Zener Diode Voltage Regulators

250 mW Wettable Flank

NZ8F Series

This series of Zener diodes is packaged in a X2DFNW2 surface mount package with an industry standard size of 0402 in. They are designed to provide voltage regulation protection and are especially attractive in situations where space is at a premium. They are well suited for applications such as cellular phones, hand held portables, and automotive control units.

Specification Features

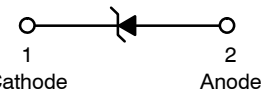
- Zener Breakdown Voltage Range −2.4 V to 47 V
  - Standard Tolerance Series − NZ8FxxxMX2WT5G
  - Tight Tolerance Series − NZ8FxxxSMX2WT5G
- Low Body Height: 0.016″ (0.40 mm)
- Wettable Flank Package for optimal Automated Optical Inspection (AOI)
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Total Device Dissipation FR−4 Board, (Note 1) @ T_A = 25°C Derate above 25°C	P_D	250 1.5	mW mW/°C
Total Device Dissipation FR−4 Board, (Note 2) @ T_A = 25°C Derate above 25°C	P_D	500 1.2	mW mW/°C
Thermal Resistance from Junction−to−Ambient (Note 1) (Note 2)	$R_{\theta JA}$	415 247	°C/W
Non−Repetitive Peak Reverse Power (Note 3)	P_{ZSM}	40	W
Junction and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR−4 Minimum Pad, 1 oz. Cu.
2. FR−4 150 mm^2, 1 oz. Cu.
3. T_A = 25°C, t_p = 100 μs.



X2DFNW2
CASE 711BG

MARKING DIAGRAM

XX = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NZ8FxxxMX2WT5G, SZNZ8FxxxMX2WT5G	X2DFNW2 (Pb−Free)	8000 / Tape & Reel
NZ8FxxxSMX2WT5G, SZNZ8FxxxSMX2WT5G	X2DFNW2 (Pb−Free)	8000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F
ΘV_Z	Maximum Temperature Coefficient of V_Z
C	Max. Capacitance @V_R = 0 and f = 1 MHz

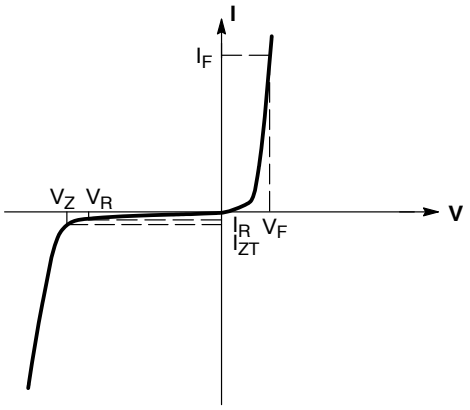


Figure 1. Uni−directional Zener

ELECTRICAL CHARACTERISTICS (NZ8FxxxMX2W Standard Tolerance Series)

(V_F = 0.9 V Max @ I_F = 10 mA for all types)

