Features

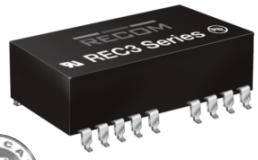
Regulated Converters

- 2kV, 4kVDC & 6kVDC Isolation
- Industry Standard 3W DIP24 Package
- Feedback Regulated Output
- Continuous Short Circuit Protection
- Wide Input 2:1 & 4:1
- Medical Approvals (4kV/6kV Versions)
- EN and UL Certificates
- 3 Pinout Options, 3 Case Styles
- Control Pin Option
- Efficiency to 86%

ECONOLINE
DC/DC-Converter
with 3 year Warranty

RECOM

3 Watt DIP24 & SMD Single & Dual Output



RoHS 2011/65/EU 6/6

E-358085

EN-60950-1 Certified
UL-60950-1 Certified
EN-60601-1 Certified

REC3-S_DRW

Description

Besides the standard isolation of 2kVDC, this series offers options of 4kVDC (= "/H4") or 6kVDC (="/H6") making it suitable for medical applications and other sophisticated industrial applications. Packaging can be either DIP-24 plastic or 5-side-shielded DIP24 metal case (=option "/M") as well as SMD pinning (= option "/SMD"). For all the above variants, 2 industry-standard pinouts (= option "/A" or "/C") are available, and B pinning is available with 1.6kVDC isolation. Remote on/off control is possible with the /CTRL option (A pinning only). The converters can deliver 140% rated power for short periods of time to cope with applications with large capacitive loads or high start up currents.

Selection Guide

Part Number DIP24 (SMD)	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%)	Max Capacitive Load[1]
REC3-xx3.3SRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	3.3	900	66-76	4700µF
REC3-xx05SRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	5	600	71-79	4700µF
REC3-xx09SRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	9	330	74-83	3300µF
REC3-xx12SRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	12	250	75-85	2200µF
REC3-xx15SRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	15	200	75-86	2200µF
REC3-xx05DRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	±5	±300	74-83	±2200µF
REC3-xx12DRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	±12	±125	75-85	±1000µF
REC3-xx15DRW/H*	4.5 - 9, 9 - 18, 18 - 36, 36 - 72	±15	±100	75-86	±1000µF
REC3-xx3.3SRWZ/H*	9 - 36, 18 - 72	3.3	900	77-79	4700µF
REC3-xx05SRWZ/H*	9 - 36, 18 - 72	5	600	78-80	4700µF
REC3-xx09SRWZ/H*	9 - 36, 18 - 72	9	330	80-83	3300µF
REC3-xx12SRWZ/H*	9 - 36, 18 - 72	12	250	83-85	2200µF
REC3-xx15SRWZ/H*	9 - 36, 18 - 72	15	200	83-85	2200µF
REC3-xx05DRWZ/H*	9 - 36, 18 - 72	±5	±300	77-80	±2200µF
REC3-xx12DRWZ/H*	9 - 36, 18 - 72	±12	±125	83-85	±1000µF
REC3-xx15DRWZ/H*	9 - 36, 18 - 72	±15	±100	83-85	±1000µF

H* = H2, H4 or H6 for A or C pinning options with 2kVDC, 4kVDC or 6kVDC isolation.

H* = H for B pinning option with 1.6kVDC isolation only.

2:1 Input (REC3-S/DRWH4/H6)
xx = 4.5-9Vin = 05
xx = 9-18Vin = 12
xx = 18-36Vin = 24
xx = 36-72Vin = 48

4:1 Input (REC3-S/DRWZ(H4/H6))
xx = 9-36Vin = 24
xx = 18-72Vin = 48

* add suffix "/A", "/A/X2", "/B"or "/C" for pinning options, see next page and Isolation Restrictions.
* add suffix "/M" for metal case.
* add suffix "/SMD" for SMD package.
* add suffix "/CTRL" for control pin option (A Pinning only)
* add suffix -R for Tape and Reel packaging

Ordering Examples:

REC3-0512DRW/H2/A/CTRL= 2:1 input, 5V Vin, ±12V Vout, 2kVDC, pinout "A", plastic case, control pin
REC3-4812SRWZ/H4/A/M = 4:1 input, 48V Vin, 12V Vout, 4kVDC, pinout "A", metal case, no control pin
REC3-2412DRWZ/H/B = 4:1 input, 24V Vin, ±12V Vout, 1.6kVDC, pinout "B", plastic case, no control pin
REC3-0505SRW/H6/C/SMD-R = 2:1 input, 5V Vin, 5V Vout, 6kVDC, SMD pinout "C", plastic case, no control pin, Tape and Reel packaging.

