VISHAY INTERTECHNOLOGY, INC.

RESISTORS

INSTRUCTIONAL GUIDE

MILITARY RESISTORS 101

Military Qualifications

Film / Foil Technology

MIL-R-10509	Leaded Metal Film Resistor, Type RN
MIL-PRF-22684	Leaded Metal Film Resistor, Type RL
MIL-PRF-39017	Leaded Metal Film Resistor, E-Rel Type RLR
MIL-PRF-55182	Leaded Metal Film / Foil Resistors, E-Rel Type RNC / RNR / RNN
MIL-PRF-55342	Thick Film / Thin Film Chip Resistor, E-Rel Type RM

Wirewound Technology

MIL-PRF-26	Leaded Wirewound Resistor, Type RW
MIL-PRF-18546	Housed Wirewound Resistor, Type RE
MIL-PRF-39007	Leaded Wirewound Resistor, E-Rel Type RWR
MIL-PRF-39009	Housed Wirewound Resistor, E-Rel Type RER
MIL-PRF-49465	Leaded Metal Element, Type RLV

Networks

MIL-PRF-83401	Thick Film / Foil Resistor Network, Type RZ

Military Resistors 101

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Military

Introduction

Vishay's line of high-reliability products reflects a long-term commitment to our military customers. As one of the largest suppliers of military components, we continually strive to meet the changing application requirements of the defense, avionics and aerospace markets by developing new products and manufacturing technologies on an on-going basis.

Vishay has one of the broadest lines of military-qualified resistors in the industry, and our high-reliability devices can be found in nearly every existing military program, including aircraft, satellites, missiles, weapons, ground vehicles, and ships.

Vishay is equipped to design and produce custom components to meet many design and reliability demands. In addition to standard military-grade resistor products, we also have many resistive products designed to meet various military source-controlled drawings.

Every component Vishay provides to the military, avionics and aerospace markets is backed by the comprehensive testing and failure analysis capabilities of our own technical staff, whom are industry experts in understanding and meeting the requirements of the military environment. Our technical expertise, our knowledge of the military industry, our broad product offering, and our ability to work long-term are all part of Vishay's ongoing commitment to meeting the changing requirements of our most reliability-conscious customer, today and in the future.

Target Applications

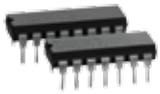
- Aircraft
- Avionics
- Satellites
- Surveillance
- Communications Systems
- Naval Vessels
- Sonar
- Missile Systems
- Weaponry
- Radar
- Ground Vehicles
- Space, Ocean, And Deep Earth Exploration
- Medical Instrumentation And Medical Implantables

Military Product Information

Network Technology

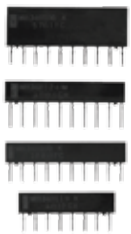
MIL Spec	Product Type		MIL Style	Power Rating (Watts)	Value Range (Ohms)	Tol. Range (± %)	TC Range (± ppm/°C)	Failure Rate Range
MIL-PRF-83401	Thick Film, Network	Dual-In-Line	RZ010	0.05 to 0.20	10 to 1 M	1 to 5	100 to 300	N/A
			RZ020	0.05 to 0.20	10 to 1 M	1 to 5	100 to 300	N/A
		Flat Pack	RZ030	0.015 to 0.05	10 to 1 M	1 to 5	100 to 300	N/A
		Single-In-Line	RZ040	0.11 to 0.20	10 to 1 M	1 to 5	100 to 300	N/A
			RZ050	0.11 to 0.20	10 to 1 M	1 to 5	100 to 300	N/A
			RZ060	0.11 to 0.20	10 to 1 M	1 to 5	100 to 300	N/A
			RZ070	0.07 to 0.12	10 to 1 M	1 to 5	100 to 300	N/A
			RZ080	0.07 to 0.12	10 to 1 M	1 to 5	100 to 300	N/A
			RZ090	0.07 to 0.12	10 to 1 M	1 to 5	100 to 300	N/A
			RZ180	0.1	N/A	2	100	N/A
			RZ190	0.1	N/A	2	100	N/A
			RZ240	0.07 to 0.12	10 to 1 M	1 to 5	100 to 300	N/A
	Bulk Metal® Foil, Network	Dual-In-Line	RZ010	0.1	100 to 10 k	0.1 to 5	5	N/A
			RZ020	0.1	100 to 10 k	0.1 to 5	5	N/A

Thick Film Military Networks



MIL-PRF-83401, TYPE RZ
MSM-Series, Slash Sheets 04 - 09, 18, 19 & 24
MDM-Series, Slash Sheets 01 - 02
DFM-Series, Slash Sheets 03

- Thick Film Element in a Rugged Molded Case Construction
- Available in Isolated, Bussed, and Dual Terminator Schematics
- Hot Solder Dipped Leads



Bulk Metal® Foil Military Networks

MIL-PRF-83401, TYPE RZ
1445Q-Series, Slash Sheets 01
1446Q-Series, Slash Sheets 02

- Bulk Metal® Foil Elements in a Hermetically-Sealed Case
- Custom Designs Available
- Hot Solder Dipped Leads Available