Device*	Device Marking	Zener Voltage (Note 1)			Zener Impedance	Leakage Current		C@ V_R = 0 f = 1 MHz
		V_Z (Volts)		@ I_{ZT}	Z_{ZT} @ I_{ZT}	I_R @ V_R		
		Min	Max	mA	Ω	μA	Volts	pF
NZ8F2V4MX2WT5G	AA	2.11	2.69	5	100	50	1	210
NZ8F2V7MX2WT5G	AC	2.43	2.97	5	100	20	1	210
NZ8F3V0MX2WT5G	AD	2.75	3.25	5	100	10	1	210
NZ8F3V3MX2WT5G	AE	3.05	3.55	5	100	10	1	210
NZ8F3V6MX2WT5G	AF	3.35	3.85	5	100	10	1	210
NZ8F3V9MX2WT5G	AG	3.65	4.15	5	100	5	1	210
NZ8F4V3MX2WT5G	AH	4.09	4.52	5	100	5	1	210
NZ8F4V7MX2WT5G	AJ	4.47	4.94	5	100	2	1	150
NZ8F5V1MX2WT5G	AK	4.85	5.36	5	80	2	1.5	130
NZ8F5V6MX2WT5G	AL	5.32	5.88	5	60	1	2.5	115
NZ8F6V2MX2WT5G	AM	5.89	6.51	5	60	1	3	110
NZ8F6V8MX2WT5G	AN	6.46	7.14	5	40	0.5	3.5	105
NZ8F7V5MX2WT5G	AQ	7.13	7.88	5	30	0.5	4	100
NZ8F8V2MX2WT5G	AP	7.79	8.61	5	30	0.5	5	90
NZ8F9V1MX2WT5G	AR	8.65	9.56	5	30	0.5	6	80
NZ8F10VMX2WT5G	AT	9.50	10.50	5	30	0.1	7	80
NZ8F11VMX2WT5G	AU	10.45	11.55	5	30	0.1	8	80
NZ8F12VMX2WT5G	AV	11.40	12.60	5	30	0.1	9	80
NZ8F13VMX2WT5G	AW	12.35	13.65	5	37	0.1	10	75
NZ8F15VMX2WT5G	AX	14.25	15.75	5	42	0.1	11	70
NZ8F16VMX2WT5G	AY	15.20	16.80	5	50	0.1	12	65
NZ8F18VMX2WT5G	AZ	17.10	18.90	5	50	0.1	14	60
NZ8F20VMX2WT5G	A2	19.00	21.00	5	55	0.1	15.4	55
NZ8F22VMX2WT5G	A3	20.90	23.10	5	55	0.1	16.8	55
NZ8F24VMX2WT5G	A4	22.80	25.20	5	70	0.1	18.9	50
NZ8F27VMX2WT5G	A5	25.65	28.35	5	80	0.1	22	50
NZ8F33VMX2WT5G	A6	31.35	34.65	5	95	0.1	26	45
NZ8F47VMX2WT5G	A7	44.65	49.35	2	170	0.1	38	40

*Includes SZ prefix where applicable: SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

ELECTRICAL CHARACTERISTICS (NZ8FxxxSMX2W Tight Tolerance Series)
(V_F = 0.9 V Max @ I_F = 10 mA for all types)

Device*	Device Marking	Zener Voltage (Note 1)			Zener Impedance	Leakage Current		C@ V_R = 0 f = 1 MHz
		V_Z (Volts)		@ I_{ZT}	Z_{ZT} @ I_{ZT}	I_R @ V_R		
		Min	Max	mA	Ω	μA	Volts	pF
NZ8F2V4SMX2WT5G	CA	2.26	2.55	5	100	50	1	210
NZ8F2V7SMX2WT5G	CC	2.54	2.86	5	100	20	1	210
NZ8F3V0SMX2WT5G	CD	2.85	3.15	5	100	10	1	210
NZ8F3V3SMX2WT5G	CE	3.14	3.47	5	100	10	1	210
NZ8F3V6SMX2WT5G	CF	3.42	3.78	5	100	10	1	210
NZ8F3V9SMX2WT5G	CG	3.71	4.10	5	100	5	1	210
NZ8F4V3SMX2WT5G	CH	4.16	4.45	5	100	5	1	210
NZ8F4V7SMX2WT5G	CJ	4.59	4.81	5	100	2	1	150
NZ8F5V1SMX2WT5G	CK	4.98	5.22	5	80	2	1.5	130
NZ8F5V6SMX2WT5G	CL	5.47	5.73	5	60	1	2.5	115
NZ8F6V2SMX2WT5G	CM	6.06	6.34	5	60	1	3	110
NZ8F6V8SMX2WT5G	CN	6.64	6.96	5	40	0.5	3.5	105
NZ8F7V5SMX2WT5G	CP	7.33	7.67	5	30	0.5	4	100
NZ8F8V2SMX2WT5G	CQ	8.01	8.39	5	30	0.5	5	90
NZ8F9V1SMX2WT5G	CR	8.89	9.31	5	30	0.5	6	80
NZ8F10VSMX2WT5G	CT	9.77	10.23	5	30	0.1	7	80
NZ8F11VSMX2WT5G	CU	10.75	11.25	5	30	0.1	8	80
NZ8F12VSMX2WT5G	CV	11.72	12.28	5	30	0.1	9	80
NZ8F13VSMX2WT5G	CW	12.70	13.30	5	37	0.1	10	75
NZ8F15VSMX2WT5G	CX	14.66	15.35	5	42	0.1	11	70
NZ8F16VSMX2WT5G	CY	15.63	16.37	5	50	0.1	12	65
NZ8F18VSMX2WT5G	CZ	17.59	18.41	5	50	0.1	14	60
NZ8F20VSMX2WT5G	C2	19.54	20.46	5	55	0.1	15.4	55
NZ8F22VSMX2WT5G	C3	21.49	22.51	5	55	0.1	16.8	55
NZ8F24VSMX2WT5G	C4	23.45	24.55	5	70	0.1	18.9	50
NZ8F27VSMX2WT5G	C5	26.38	27.62	5	80	0.1	22	50
NZ8F33VSMX2WT5G	C6	32.24	33.76	5	95	0.1	26	45
NZ8F47VSMX2WT5G	C7	45.92	48.08	2	170	0.1	38	40