Isolation Restrictions

'B" Pinning is restricted to 1.6kV isolation due to the closeness of the input and output pins.

If the options "/M" for metal case and "/SMD" for SMD pinout are combined, the maximum allowed isolation voltage is 2kVDC because of the shorter distances between pins and the metal case.

DIP-24 through-hole case and SMD-plastic case are not affected and offer the full isolation barriers of 2kV through to 6kVDC.

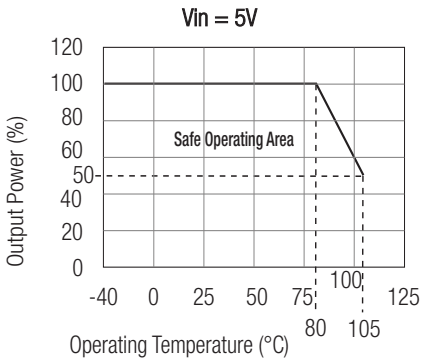
Refer to Application Notes

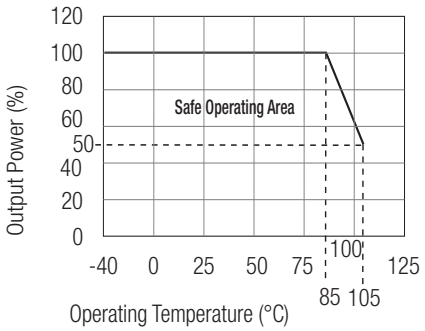
REC3-S_DRW(Z) /H* Series

Specifications (measured at T_A = 25°C, nominal input voltage, full load and after warm-up)

Input Voltage Range			2:1 & 4:1
Output Voltage Accuracy			±2% max.
Line Regulation (HL-LL)			±0.4% max.
Load Regulation (for output load current change from 20% to 100%)			±0.6% max.
Minimum Load			10% (2)
Output Ripple and Noise (0,1µF capacitor on output, 20MHz BW)			50mVp-p max.
Switching Frequency at Full Load		2:1 Input types	90kHz min. / 150kHz max.
and nominal Input Voltage		4:1 Input types	120kHz min. / 180kHz max.
Input Filter			Pi Network
Efficiency at Full Load			see above
No Load Power Consumption			300mW max.
Isolation Voltage	H2-Suffix	(tested for 1 second)	2000VDC
		(rated for 1 minute**)	1000VAC / 60Hz
Isolation Voltage	H4-Suffix	(tested for 1 second)	4000VDC
		(rated for 1 minute**)	2000VAC / 60Hz
Isolation Voltage	H6-Suffix	(tested for 1 second)	6000VDC
		(rated for 1 minute**)	3000VAC / 60Hz
Isolation Capacitance		2:1 Input types	20pF min. / 60pF max.
		4:1 Input types	40pF min. / 80pF max.
Isolation Resistance			1 GΩ min.
Short Circuit Protection (Max temp. = 60°C during short circuit conditions)			Continuous, Auto Restart
Operating Temperature Range		5V input types	-40°C to +80°C (see Graph)
(free air convection)		others	-40°C to +85°C (see Graph)
Storage Temperature Range			-55°C to +125°C
Relative Humidity			95% RH
Case Material			Non-Conductive Plastic or Metal
Thermal Impedance		Natural convection	20°C/W for plastic case
			12°C/W for metal case
Package Weight			13g
Packing Quantity			15 pcs per Tube
			100 pcs per Reel
MTBF (+25°C)	*Detailed Information see Application Notes chapter "MTBF"*	using MIL-HDBK 217F	1043 x 10^3 hours
(+85°C)		using MIL-HDBK 217F	186 x 10^3 hours
Certifications UL General Safety Report: E358085			UL 60950-1 1st Ed.
			C22.2 No. 60950-1-03
EN General Safety Report: SPCLVD1212007			EN60950-1:2006 + A1:2010+A12:2011
EN Medical Safety Report: MDD1205098-3 + RM1205098-3			IEC/EN 60601-1 3rd Ed.
Medical Report + ISO14971 Risk Assessment			