Military Product Information
Film / Foil Through-Hole Technology

MIL Spec	Product Type	MIL Style	Power Rating (Watts)	Value Range (Ohms)	Tol. Range (± %)	TC Range (± ppm/°C)	Failure Rate Range
MIL-R-10509	Metal Film, Axial Leaded	RN50	0.05	10 to 100 k	0.1 to 1	25 to 100	N/A
		RN55	0.10 to 0.125	49.9 to 100 k	0.1 to 1	25 to 100	N/A
		RN60	0.125 to 0.25	10 to 1 M	0.1 to 1	25 to 100	N/A
		RN65	0.25 to 0.50	10 to 2 M	0.1 to 1	25 to 100	N/A
		RN70	0.5 to 1	10 to 2.49 M	0.1 to 1	25 to 100	N/A
MIL-PRF-22684	Metal Film, Axial Leaded	RL07	0.25	51 to 150 k	2 to 5	200	N/A
		RL20	0.5	4.3 to 470 k	2 to 5	200	N/A
MIL-PRF-39017	Metal Film, Axial Leaded	RLR05	0.125	4.7 to 1 M	1 to 2	100	M, P, R & S
		RLR07	0.25	1 to 10 M	1 to 2	100	M, P, R & S
		RLR20	0.5	4.3 to 3.01 M	1 to 2	100	M, P & R
		RLR32	1	1 to 2.7 M	1 to 2	100	M, P & R
MIL-PRF-55182	Metal Film, Axial Leaded	RNC50	0.05 to 0.1	10 to 796 k	0.1 to 1	25 to 100	M, P, R & S
		RNC55	0.1 to 0.125	10 to 2 M	0.1 to 1	25 to 100	M, P, R & S
		RNC60	0.125 to 0.25	10 to 2 M	0.1 to 1	25 to 100	M, P, R & S
		RNC65	0.25 to 0.5	10 to 3.01 M	0.1 to 1	25 to 100	M, P & R
		RNC70	0.5 to 0.75	10 to 3.01 M	0.1 to 1	25 to 100	M, P & R
	Metal Film, Axial Leaded, Hermetically-Sealed	RNR55	0.1 to 0.125	10 to 1.21 M	0.1 to 1	25 to 50	M, P, R & S
		RNR57	0.125 to 0.25	49.9 to 200 k	1	25 to 50	M, P, R & S
		RNR60	0.125 to 0.25	10 to 2.49 M	0.1 to 1	25 to 50	M, P, R & S
		RNR65	0.25 to 0.5	24.9 to 4.99 M	0.1 to 1	25 to 50	M, P
		RNR70	0.5 to 0.75	24.9 to 4.99 M	0.1 to 1	25 to 50	M, P
		RNR75	1 to 2	49.9 to 1.21 M	0.1 to 1	25	M
	Bulk Metal® Foil, Radial Leaded	RNC90	0.6	4.99 to 121 k	0.005 to 1	2 to 5	M, P & R

Metal Film Military Resistors

MIL-R-10509, TYPE RN, MIL-PRF-22684, TYPE RL CMF-Series

- Available in MIL Sheet sizes 50, 55, 60, 65 & 70 for RN style, and sizes 07 & 20 for RL style
- Full Material and Process Traceability
- Values range from 0.1 ohm to 22.1 Megohm (far beyond Military Spec Value limits)

Established Reliability Metal Film Military Resistors

MIL-PRF-39017, TYPE RLR ERL-Series

- Available in MIL Sheet sizes 05, 07, 20 & 32
- Verified Failure Rates
  - *S Failure Rate Standard for most sizes*
  - *M, P, R Failure Rate Levels also Available*
- Full Material and Process Traceability
- DSCC Drawing (Non-QPL) Available on multiple sizes to Extended Resistance Ranges

Established Reliability Metal Film Military Resistors

MIL-PRF-55182, TYPE RNC/RNR
ERC-Series

- Available in MIL Sheet sizes 50, 55, 60, 65 & 70
- Charactersistics J, H & K (Non-Hermetically-Sealed)
- Verified Failure Rates
  - *S Failure Rate Standard for most sizes*
  - *M, P, R Failure Rate Levels also Available*
- Full Material and Process Traceability

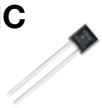
Established Reliability Metal Film Military Resistors

MIL-PRF-55182, TYPE RNR/RNN
HDN-Series

- Available in MIL Sheet sizes 55, 57, 60, 65, 70 & 75
- Charactersistics C & E (Hermetically-Sealed)
- Verified Failure Rates
  - *S Failure Rate Standard for most sizes*
  - *M, P, R Failure Rate Levels also Available*
- Full Material and Process Traceability

Established Reliability Bulk Metal® Foil Military Resistors

MIL-PRF-55182, TYPE RNC
S555, Z555-Series



- Available for MIL Sheet /09
- Characteristics Y, Z, T & S
- Verified Failure Rate
  - *M, P, R Failure Rate Levels Available*
- Non-QPL available for extended resistance ranges (1 ohm to 150 K ohm)

Style Comparison of Vishay Metal Film Axial Resistor

Parameter	RLR/RNC: E-REL MILITARY RLR: (Vishay DALE ERL) RNC: (Vishay DALE ERC)	RN/RL NON E-REL (Vishay DALE CMF Prefix Designation)
Electrical Specifications	All components conform to military power ratings. Tolerance, Resistance and TCR are supplied according to the "Qualified Products List" for MIL-PRF-39017 for RLR series and MIL-PRF-55182 for RNC series.	Non E-Rel power ratings are the same as E-Rel counterparts frequently used at the commercial power ratings and are generally higher than E-Rel components. This is possible because commercial components do not have the same reliability requirements.
Mechanical Dimensions	Components conform to MIL-PRF-39017 for the Vishay DALE RLR series. Components conform to MIL-PRF-55182 for the Vishay DALE RNC series.	Dimensions are detailed in the Vishay DALE catalog. Equivalent commercial components are basically the same size as the E-Rel components and will fit into the same packages and board spacing.
Material Requirements	All materials for the E-Rel military components are approved for use within the specific components' military qualification. All materials are baselined and cannot be modified or substituted without military approval, by request or re-qualification. No materials can be used in their manufacture without labels showing acceptance through incoming inspection.	Most materials are the same for E-Rel equivalent components and also require inspection acceptance labels. Materials are not qualified on a military controlled baseline, but are internally required to allow the component to meet MIL-R-10509 or MIL-PRF-22684 military specification for commercial components.
Process & Test Requirements	The RLR series conforms to MIL-PRF-39017 military specifications. The RNC series conforms to MIL-PRF-55182 military specifications. Reliability determination requires 10,000 hour load life in addition to other rigid environmental testing to conform to the above specifications.	Do not have additional processing and screening tests that E-Rel equivalent components require. 1,000 hour load life testing performed.
Reliability	An "Established Reliability" quality level is determined by continuously testing thousands of components in a qualified laboratory. The reliability "Failure Rate Level" is specified in the MIL-PRF-39017 or MIL-PRF-55182 military specifications and is derived from the laboratory data. Product specific statistics are available upon request.	Periodic internal testing to specific environmental and electrical parameters derived from the MIL-R-10509 or MIL-PRF-22684 military specifications are incorporated. Components are pulled from actual production and tested to conformance. Product specific statistics are available upon request.
Customer Application	Military, space, medical and in high reliability applications.	Wide range of applications including communications, military, computer, test and control electronics.
Traceability	All component materials are required to be traceable.	Materials are generally not required to be traceable. Traceability can be incorporated on components as a "special" if required by a customer.
Packaging	Available in either bulk or reeled.	Available in either bulk or reeled.

