Overview

KEMET's Goldmax conformally coated radial leaded ceramic capacitors in Z5U dielectric feature an 85°C maximum operating temperature and are considered

& I R I ¤ X W

- Radial leaded technology
- Conformally coated
- 0.100", 0.200", 0.250" and 0.400" lead spacing
- +10°C to +85°C operating temperature range
- Lead (Pb)-free, RoHS and REACH compliant
- DC voltage ratings of 25 V, 50 V, 100 V, 200 V, and 250 V

&IRI¤XW GSRX H

u'ETEGMXERGI SJJIVMRKW VERKMRK JVSQ T* XS q*
u%ZMPEFPI GETEGMXERGI 8SPIVERGIW SJ r ERH —
• Non-polar device, minimizing installation concerns
u TYVI QEXXI XMR TPEXIH PIEH ¤RMWL EPPS[MRK JSV I\GIPPIRX WS
u7R4F TPEXIH PIEH ¤RMWL STXMSR EZEMPEFPI YTSR VIUYIWX 7R 4F
u)PGETWYPEXMSR QIIXW ¥EQEFMPMX] WXERHEVH 90 :i

%TTPMGEXMSRW

Typical applications include limited temperature, decoupling and bypass.

%TTPMGEXMSR 2SXIW

These devices are not recommended for use in overmold applications and/or processes.

4EGOEKMRK ' 7TIG 3VHIVMRK 3TXMSRW 8EFPI

4EGOEKMRK 8]TI[1]	4EGOEKMRK +VEHI 3VHIVMRK 'SHI ' 7TIG
Bulk Bag	2SX VIUYMVIH &PERO
12" Tape & Reel (16.0±0.5 mm lead length)	7301
12" Tape & Reel (18.0 mm minimum lead length)	7303
Ammo Pack (16.0±0.5 mm lead length)	7305
Ammo Pack (18.0 mm minimum lead length)	7317

[1] (IJEYPX TEGOEKMRK MW &YPK &EK %R SVHIVMRK GSHI MW RSX VIUYMVIH JSV &YPK &EK TEGOEKMRK
[1] 8ETI ERH 6IIP TEGOEKMRK MW RSX EZEMPEFPI 7X]PI ERH *SVQ WIIR JSV QEXIVMEP 5YERXMX]
[1] %QQS 4EGO TEGOEKMRK MW RSX EZEMPEFPI 7X]PI ' ERH *SVQ WIIR JSV QEXIVMEP 5YERXMX]
[1] %QQS 4EGO ERH 8ETI ERH 6IIP TEGOEKMRK MW EZEMPEFPI ¤RMWL *SVQ WIIR JSV QEXIVMEP 8ETI ERH 4EGOEKMRK Information".

5YEPM¤GEXMSR 'IVXM¤GEXMSR

'SQQIVGMEP +VEHI TVSHYGXW EVI WYFNIGX XS MRXIVREP UYEPM¤GEX referenced in Table 2, Performance & Reliability.

)RZMVSRQIRXEP 'SQTPMERGI

0IEH 4F JVII 6)%', ERH 6S,7 GSQTPMERX [MXLSYX I\IQTXMSRW [LIR S
4VSHYGX SVHIVIH [MXL XMR PIEH 7R 4F [MVI PIEH ¤RMWL HS RSX

7IVMIW	8IVQMREXMSR *MRMWL ;MVI 0IEH	RoHS SQTPMERX	RoHS)\IQTXMSR SHI	6)%', SQTPMERX[1]	Halogen Free
300 (C3XX)	100% Matte Sn	Yes	n/a	Yes	Yes
	Sn60/Pb40	No	n/a	Yes	Yes

[1] 6)%'G SQTPMERX MIRIVEXIW G SRXEMR PIEH 7R 4F [MVI PIEH ¤RMWL HS RSX

)PIGXVMGEP 4EVEQIXIVW 'LEVEGXIVMWXMGW

-XIQ	4EVEQIXIVW 'LEVEGXIVMWXM
Operating Temperature Range	— q' XS q'
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC)	—
Aging Rate (Maximum % Cap Loss/Decade Hour)	7)0%
Dielectric Withstanding Voltage	250% of rated voltage (5±1 second and charge/discharge not exceeding 50 mA at 25ºC)
Dissipation Factor (DF) Maximum Limit at 25°C	See Dissipation Factor Limit Table
Insulation Resistance (IR) Limit at 25°C	QIKSLQ QMGVSJEVEHW SV + [1] (Rated voltage applied for 120±5 seconds at 25°C)