Derating-Graph (Ambient Temperature)





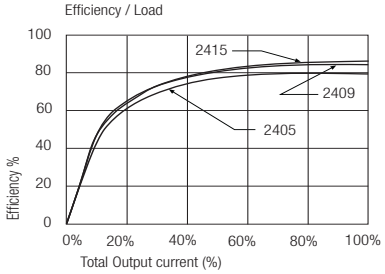
**Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

Notes

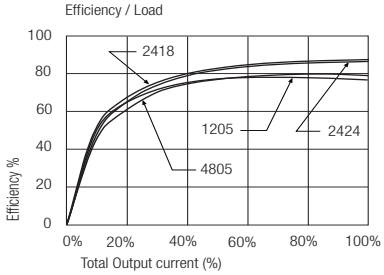
Note 1:	Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter
Note 2:	The REC3-RW series requires a minimum of 10% load on the output to maintain specified regulation. Operating under no-load conditions will not damage these devices; however, they may not meet all listed specifications.

Typical Characteristics

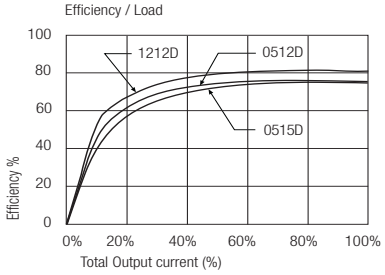
Single 2:1 Input



Single 2:1 Input



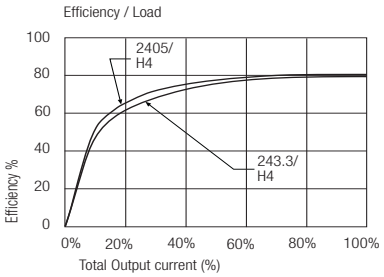
Dual 2:1 Input



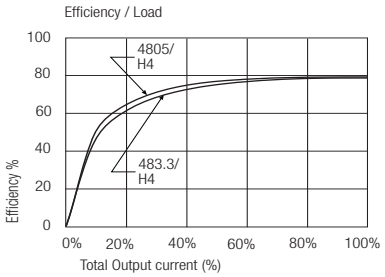
REC3-S_DRW(Z) /H* Series

Typical Characteristics - Continued

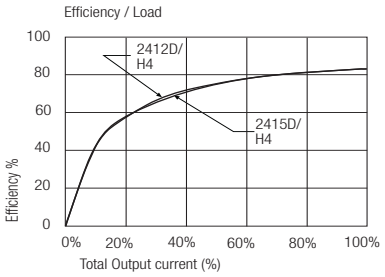
Single 4:1 Input



Single 4:1 Input

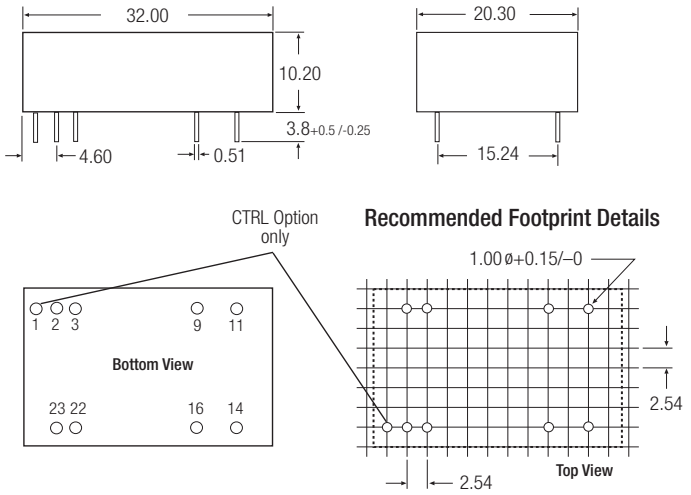


Dual 4:1 Input