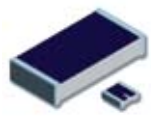
Military Product Information

Film SMD Technology

MIL Spec	Product Type	Slash Sheet	MIL Style	Power Rating (Watts)	Value Range (Ohms)	Tol. Range (± %)	TC Range (± ppm/°C)	Failure Rate Range
MIL-PRF-55342	Thick Film Chip, SMD	/1	RM0502	0.02	1 to 9.1	2 to 10	300	C, M, P, R, S & T
					10 to 22 M	1 to 10	100 to 300	
		/2	RM0505	0.055	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/3	RM1005	0.1	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/4	RM1505	0.15	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/5	RM2208	0.225	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/6	RM0705	0.1	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/7	RM1206	0.25	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/8	RM2010	0.8	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/9	RM2512	1	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/10	RM1010	0.5	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/11	RM0402	0.04	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/12	RM0603	0.07	1 to 22 M	1 to 10	100 to 300	C, M, P, R, S & T
		/13	RM0302	0.04	1 to 9.1	5 to 10	300	C, M, P, R, S & T
					10 to 22 M	1 to 10	100 to 300	
	Thin Film Chip, SMD	/1	RM0502	0.01 to 0.02	100 to 130 k	0.1	25 to 300	C, M, P, R
					59 to 130 k	1 to 10	25 to 300	C, M, P, R
		/2	RM0505	0.025 to 0.05	100 to 301 k	0.1	25 to 300	C, M, P, R
					20 to 301 k	1 to 10	25 to 300	C, M, P, R
		/3	RM1005	0.05 to 0.1	100 to 649 k	0.1	25 to 300	C, M, P, R
					10 to 649 k	1 to 10	25 to 300	C, M, P, R
		/4	RM1505	0.1 to 0.15	100 to 1 M	0.1	25 to 300	C, M, P, R
					10 to 1 M	1 to 10	25 to 300	C, M, P, R
		/5	RM2208	0.2 to 0.225	100 to 1.75 M	0.1	25 to 300	C, M, P, R
					10 to 1.75 M	1 to 10	25 to 300	C, M, P, R
		/6	RM0705	0.05 to 0.1	100 to 475 k	0.1	25 to 300	C, M, P, R
					10 to 475 k	1 to 10	25 to 300	C, M, P, R
		/7	RM1206	0.125 to 0.250	100 to 1 M	0.1	25 to 300	C, M, P, R
					10 to 1 M	1 to 10	25 to 300	C, M, P, R
		/8	RM2010	0.4 to 0.8	100 to 2 M	0.1	25 to 300	C, M, P, R
					10 to 2 M	1 to 10	25 to 300	C, M, P, R
		/9	RM2512	0.5 to 1	100 to 3 M	0.1	25 to 300	C, M, P, R
					10 to 3 M	1 to 10	25 to 300	C, M, P, R
		/10	RM1010	0.25 to 0.5	100 to 1 M	0.1	25 to 300	C, M, P, R
					49.9 to 1 M	1 to 10	25 to 300	C, M, P, R
		/11	RM0402	0.04	100 to 71.5 k	0.1	25 to 300	C, M, P, R
					59 to 71.5 k	1 to 10	25 to 300	C, M, P, R
		/12	RM0603	0.07	100 to 160 k	0.1	25 to 300	C, M, P, R
					20 to 160 k	1 to 10	25 to 300	C, M, P, R

Established Reliability Thick Film Military Chip Resistors

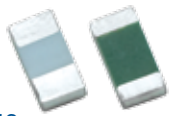
MIL-PRF-55342, TYPE RM
RCWPM-Series



- Available for MIL Sheets /01 through /13
- Verified Failure Rate
  – *C, M, P, R, S, T Failure Rate Levels Available*
- Available in either Characteristic K (100 ppm) or M (300 ppm)
- Termination Style
  – *Standard Pre-Tinned Nickel Barrier Wraparound (style B)*

Established Reliability Thin Film Military Chip Resistors

MIL-PRF-55342, TYPE RM
E/H-Series



- Available for MIL Sheets /01 through /12
- Verified Failure Rate
  – *C, M, P, R Failure Rate Levels Available*
- Available in Characteristics E (25 ppm), H (50 ppm), K (100 ppm) or M (300 ppm)
- Termination Style
  – *Standard Pre-Tinned Nickel Barrier Wraparound (style B)*