*Includes SZ prefix where applicable: SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

TYPICAL CHARACTERISTICS

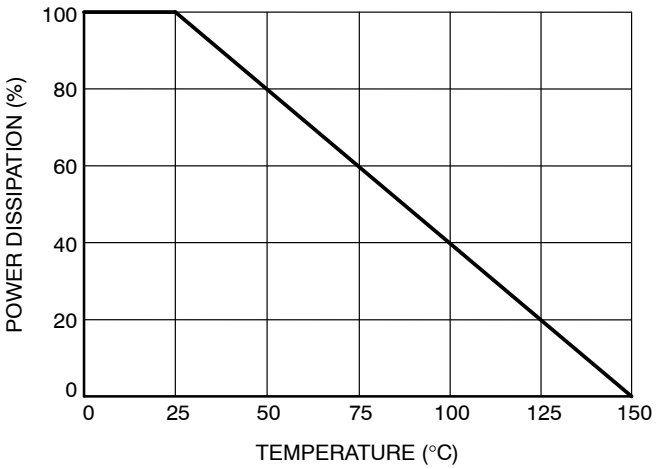


Figure 2. Steady State Power Derating

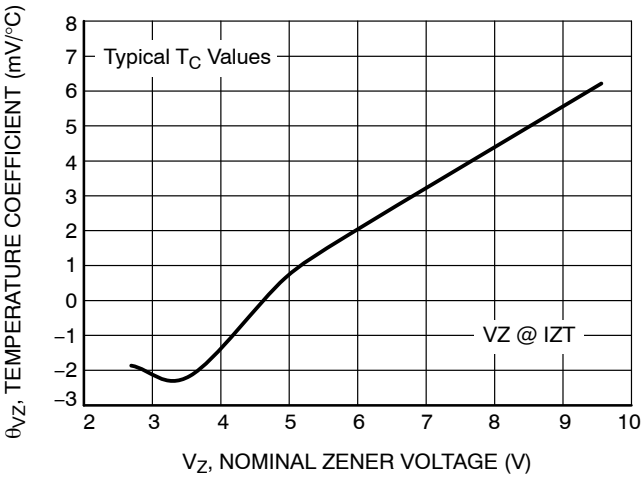


Figure 3. Temperature Coefficients (Temperature Range −55°C to +150°C)

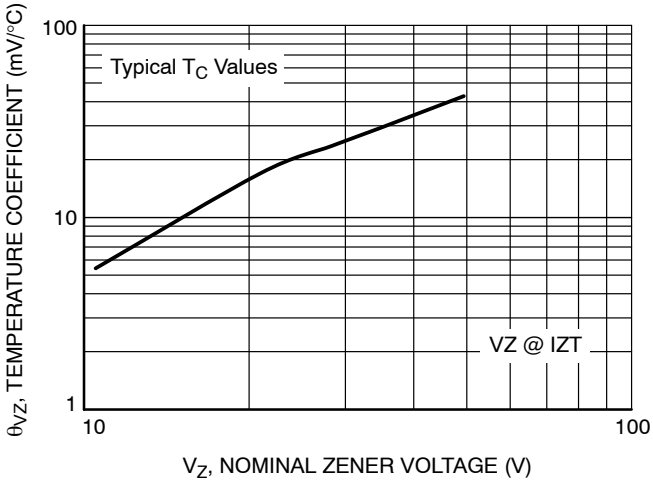


Figure 4. Temperature Coefficients (Temperature Range −55°C to +150°C)