Package Style and Pinning (mm) DIP 24 , Wide Input 2:1 & 4:1

"A" Pinning /H2, /H4 & /H6



Pin Connections

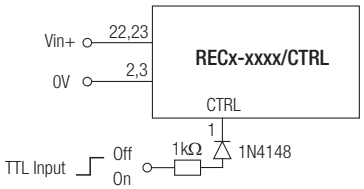
Pin #	Single	Single/X2	Dual
1 (option)	CTRL	CTRL	CTRL
2	–Vin	–Vin	–Vin
3	–Vin	–Vin	–Vin
9	NC	No Pin	Com
11	NC	NC	–Vout
14	+Vout	+Vout	+Vout
16	–Vout	–Vout	Com
22	+Vin	+Vin	+Vin
23	+Vin	+Vin	+Vin

NC = No Connection

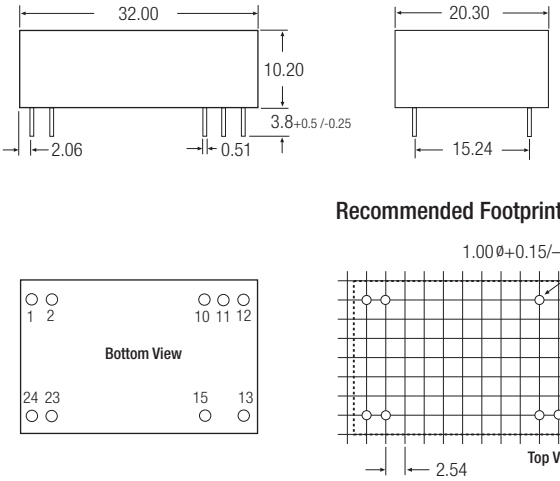
XX.X ± 0.5 mm
XX.XX ± 0.25 mm

CTRL Option

ON = Open or 0V< V_{ctrl} <1.2V
OFF = 2.2V< V_{ctrl} <12V



"C" Pinning /H2, /H4 & /H6



Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	+Vin	+Vin
10	NC	Com
11	NC	Com
12	–Vout	NC
13	+Vout	–Vout
15	NC	+Vout
23	–Vin	–Vin
24	–Vin	–Vin

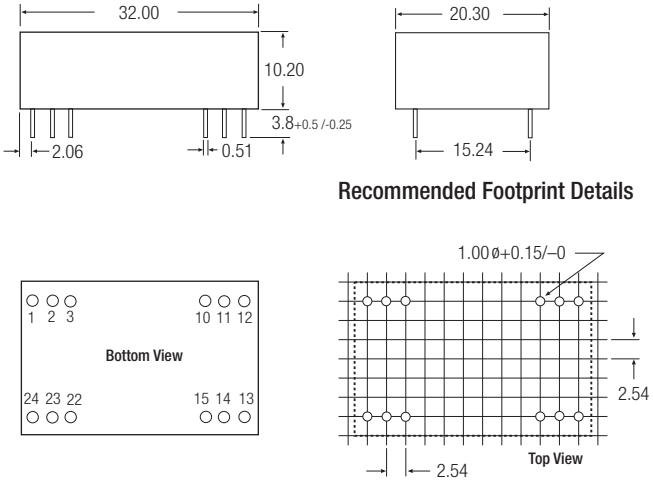
NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

REC3-S_DRW(Z) /H* Series

Package Style and Pinning (mm) DIP 24 , Wide Input 2:1 & 4:1

"B" Pinning /H (1.6kV Only)