6IKEV

4SWX)RZMVSRQIRXEP 0MQMXW

,MKL 8IQTIVEXYVI 0MJI &MEWIH ,YQMHMX] ERH 7XSVEKI 0MJ					
Style/Size	Rated DC Voltage	Capacitance Value	Dissipation Factor (Maximum %)	Capacitance Shift	Insulation Resistance
C31X	All	All	5.0	±30%	10% of Initial Limit
C32X, C33X, C34X	25	q *	5.0		
	> 25	q *	5.0		
	25 / 50	ž q *	20.0		
C35X	All	All	5.0		

(MWWMTEXMSR *EGXSV (* 0MQMX 8EFPI

7X]PI 7M^I	6EXIH (' :SPXEKI	6EXIH 'ETEGMXERG1E\MQYQ	(MWWMTEXMSR *EGXSV
C31X	All	All	4.0
C32X, C33X, C34X	25	q *	4.0
	> 25	q *	4.0
	25 / 50	ž q *	10.0
C35X	All	All	4.0

8EFPI % i ' < 7X]PI 7M^I 'ETEGMXERGI 6ERKI ;EXIVJEI

		' ' ' ' 7X]PI 7M^I ERH 0IEH 7TEGMF				
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A
'ETEGMXERGI	'ETEGMXERGI Tolerance	'ETEGMXERGI 'SHI %ZEMPEFPI 'ETEGM				
100pF	M = ±20% Z = +80%/ -20%	101	101	101	101	101
120pF		121	121	121	121	121
150pF		151	151	151	151	151
180pF		181	181	181	181	181
220pF		221	221	221	221	221
270pF		271	271	271	271	271
330pF		331	331	331	331	331
390pF		391	391	391	391	391
470pF		471	471	471	471	471
560pF		561	561	561	561	561
680pF		681	681	681	681	681
820pF		821	821	821	821	821
1000pF		102	102	102	102	102
1200pF		122	122	122	122	122
1500pF		152	152	152	152	152
1800pF		182	182	182	182	182
2200pF		222	222	222	222	222
2700pF		272	272	272	272	272
3300pF		332	332	332	332	332
3900pF		392	392	392	392	392
4700pF		472	472	472	472	472
5600pF		562	562	562	562	562
6800pF		682	682	682	682	682
8200pF		822	822	822	822	822
0.01µF		103	103	103	103	103
0.012µF		123	123	123	123	123
0.015µF		153	153	153	153	153
0.018µF		183	183	183	183	183
0.022µF		223	223	223	223	223
0.027µF		273	273	273	273	273
0.033µF		333	333	333	333	333
0.039µF		393	393	393	393	393
0.047µF		473	473	473	473	473
0.056µF		563	563	563	563	563
0.068µF		683	683	683		
0.082µF		823	823	823		
0.1µF		104	104	104		
0.12µF		124	124	124		
0.15µF		154	154	154		
0.18µF		184	184	184		
0.22µF		224	224	224		
0.27µF		274	274			
0.33µF		334	334			
0.39µF		394	394			
0.47µF		474	474			
0.56µF		564	564			
0.68µF		684	684			
0.82µF		824				
1.0µF		105				
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A