Style Comparison of Vishay Thick Film / Thin Film Chip Resistors

Parameter	Military (RCWPM, 55342)	Industrial (RCWP, P-NS, PTN)	Commercial (CRCW, M)
Construction & Materials	All materials conform to MIL-PRF-55342 and are supplied according to the "Qualified Products List"; Terminations = Silver/Gold base conductor, Sulfur Impervious, nickel barrier, and 80/20 solder finish. (100 % Sn not allowed) "JAN" branded; Space Level available. No material changes made without DSCC approval.	The same materials as Military chips; 100 % Sn solder is available. RCWP-540 size is available; No "JAN" brand; Process change qualifications are not DSCC approved. Qualifications are done on several levels.	Manufactured to EIA-575 with exceptions; RM-1005, RM-1505; RM-2208, RM-1010, RM-0502, & RM-0302 sizes are not available; Silver Base Conductor 90/10 or 100 % Sn terminations No "JAN" brand; Internal qualification of changes does not require a governing agency's approval.
Processing & Line Control	Manufactured using military qualified and documented processes. Group-A screening tests on all parts and 100 % visual inspection. MIL-STD-790 training required. No major process changes made without DSCC approval.	100 % Group-A thermal shock is included with 5 % Percent Defects Allowed (PDA) Process modifications to conform to customer requirements are allowed. Only internal qualifications required for major process changes.	Only internal qualifications required for major process changes. Group-A thermal shock is not done; No 100 % visual inspection required; No PDA requirement; Process modifications to conform to special or unique customer requirements are generally not allowed.
Inspection	Inspection per MIL-PRF-55342; Electrical defects; C = 0 Mechanical defects; C = 0 Visual defects; C = 0 Inspection quality levels: First Submission Electrical = 27 ppm Average Outgoing Visual/mechanical = 30 ppm	Inspection MIL-STD-105 Level II; 1 % AQL major; 4 % AQL minor; C = 0 critical Inspection quality levels: First Submission Electrical = 227 ppm Average Outgoing Visual/mechanical = 24 ppm	Inspection MIL-STD-105 Level I; 1 % AQL major; 4 % AQL minor; C = 0 critical Inspection quality levels: Electrical AOQ = 6 ppm (15,000 pc. Sample/week) Average Outgoing Visual/mechanical = 267 ppm
Reliability	An "Established Reliability" quality level is determined by continuously testing thousands of components in a qualified laboratory. The reliability "Failure Rate Level" is specified in the MIL-PRF-55342 military specification and is derived from the laboratory data. Product specific statistics are available upon request.	Periodic internal testing to specific environmental and electrical parameters is based on MIL-PRF-55342. No failure rate data is available.	Failure rate is based on field failures, which are the total number of failures versus the total number of products shipped.
Traceability	Conforms to MIL-PRF-55342; All Group-A, Group-B, & Group-C test data is recorded and retained for a minimum of 5 years. Only single lots and date codes allowed on a reel.	Final inspection data is retained for a minimum of 1 year; In special cases, multiple date codes and/or production lots may be allowed on a single reel.	Final inspection data is retained for a minimum of 1 year;

Military

Military Product Information

Wirewound / Metal Element Axial Leaded Technology

MIL Spec	Product Type	MIL Style	Power Rating (Watts)	Value Range (Ohms)	Tol. Range (± %)	TC Range (± ppm/°C)	Failure Rate Range
MIL-PRF-26	Wirewound, Axial Leaded	RW67	6.5	0.1 to 8.2 k	5, 10	20 to 90	N/A
		RW68	11	0.1 to 20 k	5, 10	20 to 90	N/A
		RW69	3	0.1 to 2.0 k	5, 10	20 to 90	N/A
		RW70	1	0.1 to 2.74 k	0.1, 0.5, 1	20 to 90	N/A
		RW74	5	0.1 to 24.3 k	0.1, 0.5, 1	20 to 90	N/A
		RW78	10	0.1 to 71.5 k	0.1, 0.5, 1	20 to 90	N/A
		RW79	3	0.1 to 6.49 k	0.1, 0.5, 1	20 to 90	N/A
		RW80	2	0.1 to 2.74 k	0.1, 0.5, 1	20 to 90	N/A
		RW81	1	0.1 to 1.0 k	0.1, 0.5, 1	20 to 90	N/A
MIL-PRF-39007	Wirewound, Axial Leaded	RWR71	2	0.1 to 12.1 k	0.1, 0.5, 1	20 to 650	M, P, R & S
		RWR74	5	0.1 to 12.1 k	0.1, 0.5, 1	20 to 650	M, P, R & S
		RWR78	10	0.1 to 39.2 k	0.1, 0.5, 1	20 to 650	M, P, R & S
		RWR80	2	0.1 to 3.16 k	0.1, 0.5, 1	20 to 650	M, P, R & S
		RWR81	1	0.1 to 1.0 k	0.1, 0.5, 1	20 to 650	M, P, R & S
		RWR82	1.5	0.1 to 1.3 k	0.1, 0.5, 1	20 to 650	M, P, R & S
		RWR84	7	0.1 to 12.4 k	0.1, 0.5, 1	20 to 650	M, P, R & S
		RWR89	3	0.1 to 4.12 k	0.1, 0.5, 1	20 to 650	M, P, R & S
MIL-PRF-49465	Metal Element, Axial Leaded	RLV10	5	0.01 to 0.5	1, 3, 5	50 to 150	N/A
		RLV30	3	0.01 to 0.2	1, 3, 5	50 to 350	N/A
		RLV31	5	0.01 to 0.3	1, 3, 5	50 to 250	N/A

Fixed Wirewound Military Resistors

MIL-PRF-26, TYPE RW
RS, NS-Series
G, GN-Series

- Available in either Standard (RS & G) or Non-Inductive (NS & GN) Winding
- 9 Sizes (1 W to 11 W)

Established Reliability Fixed Wirewound Military Resistors

MIL-PRF-39007, TYPE RWR
ESS, ESW, ESN-Series EGS, EGW, EGN-Series

- 100 % Power Stabilization and Screening Test
- Available in either Standard (ESS, ESW, EGS & EGW) or Non-Inductive (ESN & EGN) Winding
- 8 sizes (1 W to 10 W)
- S Failure Rate Available

Fixed Metal Element Military Resistors

MIL-R-49465, TYPE RLV, LVR-Series SPR-1005-Series

- Extremely Low Resistance Values
- Ideal for Current Sensing Applications

Style Comparison Of Vishay Wirewound Axial Resistors

Parameter	RWR E-REL MILITARY ESS, EGS (Vishay Dale) ESN, EGN (Vishay Dale)	RW NON E-REL RS (Vishay Dale) NS (Vishay Dale)
Electrical Specifications	All components conform to the electrical requirements of MIL-PRF-39007.	All components conform to the electrical requirements of MIL-PRF-26.
Mechanical Specifications	All components conform to the mechanical requirements of MIL-PRF-39007.	All components conform to the mechanical requirements of MIL-PRF-26.
Material Requirements	All materials for the E-Rel military components are approved for use per MIL-PRF-39007. All materials are baselined and cannot be modified or substituted without military approval by request and/or requalification. No materials can be used in their manufacture without labels showing acceptance through incoming inspection.	Most materials are the same for E-Rel equivalent components and also require inspection acceptance labels. Materials are not qualified on a military controlled baseline, but are internally required to allow the components to meet MIL-PRF-26 specification.
Process & Test Requirements	The RWR series conforms to MIL-PRF-39007, which includes 100 % 100 hr power conditioning. Reliability determination requires 10,000 hour load life in addition to other rigid environmental testing to conform to the above specification.	Do not have additional processing and screening tests that E-Rel equivalent components require.
Reliability	An “Established Reliability” quality level is determined by continuously testing thousands of components in a qualified laboratory. The reliability “Failure Rate Level” is specified in the MIL-PRF-39007 military specification and is derived from the laboratory data. Product specific statistics are available upon request.	Periodic internal testing to specific environmental and electrical parameters derived from the MIL-PRF-26 military specifications are incorporated. Product specific statistics are available upon request.
Customer Application	Military, Space, Medical and in High Reliability applications.	Wide range of applications including communications, military, computer, industrial, test and control electronics.
Traceability	All component materials are required to be traceable.	Materials are generally not required to be traceable. Traceability can be incorporated on components as a “special” if required by customer.
Packaging	Available in either bulk or reeled.	Available in either bulk or reeled.