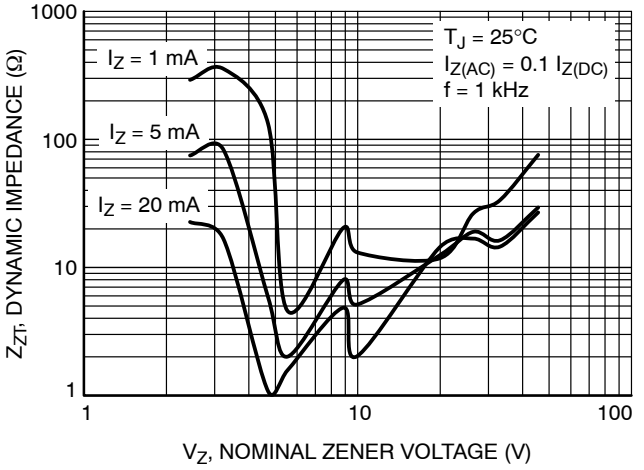


Figure 5. Effect of Zener Voltage on Zener Impedance

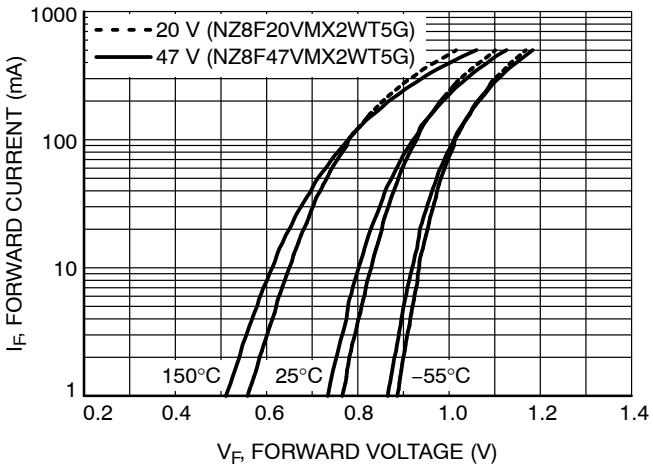


Figure 6. Typical Forward Voltage

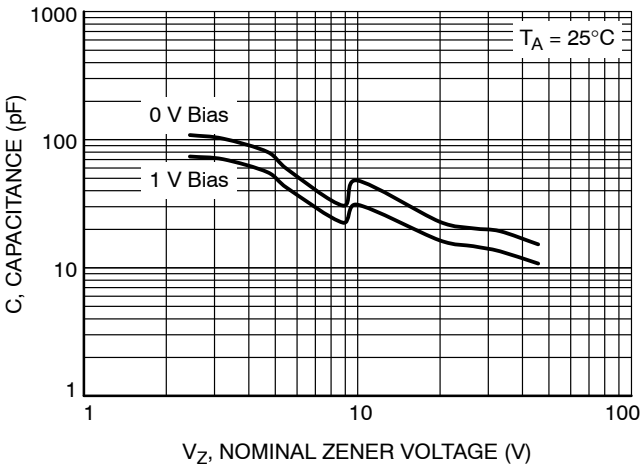


Figure 7. Typical Capacitance

TYPICAL CHARACTERISTICS

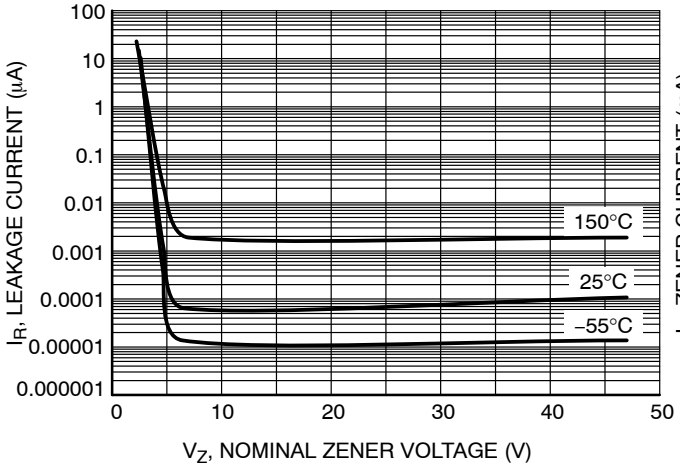


Figure 8. Typical Leakage Current

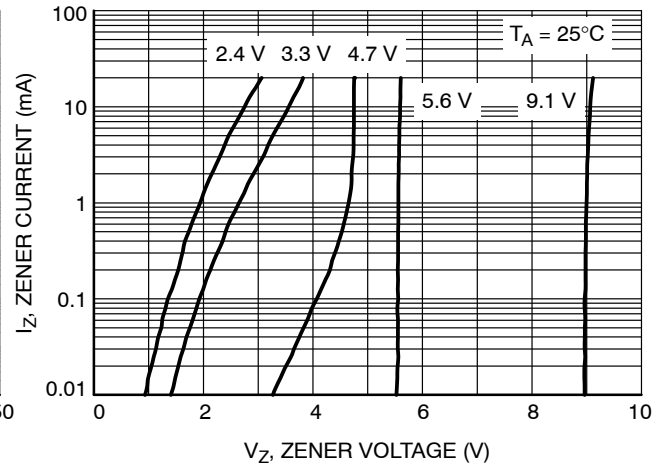


Figure 9. Zener Voltage vs. Zener Current (V_Z up to 9.1 V)