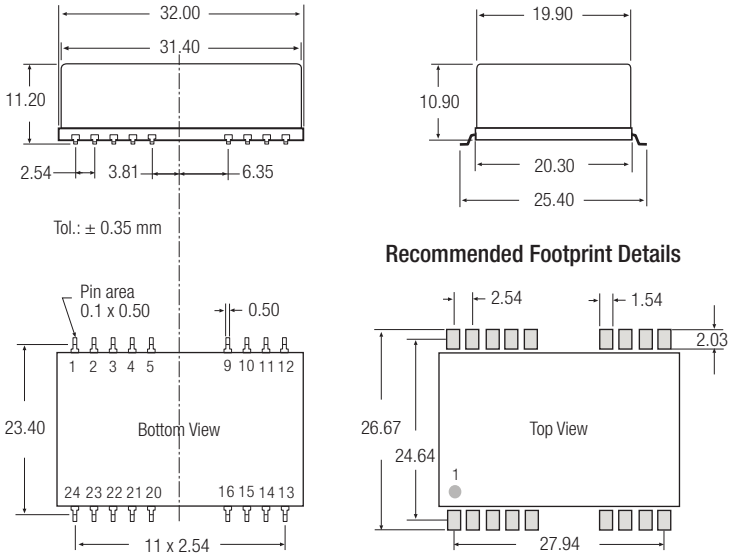


Pin Connections		
Pin #	Single	Dual
1	+Vin	+Vin
2	No Pin	–Vout
3	No Pin	Com
10	–Vout	Com
11	+Vout	+Vout
12	–Vin	–Vin
13	–Vin	–Vin
14	+Vout	+Vout
15	–Vout	Com
22	No Pin	Com
23	No Pin	–Vout
24	+Vin	+Vin

NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

SMD Pinning



SMD pin connections follow standard package A (/A/SMD), B (/B/SMD) or C (/C/SMD) pinning.

All unused pins are NC (No Connection). See Below for detailed pinout lists

for all packages incl.SMD case the length of plastic case is 31,8 mm, length of metal case 32.0 mm

/A/SMD Pinning

Pin Connections		
Pin #	Single	Dual
1 (Option)	CTRL	CTRL
2	–Vin	–Vin
3	–Vin	–Vin
4	NC	NC
5	NC	NC
9	NC	Com
10	NC	NC
11	NC	-Vout
12	NC	NC

Pin Connections		
Pin #	Single	Dual
13	NC	NC
14	+Vout	+Vout
15	NC	NC
16	-Vout	Com
20	NC	NC
21	NC	NC
22	+Vin	+Vin
23	+Vin	+Vin
24	NC	NC

/B/SMD Pinning

Pin Connections		
Pin #	Single	Dual
1	+Vin	+Vin
2	NC	–Vout
3	NC	Com
4	NC	NC
5	NC	NC
9	NC	NC
10	-Vout	Com
11	+Vout	+Vout
12	-Vin	-Vin

Pin Connections		
Pin #	Single	Dual
13	-Vin	-Vin
14	+Vout	+Vout
15	-Vout	Com
16	NC	NC
20	NC	NC
21	NC	NC
22	NC	Com
23	NC	-Vout
24	+Vin	+Vin

/C/SMD Pinning

Pin Connections		
Pin #	Single	Dual
1	+Vin	+Vin
2	+Vin	+Vin
3	NC	NC
4	NC	NC
5	NC	NC
9	NC	NC
10	NC	Com
11	NC	Com
12	-Vout	NC

Pin Connections		
Pin #	Single	Dual
13	+Vout	-Vout
14	NC	NC
15	NC	+Vout
16	NC	NC
20	NC	NC
21	NC	NC
22	NC	NC
23	-Vin	-Vin
24	-Vin	-Vin

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.