Military Product Information

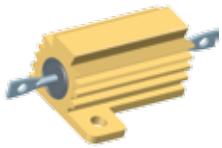
Wirewound Chassis Mount Technology

MIL Spec	Product Type	MIL Style	Power Rating (Watts)	Value Range (Ohms)	Tol. Range (± %)	TC Range (± ppm/°C)	Failure Rate Range
MIL-PRF-18546	Wirewound, Chassis Mount	RE60	5	0.1 to 3.32 k	1	30 to 100	N/A
		RE65	10	0.1 to 5.62 k	1	30 to 100	N/A
		RE70	20	0.1 to 12.1 k	1	30 to 100	N/A
		RE75	30	0.1 to 39.2 k	1	30 to 100	N/A
		RE77	75	0.05 to 29.4 k	1	30 to 100	N/A
		RE80	120	0.1 to 35.7 k	1	30 to 100	N/A
MIL-PRF-39009	Wirewound, Chassis Mount	RER40	5	1 to 1.65 k	1	30 to 50	M, P & R
		RER45	10	1 to 2.8 k	1	30 to 50	M, P & R
		RER50	20	1 to 6.04 k	1	30 to 50	M, P & R
		RER55	30	1 to 4.99 k	1	30 to 50	M, P & R
		RER60	5	0.1 to 3.32 k	1	30 to 100	M, P & R
		RER65	10	0.1 to 5.62 k	1	30 to 100	M, P & R
		RER70	20	0.1 to 12.1 k	1	30 to 100	M, P & R
		RER75	30	0.1 to 39.2 k	1	30 to 100	M, P & R

Wirewound Chassis Mount Military Resistors

MIL-PRF-18546, TYPE RE, RH, NH-Series

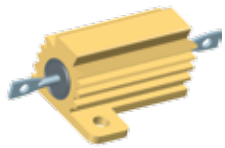
- Aluminum Housed Standard (RH) or Non-Inductive (NH) Winding/Molded Construction gives complete Environmental Protection
- Mounts on Chassis for High Stability at Conventional Power Ratings
- 6 Sizes (5 W to 120 W)



Established Reliability Wirewound Chassis Mount Military Resistors

MIL-PRF-39009, TYPE RER ERH, ENH-Series

- Aluminum Housed Standard (ERH) or Non-Inductive (ENH) Winding/Molded Construction gives complete Environmental Protection
- Mounts on Chassis for High Stability at Conventional Power Ratings
- Utilize Heat Sink Effect
- 4 Sizes (5 W to 30 W)
- R Failure Rate



Style Comparison Of Vishay Wirewound Chassis Mount Resistors

Parameter	RER E-REL MILITARY ERH (Vishay Dale) ENH (Vishay Dale)	RE NON E-REL RH (Vishay Dale) NH (Vishay Dale)
Electrical Specifications	All components conform to the electrical requirements of MIL-PRF-39009.	All components conform to the electrical requirements of MIL-PRF-18546
Mechanical Specifications	All components conform to the mechanical requirements of MIL-PRF-39009.	All components conform to the mechanical requirements of MIL-PRF-18546.
Material Requirements	All materials for the E-Rel military components are approved for use per MIL-PRF-39009. All materials are baselined and cannot be modified or substituted without military approval by request and/or re-qualification. No materials can be used in their manufacture without labels showing acceptance through incoming inspection.	Most materials are the same for E-Rel equivalent components and also require inspection acceptance labels. Materials are not qualified on a military controlled baseline, but are internally required to allow the components to meet MIL-PRF-18546 specification.
Process & Test Requirements	The RER series conforms to MIL-PRF-39009, which includes 100 % 100 hr power conditioning. Reliability determination requires 10,000 hour load life in addition to other rigid environmental testing to conform to the above specification.	Do not have additional processing and screening tests that E-Rel equivalent components require.
Reliability	An “Established Reliability” quality level is determined by continuously testing thousands of components in a qualified laboratory. The reliability “Failure Rate Level” is specified in the MIL-PRF-39009 military specification and is derived from the laboratory data. Product specific statistics are available upon request.	Periodic internal testing to specific environmental and electrical parameters derived from the MIL-PRF-18546 military specifications are incorporated. Product specific statistics are available upon request.
Customer Application	Military, Space, Medical and in High Reliability applications.	Wide range of applications including communications, military, computer, industrial, test and control electronics.
Traceability	All component materials are required to be traceable.	Materials are generally not required to be traceable. Traceability can be incorporated on components as a “special” if required by customer.
Packaging	Available in “Card Pack”	5 W through 30 W available in “Card Pack”, 70 W & 120 W available in “Skin Pack”