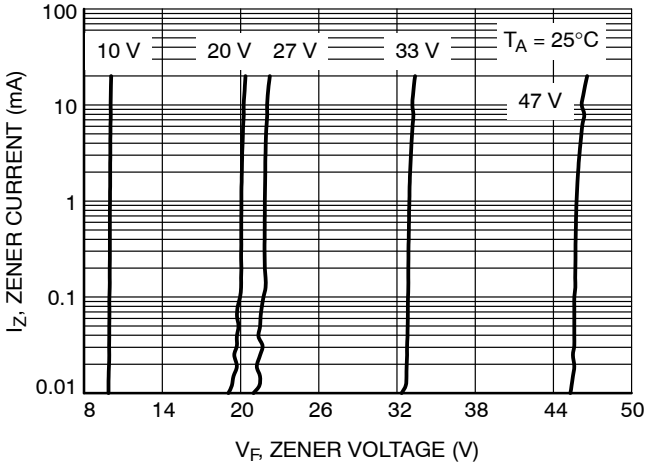
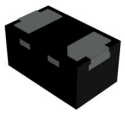
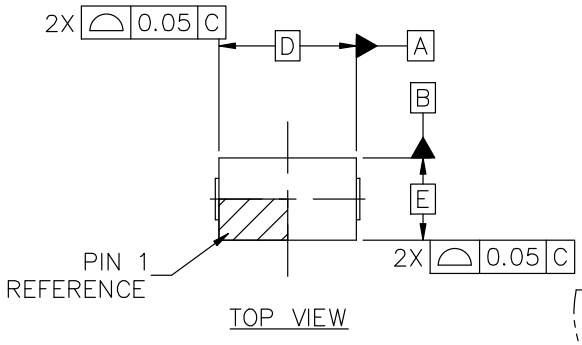


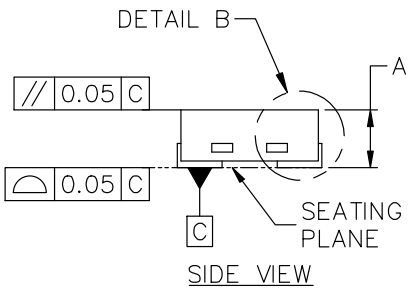
Figure 10. Zener Voltage vs. Zener Current (V_Z = 9.1 V to 47 V)

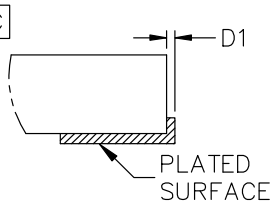


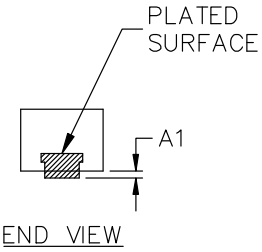
X2DFNW2 1.00x0.60x0.37, 0.65P
CASE 711BG
ISSUE D

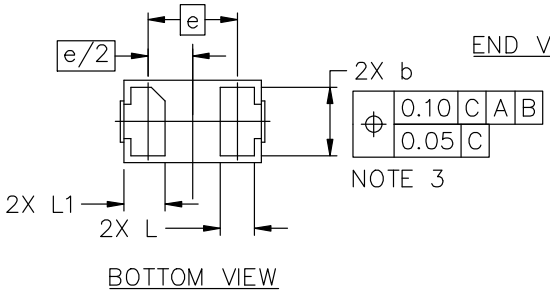
DATE 29 FEB 2024







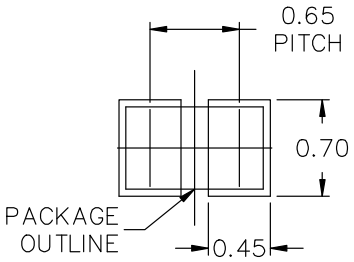




NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSION b APPLIES TO THE PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 FROM THE TERMINAL TIP.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.34	0.37	0.40
A1	−−−	−−−	0.05
b	0.45	0.50	0.55
D	1.00 BSC		
D1	−−−	−−−	0.05
E	0.60 BSC		
e	0.65 BSC		
L	0.22 REF		
L1	0.24	0.28	0.34