8EFPI & i ' < 7X]PI 7M^I 'ETEGMXERGI 6ERKI ;EXIVJEP

' ' ' ' ' 7X]PI 7M^I ERH 0IEH 7TEG						
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A
'ETEGMXERGI	'ETEGMXERGI Tolerance	'ETEGMXERGI 'SHI %ZEMPEFPI 'ETEGM				
100pF		101	101	101	101	101
120pF		121	121	121	121	121
150pF		151	151	151	151	151
180pF		181	181	181	181	181
220pF		221	221	221	221	221
270pF		271	271	271	271	271
330pF		331	331	331	331	331
390pF		391	391	391	391	391
470pF		471	471	471	471	471
560pF		561	561	561	561	561
680pF		681	681	681	681	681
820pF		821	821	821	821	821
1000pF		102	102	102	102	102
1200pF		122	122	122	122	122
1500pF		152	152	152	152	152
1800pF		182	182	182	182	182
2200pF		222	222	222	222	222
2700pF		272	272	272	272	272
3300pF		332	332	332	332	332
3900pF		392	392	392	392	392
4700pF		472	472	472	472	472
5600pF		562	562	562	562	562
6800pF		682	682	682	682	682
8200pF		822	822	822	822	822
0.01µF		103	103	103	103	103
0.012µF	M = ±20% Z = +80%/ -20%	123	123	123	123	123
0.015µF		153	153	153	153	153
0.018µF		183	183	183	183	183
0.022µF		223	223	223	223	223
0.027µF		273	273	273	273	273
0.033µF		333	333	333	333	333
0.039µF		393	393	393	393	393
0.047µF		473	473	473	473	473
0.056µF		563	563	563	563	563
0.068µF		683	683	683	683	683
0.082µF		823	823	823	823	823
0.1µF		104	104	104	104	104
0.12µF		124	124	124	124	124
0.15µF		154	154	154	154	154
0.18µF		184	184	184		
0.22µF		224	224	224		
0.27µF		274	274	274		
0.33µF		334	334	334		
0.39µF		394	394	394		
0.47µF		474	474	474		
0.56µF		564	564			
0.68µF		684	684			
0.82µF		824	824			
1.0µF		105	105			
1.2µF		125	125			
1.5µF		155	155			
1.8µF		185	185			
2.2µF		225	225			
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A

[1] 8LMGOQREI\WMQ8!Q QQJSG'ETEGMXERGI... v*

8EFPI & i ' < 7X]PI 7M^I 'ETEGMXERGI 6ERKI ;EXIVJEP

1

8EFPI ' i ' < 7X]PI 7M^I 'ETEGMXERGI 6ERKI ;EXIVJEP

' ' ' ' 7X]PI 7M^I		ERH 0IEH 7TE				
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A
'ETEGMXERGI	'ETEGMXERGI Tolerance	'ETEGMXERGI 'SHI %ZEMPEFPI 'ETEGM				
0.022µF	M = ±20% Z = +80%/ -20%	223	223	223	223	223
0.027µF		273	273	273	273	273
0.033µF		333	333	333	333	333
0.039µF		393	393	393	393	393
0.047µF		473	473	473	473	473
0.056µF		563	563	563	563	563
0.068µF		683	683	683	683	683
0.082µF		823	823	823	823	823
0.1µF		104	104	104	104	104
0.12µF		124	124	124	124	124
0.15µF		154	154	154	154	154
0.18µF		184	184	184		
0.22µF		224	224	224		
0.27µF		274	274	274		
0.33µF		334	334	334		
0.39µF		394	394	394		
0.47µF		474	474	474		
0.56µF		564	564			
0.68µF		684	684			
0.82µF		824	824			
1.0µF		105	105			
1.2µF		125	125			
1.5µF		155	155			
1.8µF		185	185			
2.2µF		225	225			
2.7µF		275	275			
3.3µF		335	335			
3.9µF		395	395			
4.7µF		475[1]	475[1]			
5.6µF		565[1]				
6.8µF		685[1]				
10µF		106[1]				

[1] 8LMG QRE\WMQ8!Q QQJSG'ETEGMXERGI... v*

Table D – C X Style Size Capacitance Range Waterfall

		C	C	C	C	C
Style Size and Lead Spac…						
Rated Voltage (VDC)			50	100		
Voltage Code		3	5	1		A
Capacitance	Capacitance Tolerance	Capacitance Code Available Capaci…				
4700pF	M = ±20% Z = +80%/ -20%	472*	472*	472*	472*	472*
5600pF		562*	562*	562*	562*	562*
6800pF		682*	682*	682*	682*	682*
8200pF		822*	822*	822*	822*	822*
0.01µF		103*	103*	103*	103*	103*
0.012µF		123*	123*	123*	123*	123*
0.015µF		153*	153*	153*	153*	153*
0.018µF		183*	183*	183*	183*	183*
0.022µF		223*	223*	223*	223*	223*
0.027µF		273*	273*	273*	273*	273*
0.033µF		333*	333*	333*	333*	333*
0.039µF		393*	393*	393*	393*	393*
0.047µF		473*	473*	473*	473*	473*
0.056µF		563*	563*	563*	563*	563*
0.068µF		683*	683*	683*	683*	683*
0.082µF		823*	823*	823*	823*	823*
0.1µF		104*	104*	104*	104*	104*
0.12µF		124*	124*	124*	124*	124*
0.15µF		154*	154*	154*	154*	154*
0.18µF		184*	184*	184*	184	184
0.22µF		224*	224*	224*	224	224
0.27µF		274*	274*	274*	274	274
0.33µF		334*	334*	334*	334	334
0.39µF		394*	394*	394*	394	394
0.47µF		474*	474*	474*	474	474
0.56µF		564*	564*	564*	564	564
0.68µF		684*	684*	684*	684	684
0.82µF		824*	824*	824*	824	824
1.0µF		105*	105*	105*	105	105
1.2µF		125*	125*	125	125	125
1.5µF		155*	155*			
1.8µF		185*	185*			
2.2µF		225*	225*			
Rated Voltage (VDC)			50	100		
Voltage Code		3	5	1		A