DSCC Drawings
Vishay Qualified Products

DSCC Dwg#	Description	Dale	Techno	Thin Film	Foil
87010	Resistor, Fixed, Zero-Ohm, 0.125 Watt	X			
87011	Zero-Ohm Chip Resistor, Style 1010	X		X	
87012	Resistor Network, Fixed, Film, Surface Mount, Gull Wing, 16-Pin	X		X	
87013	Resistor Network, Fixed, Film, Surface Mount, Gull Wing, 14-Pin	X			
87014	Resistor Network, 16-Pin, Leadless Chip Carrier			X	
87015	Resistor Network, 28-Pin, Leadless Chip Carrier			X	
87016	Resistor Network, 20-Pin, Leadless Chip Carrier			X	
87017	Resistor Network, Fixed, Film, Surface Mount, 20-Pin, Leadless Chip Carrier			X	
87018	Resistor Network, 16 Pin, Leadless Chip Carrier			X	
87025	Resistor Network, 8-Pin, Dual-In-Line Package (DIP)			X	X
87026	Resistor Network, Fixed, Film, 3-Pin				X
87030	Resistor, Network, 6-Pin, Single-in-Line Package (SIP)	X			
87031	Resistor, Network, 8-Pin, Single-in-Line Package (SIP)	X	X		
87032	Resistor Network, 10-Pin, Single-in-Line Package (SIP)	X			
87033	Resistor Network, 10-Pin, Single-in-Line Package (SIP)	X	X		
87053	Resistor, Network, 14-Pin, Flat Pack	X			
87067	Resistor Network, Fixed, Film, 7-Pin SIP (Low Profile), Multiple Schematics	X	X		
87068	Resistor Network, Fixed, Film, 7-Pin SIP (High Profile), Multiple Schematics	X	X		
87071	Resistor Network, Fixed, Film, 10-Pin SIP, Multiple Resistance Values, Multiple Schematics, (Low Profile)	X	X		
87072	Resistor Network, Fixed, Film, 10-Pin SIP, Multiple Resistance Values, Multiple Schematics and Multiple Tolerances.	X	X		
87073	Resistor Network, Fixed, Film, 8-Pin SIP, Multiple Resistance Values, Multiple Schematics, (Low Profile)	X	X		
87074	Resistor Network, Fixed, Film, 8-Pin SIP, Multiple Resistance Values, Multiple Schematics, (High Profile)		X		
87103	Resistor, Network, 9-Pin, SIP Multiple Values, Multiple Tolerances, (Low Profile)		X		
87105	Resistor, Network, 9-Pin, SIP Multiple Values, Multiple Tolerances, (High Profile)		X		
87126	Resistor, Variable, Non-Wirewound (Adjustment Type, Lead Screw Actuated)				X
88014	Resistor, Network, 12-Pin, Single-in-Line Package (SIP)	X			
88015	Resistor, Network, 8-Pin, Single Inline Package	X	X		
88018	Resistor, Chip, Fixed, Film, Style 0705	X			
88027	Resistor, Chip, Fixed, Film, Style 0504	X			
88030	Resistor, Fixed, Film, Chip, Style 1005	X			
88031	Resistor, Chip, Fixed, Film, Style 1505	X			
88033	Resistor, Fixed, Film, Chip, Style 1010	X			
89004	Resistor-Capacitor Network, 16-Pin DIP	X			
89023	Resistor-Capacitor Network, 16-Pin Flat Pack	X			
89039	Resistor, Fixed, Film, Precision				X
89040	Resistor, Fixed, Wirewound, Surface Mount, Power Type (2.5 Watts)	X			
89088	Resistor, Fixed, Film, Precision, 0.1 Watt, Power Curve C	X			
90038	Resistor, Fixed, Film, Precision, 0.25 Watt, Power Curve C	X			
90047	Resistor, Fixed, Chip, Zero-Ohm, Style RM2208	X		X	

DSCC Dwg#	Description	Dale	Techno	Thin Film	Foil
90048	Resistor, Chip, Fixed, Film, Zero-Ohm, Style 0705	X		X	
90049	Resistor, Chip, Fixed, Film, Zero-Ohm, Style 1005	X		X	
90092	Resistor, Chip, Fixed, Film, Zero-Ohm, Style RM1505	X		X	
92013	Resistor Network, 10-Pin, SIP, Extended Lead Length	X	X		
93075	Resistor, Fixed, Wirewound, Surface Mount, Power Type (0.5 Watt)	X			
93076	Resistor, Fixed, Wirewound, Surface Mount, Power Type (1 Watt)	X			
93077	Resistor, Fixed, Wirewound, Surface Mount, Power Type (2 Watt)	X			
94011	Resistor, Chip, Fixed, Film, Zero-Ohm, Style RM1206	X		X	
94012	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 0505	X		X	
94013	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 1005	X		X	
94014	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 2208	X		X	
94015	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 0705	X		X	
94016	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 1206	X		X	
94017	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 2010	X		X	
94018	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 2512	X		X	
94019	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 1010	X		X	
94025	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 0502	X		X	
94026	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 1505	X		X	
96002	Resistor, Fixed, Film, Insulated, Low Inductance	X			
97004	Resistor, Fixed, Film (Insulated), 2 Watt	X			
98020	Resistor, Fixed, Film (Insulated), 0.125 Watt	X			
98021	Resistor, Fixed, Film (Insulated), 0.5 Watt	X			
98022	Resistor, Fixed, Film (Insulated), 1 Watt	X			
99011	Resistor, Fixed, Film (Insulated), 0.25 Watt	X			
02001	Resistor, Fixed, Film, Precision, Chip 0.125 Watt, Style 2012	X			
02008	Resistor, Fixed, Film, Chip, Low and High Values, Style 1206	X		X	
02009	Resistor, Fixed, Film, Flip Chip, Ultra Precision, Style 1206				X
03002	Resistor, Chip, Fixed, Film, Zero-Ohm, Style 0505	X		X	
03010	Resistor, Fixed, Film, Chip, Surface Mounted, Ultra Precision, Style 1506				X
03011	Resistor, Fixed, Film, Chip, Zero-Ohm, Style 0201	X			
03013	Resistor, Chip, Fixed, Film, Zero-Ohm, Style 0603	X		X	
03014	Resistor, Chip, Fixed, Film, Zero-Ohm, Style 0402	X		X	
03015	Resistor, Chip, Fixed, Film, Zero-Ohm, Style 2010	X		X	
03016	Resistor, Chip, Fixed, Film, Zero-Ohm, Style 2512	X		X	
03025	Resistor, Chip, Fixed, Film, High Voltage, Style 1206		X		
03026	Resistor, Chip, Fixed, Film, High Voltage, Style 2010		X		
03027	Resistor, Chip, Fixed, Film, High Voltage, Style 2512		X		
04007	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 0302	X			

