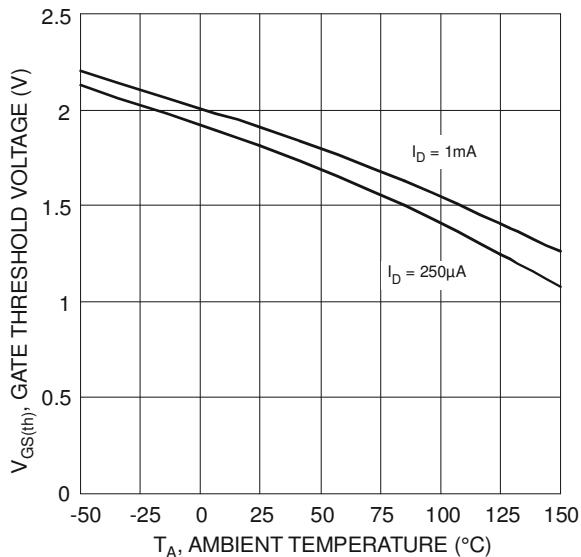


Figure 7 Gate Threshold Variation vs. Ambient Temperature

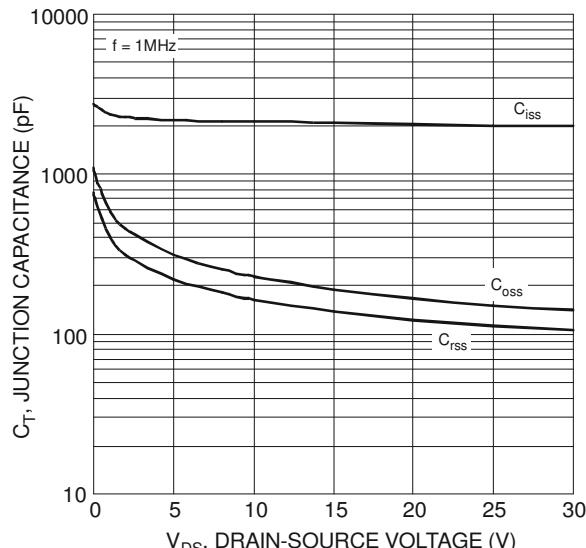


Figure 9 Typical Junction Capacitance

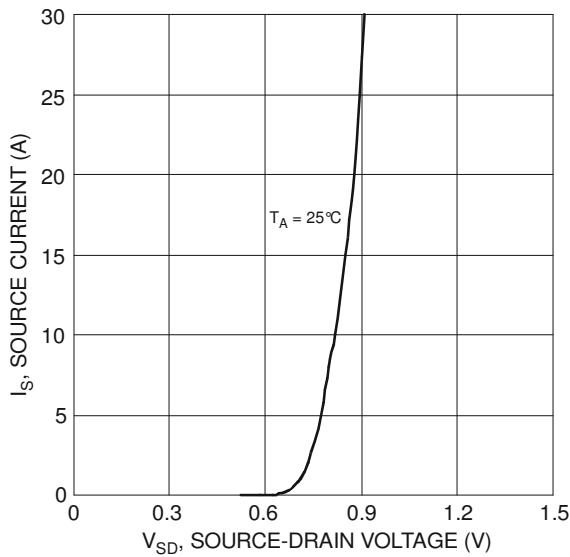


Figure 8 Diode Forward Voltage vs. Current

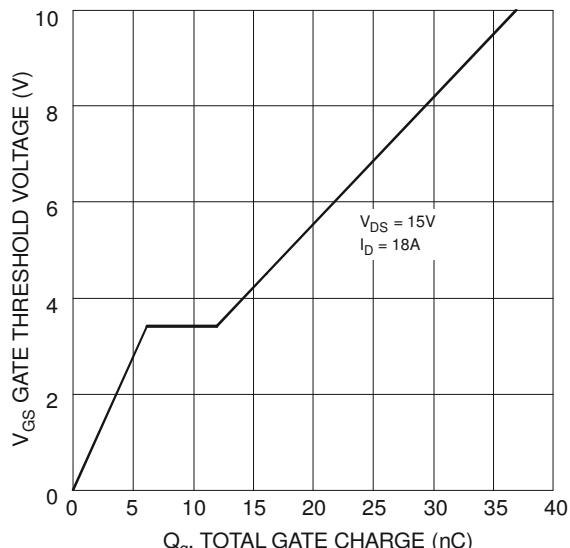


Figure 10 Gate Charge

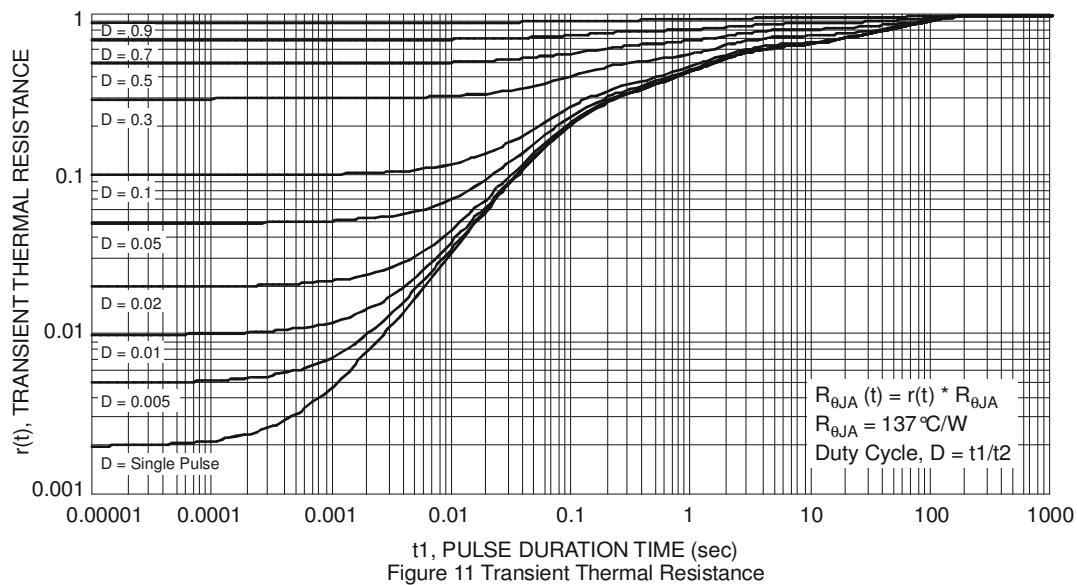
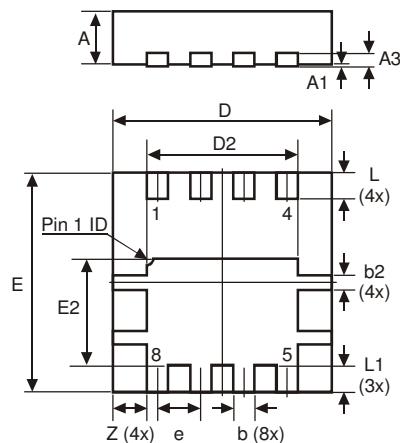


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

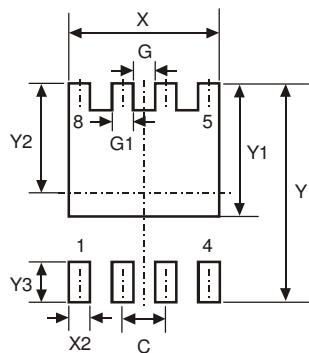


POWERDI®3333-8			
Dim	Min	Max	Typ
D	3.25	3.35	3.30
E	3.25	3.35	3.30
D2	2.22	2.32	2.27
E2	1.56	1.66	1.61
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	—	—	0.20
L	0.35	0.45	0.40
L1	—	—	0.39
e	—	—	0.65
Z	—	—	0.515

All Dimensions in mm

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	0.650
G	0.230
G1	0.420
Y	3.700
Y1	2.250
Y2	1.850
Y3	0.700
X	2.370
X2	0.420

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AMEYA360

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Website :

Welcome to visit www.ameya360.com

Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email amall@ameya360.com

QQ 800077892

Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com