Capaci[illegible]

8EFPI) i ' < 7X]PI 7M^I 'ETEGMXERGI 6ERKI ;EXIVJEP

		' ' 7X]PI 7M^I 0IEH 7TEGMRK				
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A
'ETEGMXERGI	'ETEGMXERGI Tolerance	'ETEGMXERGI 'SHI %ZEMPEFPI 'ETEGM				
0.068µF	M = ±20% Z = +80%/ -20%	683*	683*	683*	683*	683*
0.082µF		823*	823*	823*	823*	823*
0.1µF		104*	104*	104*	104*	104*
0.12µF		124*	124*	124*	124*	124*
0.15µF		154*	154*	154*	154*	154*
0.18µF		184*	184*	184*	184	184
0.22µF		224*	224*	224*	224	224
0.27µF		274*	274*	274*	274	274
0.33µF		334*	334*	334*	334	334
0.39µF		394*	394*	394*	394	394
0.47µF		474*	474*	474*	474	474
0.56µF		564*	564*	564*	564	564
0.68µF		684*	684*	684*	684	684
0.82µF		824*	824*	824*	824	824
1.0µF		105*	105*	105*	105	105
1.2µF		125*	125*	125	125	125
1.5µF		155*	155*	155		
1.8µF		185*	185*	185		
2.2µF		225*	225*	225		
2.7µF		275	275			
3.3µF		335	335			
3.9µF		395	395			
4.7µF		475	475			
5.6µF		565	565			
6.8µF		685	685			
8.2µF		825	825			
10µF		106	106			
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A

7X]PI '7M MIWY TMPERTLSYPHIVIGHRR¤KY*VSEXMSVRXRSSVEQEVKMSVRIE'HSR¤KYVEXMSRW

8EFPI * i ' < 7X]PI 7M^I 'ETEGMXERGI 6ERKI ;EXIVJEP

		' ' 7X]PI 7M^I 0IEH 7TEGMRK				
6EXIH :SPXEKI :('		50	100		
:SPXEKI 'SHI	3	5	1		A
'ETEGMXERGI	'ETEGMXERGI Tolerance	'ETEGMXERGI 'SHI %ZEMPEFPI 'ETEGM				
0.18µF		184	184	184	184	184
0.22µF		224	224	224	224	224
0.27µF		274	274	274	274	274
0.33µF		334	334	334	334	334
0.39µF		394	394	394	394	394
0.47µF		474	474	474	474	474
0.56µF		564	564	564	564	564
0.68µF		684	684	684	684	684
0.82µF		824	824	824	824	824
1.0µF		105	105	105	105	105
1.2µF	M = ±20%	125	125	125	125	125
1.5µF	Z = +80%/ -20%	155	155			
1.8µF		185	185			
2.2µF		225	225			
2.7µF		275	275			
3.3µF		335	335			
3.9µF		395	395			
4.7µF		475	475			
5.6µF		565	565			
6.8µF		685	685			
8.2µF		825	825			
10µF		106	106			
6EXIH :SPXEKI :('			50	100		
:SPXEKI 'SHI		3	5	1		A