DSCC Dwg#	Description	Dale	Techno	Thin Film	Foil
04008	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 0402	X		X	
04009	Resistor, Chip, Fixed, Film, Moisture Resistant, Military and Space Level, Style 0603	X		X	
06001	Resistor, Chip, Fixed, Bulk Metal® Foil, Ultra Precision, Style 2010				X
06002	Resistor, Chip, Fixed, Bulk Metal® Foil, Ultra Precision, Style 2512				X
06003	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (2 Watt)	X			
06006	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (3 Watt), Style 4527	X			
06007	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (0.1 Watt), Style 0603	X			
06008	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (0.125 Watt), Style 0805	X			
06009	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (0.25 Watt), Style 1206	X			
06010	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (0.5 Watt), Style 2010	X			
06011	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (1.0 Watt), Style 2512	X			
06012	Resistor, Chip, Fixed, Power Metal Strip®, Surface Mount, Low Value (2.0 Watt), Style 2816	X			
06018	Resistor Network, Fixed, Film, Surface Mount, Voltage Divider, 3-Pin			X	
06020	Resistor, Fixed, Bulk Metal® Foil, High Precision, 0.25 / 0.16 Watt				X
06021	Resistor, Fixed, Bulk Metal® Foil, High Precision, 0.6 / 0 .4 Watt				X
07002	Resistor, Fixed, Wirewound, Surface Mount, Power Type (3 Watt)	X			
07011	Resistor, Fixed, Current Sensing, Metal Strip, High Precision, Surface Mount, Style 2512				X
07012	Resistor, Fixed, Current Sensing, Metal Strip, High Precision, Surface Mount, Style 3637				X
07024	Resistor, Chip, Fixed, Bulk Metal® Foil, Ultra Precision, Style 0805				X
07025	Resistor, Chip, Fixed, Bulk Metal® Foil, Ultra Precision, Style 1206				X
A-A-55502	Resistor, Fixed, Zero-Ohm, 1/8 Watt	X			
A-A-55534/01	Resistor, Fixed, Wirewound or Metal Element, (Power Type), Style VLV1	X			
A-A-55534/02	Resistor, Fixed, Wirewound or Metal Element, Chip, (Power Type), Style VLV1206	X			
A-A-55534/03	Resistor, Fixed, Wirewound or Metal Element, (Power Type), Style VLV3	X			
A-A-55534/04	Resistor, Fixed, Wirewound or Metal Element, (Power Type), Style VLV5	X			
A-A-55534/07	Resistor, Fixed, Wirewound or Metal Element, Chip, (Power Type), Style VLV2010	X			
A-A-55534/08	Resistor, Fixed, Wirewound or Metal Element, Chip, (Power Type), Style VLV2512	X			
A-A-55534/09	Resistor, Fixed, Wirewound or Metal Element, Chip, (Power Type), Style VLV2	X			

Common Terminology

C of C (Certificate of Conformance)

- Material supplied to Mil Specs shall be accompanied by a C of C, which may include:

1. Original manufacturer's name, address, telephone number and CAGE number
2. Purchase order number
3. Part number
4. Drawing or specification number and revision
5. Serial numbers or date code or lot number (as applicable)
6. QA signature and date
7. Statement of conformance to all requirements

Note: The supplier shall also retain the C of C and all relevant supporting data on file for a period of time after completion of the purchase order.

CAGE Code (Commercial and Government Entity code)

- A five-digit number assigned to a company to represent the company's physical address. Formerly referred to as FSCM (Federal Supply Code for Manufacturers).
  It is used for mailing, payments and administrative records. A vendor cannot do business with the government without a CAGE code.

COTS (Commercial Off The Shelf)

- Any item of supply that is (i) a commercial item; (ii) sold in substantial quantities in the commercial marketplace; and (iii) offered to the government, without modification, in the same form in which it is sold in the commercial marketplace.

Date Code Restriction

- Product must be manufactured within a specified period of time prior to shipment.

DFAR (Defense Federal Acquisition Regulations)

- Procurement regulations used by organizations in the Department of Defense. Also called Defense Acquisition Regulations (DAR).

DFARS (Defense Federal Acquisition Regulations Supplement)

- Interpretation and regulations specifically for Department of Defense Procurement. Supplements the Federal Acquisition Regulations (FAR).

DFARS 252.225-7014, Preference for Domestic Specialty Metals, Alt I

- Specifies that specialty metals must be melted in the United States or a qualifying country, or they can be melted anywhere but must be incorporated in an article manufactured in a qualifying country.
- Vishay DALE Resistors are DFARS Compliant.

DLA (Defense Logistics Agency)

- The Department of Defense (DoD) Agency responsible for supplying military needs. The Agency is headquartered at Ft. Belvoir, VA and maintains several Inventory Control Points (ICPs) including DSCC, DSCP, and DSCR.

DPA (Defense Production Act)

- Under authority of the Defense Production Act of 1950 and related executive Order 12656, the Commerce Department is charged with identifying critical defense-related industries, assessing their capability to meet peacetime and national security needs, identifying current and potential production constraints, and proposing remedial actions as appropriate. Title I of the DPA requires that: (i) contracts or orders relating to certain approved defense and energy programs be accepted and performed on a preferential basis over all other contracts and orders and (ii) materials, facilities, and services be allocated in such a manner as to promote approved programs, facilities, and services be allocated in such a manner as to promote approved programs.

Common Terminology

DPAS (Defense Priorities and Allocation System)

- The goals of the DPAS are to (i) assure the timely availability of industrial resources to meet current national defense requirements and (ii) provide a framework for rapid industrial expansion in case of a national emergency.
  - There are two levels of priority established by this regulation, identified by the rating symbols “DO ” and “DX”. All DO rated orders have equal priority with each other and take preference over unrated orders. All DX orders have equal priority with each other and take preference over DO rated orders and unrated orders.

DSC, DSCC, DSCP, DSCR

- Abbreviations for the Supply Centers, which procure supplies for the Military. Each Supply Center manages different types of items.
- DSC = Defense Supply Center
  - DSCC = Defense Supply Center Columbus (Columbus, OH)
    - Maritime and land weapon systems support
  - DSCP = Defense Supply Center Philadelphia (Philadelphia, PA)
    - Food, clothing, medical, construction, and equipment support
  - DSCR = Defense Supply Center Richmond (Richmond, VA)
    - Aviation weapon systems and environmental logistics support

EDI (Electronic Data Interchange)

- The electronic communications of business transactions; specifically the exchange of trade-related documents such as purchase orders, invoices, and corporate Electronic Funds Transfer (EFTs) in a standard format.