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REC3-2412DRW/H/B/SMD REC3-2412DRW/H/B/SMD-R REC3-2412DRW/H2/A REC3-2412DRW/H2/A/CTRL REC3-2412DRW/H2/A/M REC3-2412DRW/H2/A/M/CTRL REC3-2412DRW/H2/A/M/SMD REC3-2412DRW/H2/A/M/SMD/CTRL REC3-2412DRW/H2/A/M/SMD/CTRL-R REC3-2412DRW/H2/A/M/SMD-R REC3-2412DRW/H2/A/SMD REC3-2412DRW/H2/A/SMD/CTRL REC3-2412DRW/H2/A/SMD/CTRL-R REC3-2412DRW/H2/A/SMD-R REC3-2412DRW/H2/C REC3-2412DRW/H2/C/M REC3-2412DRW/H2/C/M/SMD REC3-2412DRW/H2/C/M/SMD-R REC3-2412DRW/H2/C/SMD REC3-2412DRW/H2/C/SMD-R REC3-2412DRW/H4/A REC3-2412DRW/H4/A/CTRL REC3-2412DRW/H4/A/M REC3-2412DRW/H4/A/M/CTRL REC3-2412DRW/H4/A/SMD REC3-2412DRW/H4/A/SMD/CTRL REC3-2412DRW/H4/A/SMD/CTRL-R REC3-2412DRW/H4/A/SMD-R REC3-2412DRW/H4/C REC3-2412DRW/H4/C/M REC3-2412DRW/H4/C/SMD REC3-2412DRW/H4/C/SMD-R REC3-2412DRW/H6/A REC3-2412DRW/H6/A/CTRL REC3-2412DRW/H6/A/M REC3-2412DRW/H6/A/M/CTRL REC3-2412DRW/H6/A/SMD REC3-2412DRW/H6/A/SMD/CTRL REC3-2412DRW/H6/A/SMD/CTRL-R REC3-2412DRW/H6/A/SMD-R REC3-2412DRW/H6/C REC3-2412DRW/H6/C/M REC3-2412DRW/H6/C/SMD REC3-2412DRW/H6/C/SMD-R REC3-2412DRWZ/H/B REC3-2412DRWZ/H/B/M REC3-2412DRWZ/H/B/M/SMD REC3-2412DRWZ/H/B/M/SMD-R REC3-2412DRWZ/H/B/SMD REC3-2412DRWZ/H/B/SMD-R REC3-2412DRWZ/H2/A REC3-2412DRWZ/H2/A/CTRL REC3-2412DRWZ/H2/A/M REC3-2412DRWZ/H2/A/M/CTRL REC3-2412DRWZ/H2/A/M/SMD REC3-2412DRWZ/H2/A/M/SMD/CTRL REC3-2412DRWZ/H2/A/M/SMD/CTRL-R REC3-2412DRWZ/H2/A/M/SMD-R REC3-2412DRWZ/H2/A/SMD REC3-2412DRWZ/H2/A/SMD/CTRL REC3-2412DRWZ/H2/A/SMD/CTRL-R REC3-2412DRWZ/H2/A/SMD-R REC3-2412DRWZ/H2/C REC3-2412DRWZ/H2/C/M REC3-2412DRWZ/H2/C/M/SMD REC3-2412DRWZ/H2/C/M/SMD-R REC3-2412DRWZ/H2/C/SMD REC3-2412DRWZ/H2/C/SMD-R REC3-2412DRWZ/H4/A REC3-2412DRWZ/H4/A/CTRL REC3-2412DRWZ/H4/A/M REC3-2412DRWZ/H4/A/M/CTRL REC3-2412DRWZ/H4/A/SMD REC3-2412DRWZ/H4/A/SMD/CTRL REC3-2412DRWZ/H4/A/SMD/CTRL-R REC3-2412DRWZ/H4/A/SMD-R REC3-2412DRWZ/H4/C REC3-2412DRWZ/H4/C/M REC3-2412DRWZ/H4/C/SMD REC3-2412DRWZ/H4/C/SMD-R REC3-2412DRWZ/H6/A REC3-2412DRWZ/H6/A/CTRL REC3-2412DRWZ/H6/A/M REC3-2412DRWZ/H6/A/M/CTRL REC3-2412DRWZ/H6/A/SMD REC3-2412DRWZ/H6/A/SMD/CTRL REC3-2412DRWZ/H6/A/SMD/CTRL-R REC3-2412DRWZ/H6/A/SMD-R REC3-2412DRWZ/H6/C REC3-2412DRWZ/H6/C/M REC3-2412DRWZ/H6/C/SMD REC3-2412DRWZ/H6/C/SMD-R REC3-2412SRW/H/B REC3-2412SRW/H/B/M REC3-2412SRW/H/B/M/SMD REC3-2412SRW/H/B/M/SMD-R REC3-2412SRW/H/B/SMD REC3-2412SRW/H/B/SMD-R REC3-2412SRW/H2/A REC3-2412SRW/H2/A/CTRL