RECOMMENDED MOUNTING FOOTPRINT*

* FOR ADDITIONAL INFORMATION ON OUR Pb−FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

GENERIC
MARKING DIAGRAM*

XX = Specific Device Code
M = Date Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G”, may or not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	**98AON15241G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**X2DFNW2 1.00x0.60x0.37, 0.65P**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

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NZ8F10VSMX2WT5G NZ8F11VSMX2WT5G NZ8F12VSMX2WT5G NZ8F13VSMX2WT5G NZ8F15VSMX2WT5G NZ8F16VSMX2WT5G NZ8F9V1SMX2WT5G NZ8F6V8SMX2WT5G NZ8F7V5MX2WT5G NZ8F7V5SMX2WT5G NZ8F8V2MX2WT5G NZ8F8V2SMX2WT5G NZ8F9V1MX2WT5G NZ8F5V1SMX2WT5G NZ8F5V6MX2WT5G NZ8F5V6SMX2WT5G NZ8F6V2MX2WT5G NZ8F6V2SMX2WT5G NZ8F6V8MX2WT5G NZ8F47VSMX2WT5G NZ8F4V3MX2WT5G NZ8F4V3SMX2WT5G NZ8F4V7MX2WT5G NZ8F4V7SMX2WT5G NZ8F5V1MX2WT5G NZ8F3V3MX2WT5G NZ8F3V3SMX2WT5G NZ8F3V6MX2WT5G NZ8F3V6SMX2WT5G NZ8F3V9MX2WT5G NZ8F3V9SMX2WT5G NZ8F2V4SMX2WT5G NZ8F2V7MX2WT5G NZ8F2V7SMX2WT5G NZ8F33VSMX2WT5G NZ8F3V0MX2WT5G NZ8F3V0SMX2WT5G NZ8F18VSMX2WT5G NZ8F20VSMX2WT5G NZ8F22VSMX2WT5G NZ8F24VSMX2WT5G NZ8F27VSMX2WT5G NZ8F2V4MX2WT5G NZ8F10VMX2WT5G NZ8F11VMX2WT5G NZ8F12VMX2WT5G NZ8F13VMX2WT5G NZ8F15VMX2WT5G NZ8F16VMX2WT5G NZ8F18VMX2WT5G NZ8F20VMX2WT5G NZ8F22VMX2WT5G NZ8F24VMX2WT5G NZ8F27VMX2WT5G NZ8F33VMX2WT5G NZ8F47VMX2WT5G SZNZ8F10VMX2WT5G SZNZ8F10VSMX2WT5G SZNZ8F11VMX2WT5G SZNZ8F11VSMX2WT5G SZNZ8F12VMX2WT5G SZNZ8F12VSMX2WT5G SZNZ8F13VMX2WT5G SZNZ8F13VSMX2WT5G SZNZ8F15VMX2WT5G SZNZ8F15VSMX2WT5G SZNZ8F16VMX2WT5G SZNZ8F16VSMX2WT5G SZNZ8F18VMX2WT5G SZNZ8F18VSMX2WT5G SZNZ8F20VMX2WT5G SZNZ8F20VSMX2WT5G SZNZ8F22VMX2WT5G SZNZ8F22VSMX2WT5G SZNZ8F24VMX2WT5G SZNZ8F24VSMX2WT5G SZNZ8F27VMX2WT5G SZNZ8F27VSMX2WT5G SZNZ8F2V4MX2WT5G SZNZ8F2V4SMX2WT5G SZNZ8F2V7MX2WT5G SZNZ8F2V7SMX2WT5G SZNZ8F33VMX2WT5G SZNZ8F33VSMX2WT5G SZNZ8F3V0MX2WT5G SZNZ8F3V0SMX2WT5G SZNZ8F3V3MX2WT5G SZNZ8F3V3SMX2WT5G SZNZ8F3V6MX2WT5G SZNZ8F3V6SMX2WT5G SZNZ8F3V9MX2WT5G SZNZ8F3V9SMX2WT5G SZNZ8F47VMX2WT5G SZNZ8F47VSMX2WT5G SZNZ8F4V3MX2WT5G SZNZ8F4V3SMX2WT5G SZNZ8F4V7MX2WT5G SZNZ8F4V7SMX2WT5G SZNZ8F5V1MX2WT5G SZNZ8F5V1SMX2WT5G