ESD (Electrostatic Sensitive Devices)

- The devices supplied under contract shall be packaged in accordance with the latest revision of the MIL-STD-1686 (Electrostatic Discharge Control Program for Protection of Electronic Devices) and MIL-HDBK-263 (ESD Handbook for Protection Parts, Assemblies and Equipments). Packaging shall be marked with an ESD cautionary note or symbol.

E-REL (Established Reliability)

- A quantitative maximum failure rate demonstrated under controlled conditions specified in a Department of Defense specification and usually expressed as percent failures per thousand hours of test.

Failure Rate

- The probability of failure per unit of time of items in operation. Sometimes estimated as a ratio of the number of failures to the accumulated operating time for the items.

Failure Rate Level Designation/Symbol	Failure Rate (Percent/1,000 Hours)
C	Non-Established Reliability
M	1
P	0.1
R	0.01
S	0.001
T	Space Level

Failure Rate	Failure Rate Substitution
T (Space)	—
S (0.001)	T
R (0.01)	T, S
P (0.1)	T, S, R
M (1.0)	T, S, R, P
C (Non-ER)	T, S, R, P, M

Common Terminology

FAR (Federal Acquisition Regulations)

- The main guidance for procurement supplies and services in the Federal Government. Procurement regulations used by both civilian and defense organizations.

FAT (First Article Testing)

- A performance test required on certain items prior to manufacture. A specified sample of the product is tested and must be approved prior to manufacture of a full production run. Testing is generally extensive and expensive.

FIT (Failures In Time)

- The number of component failures that can be expected in one billion hours of operation.

FSC (Federal Stock Class)

- A term for the first four digits of an NSN. It identifies government procured commodities into broad categories. Defense Supply Center management responsibilities are divided based on assignment of FSCs.

FSG (Federal Supply Group)

- The first two digits of a four digit federal stock class (FSC) and therefore, the first two digits of an NSN. It is the broadest categorization of an item.

ITAR Compliance

- Information contained on documentation may be subject to International Traffic Arms Regulations (ITAR) or Export Administration Regulations (EAR) Controls and may not be disclosed to any foreign person(s) or firms, including persons employed by or associated with your company, without first complying with all requirements of the ITAR, 22 CFR 120-130 and the EAR, 15 CFR 730-774.

Military Drawings

- Some items at the DSC's are required to be manufactured in accordance with a drawing. The drawing may have been designed by either a government agency or a commercial vendor. If a drawing is cited in the Acquisition Item Description (AID), the vendor is responsible for assuring the product offered meets the standards and requirements of the drawing.

Military Handbooks

- MIL-HDBK's are generally how to do documents intended to standardize and educate.

Military Specs

- Some items at the DSC's are required to be manufactured in accordance with a specification. The specification may be designated as a Federal Specification (Fed-Spec - applicable to all military services), a Military Specification (Mil-Spec - used by a specific service) or a commercial specification such as North American Specification (NAS) or American National Standards Institute (ANSI). If a specification is cited in the Acquisition Item Description (AID), the vendor is responsible for assuring the product offered meets the requirements of the specification.

Military Standards

- MIL-STD's are generally documents that imposed requirements and give details on what to do.

MIL-STD-202G Test Methods Standard Electronic and Electrical Component Parts

- This military standard establishes uniform methods for testing electronic and electrical component parts, including basic environmental tests to determine resistance to deleterious effects of natural elements and conditions surrounding military operations, and physical and electrical tests.

Common Terminology

MIL-STD-883F Test Method Standard Microcircuits

- This military standard establishes uniform methods, controls, and procedures for testing microelectronic devices suitable for use within Military and Aerospace electronic systems including basic environmental tests and other controls and constraints as have been deemed necessary to ensure a uniform level of quality and reliability suitable to the intended applications of those devices.

MTBF (Mean Time Between Failures)

- The average time a component works without failure. It is the number of failures divided by the hours under observation.

NIIN (National Item Identification Number)

- The second of two main parts of the National Stock Number. The NIIN is a unique number with no two items having the same NIIN. An item can be tracked in technical files using just the NIIN. Contract files require the full NSN to track information.

NSN (National Stock Number)

- A unique government tracking number assigned by the General Services Administration consisting of a Federal Stock Class (FSC) and a National Item Identification Number (NIIN). The number is used by requisitioners to identify the item needed and is associated with all buys related to that item. More than one part number may be associated with an NSN; however, all parts associated will have to be the same in form, fit and function.

Prohibited Materials (Tin Whiskers)

- Unless otherwise specified in the product specification, material supplied meet the requirements of ANSI/J-STD-002, Category 3 Test Method A, B, or C as applicable. In addition, constructions and finishes containing pure tin are prohibited unless they contain a minimum of 3 percent by weight alloying element(s) (i.e. lead, silver, etc.).

QPL (Qualified Products List)

- A list of pre-tested qualified manufacturers and products as they related to a specific military specification. A solicitation specifying a QPL restriction requires contractors to supply only the source and part number specified on the QPL list.
- Failure Rated QPL
  - Established Reliability product with a verified Failure Rate that has been qualified to a military specification.
- Non-Failure Rated QPL
  - Product without a verified Failure Rate that has been qualified to a military specification or drawing.

Single Lot Traceability

- Items provided in accordance with this purchase order clause requires each shipment (i) be from only one OEM; (ii) be from one Manufacturing Lot; (iii) components that are too small to have the Lot Code marked on them are to have their packaging identified with the appropriate Lot Code marking / serial number. Also known as Single Lot Date Code (SLDC) and Date Code (DC).

Notes

Notes

SEMICONDUCTORS:
Rectifiers • High-Power Diodes and Thyristors • Small-Signal Diodes • Zener and Suppressor Diodes • FETs • RF Transistors • Optoelectronics • ICs • Modules and Assemblies

PASSIVE COMPONENTS:
Resistive Products • Magnetics • Capacitors • Strain Gage Transducers and Stress Analysis Systems

One of the World's Largest Manufacturers
of Discrete Semiconductors and Passive Components

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