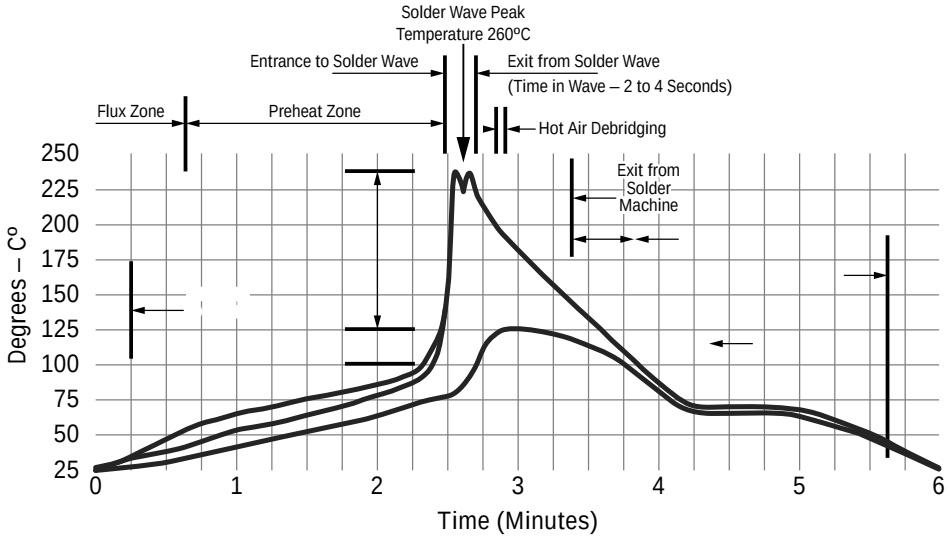
7SPHIVMRK 4VSGIWW

6IGSQQIRHIH 7SPHIVMRK 1IXLSHW

- Sdder Wave
- Hard Soldering (Manual)

6IGSQQIRHIH 7SPHIVMRK 4VS¤PI

u3TXMQYQ ;EZI 7SPHIV 4VS¤PI



8EFPI i 4IVJSVQERGI 6IPMEFMPMX] 8IWX 1IXLSHW E

7XVIWW 6IJIVIRGI	8IWX SV -RWTIGXMSR 1IXLSH
Solderability . i 7 8 (i	1 E K R M ¤ G E X M S R < 'S R H M X M S R W a) Method A, at 235°C, Category 3
Temperature Cycling .) 7 (1 I X L S H	. % i G] G P I W — q ' X S q ' Q I E W Y V I Q I R X E X L S Y V
Biased Humidity 1 - 0 i 7 8 (i 103 1 I X L S H	Load humidity, 1,000 hours 85°C/85%RH and rated voltage. Add 100 K ohm resistor 1 I E W Y V I Q I R X E X L S Y V W — L S Y V W E J X I V X I W X Low volt humidity, 1,000 hours 85C°/85%RH and 1.5 V. Add 100 K ohm resistor. 1 I E W Y V I Q I R X E X L S Y V W — L S Y V W E J X I V X I W X
Moisture Resistance 1 - 0 i 7 8 (i 106 1 I X	X ! L S Y V W G] G P I 7 X I T W E E R H F R S X V I U Y M V I — L S Y V W E J X I V X I W X G S R G P Y W M S R
Thermal Shock 1 - 0 i 7 8 (i 107 1 I X	— { ' X S q ' 2 S X I 2 Y Q F I V S J G] G P I W V I U Y M V I H W I G S R H W ([I P P X M Q I i Q M R Y X I W % M V i % M V
High Temperature Life 1 - 0 i 7 8 (i) - % i 1 I X	1,000 hours at 125°C (85°C for Z5U) with 1 X rated voltage applied.
Storage Life 1 - 0 i 7 8 (i 108 1 I X	125°C, 0 VDC for 1,000 hours.
Vibration 1 - 0 i 7 8 (i 204 1 I X L S H	K J S V Q M R Y X I W G] G P I W I E G L S J S V M I R X E X secure points on one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz.
Resistance to Solderin Heat 1 - 0 i 7 8 (i 210 1 I X	'S R H M X M S R & 2 S T V I L I E X S J W E Q T P I W 2 S X I W M R K P I [
Terminal Strength 1 - 0 i 7 8 (i 211 1 I X	Conditions A (454g), Condition C (227g)
Mechanical Shock 1 - 0 i 7 8 (i 213 1 I X	Figure 1 of Method 213, Condition C.
Resistance to Solvents 1 - 0 i 7 8 (i 215 1 I X	% H H E U Y I S Y W [E W L G L I Q M G E P i 3 /) 1 ' P I E R S V I U Y M Z E P I

7XSVEKI ,ERHPMRK

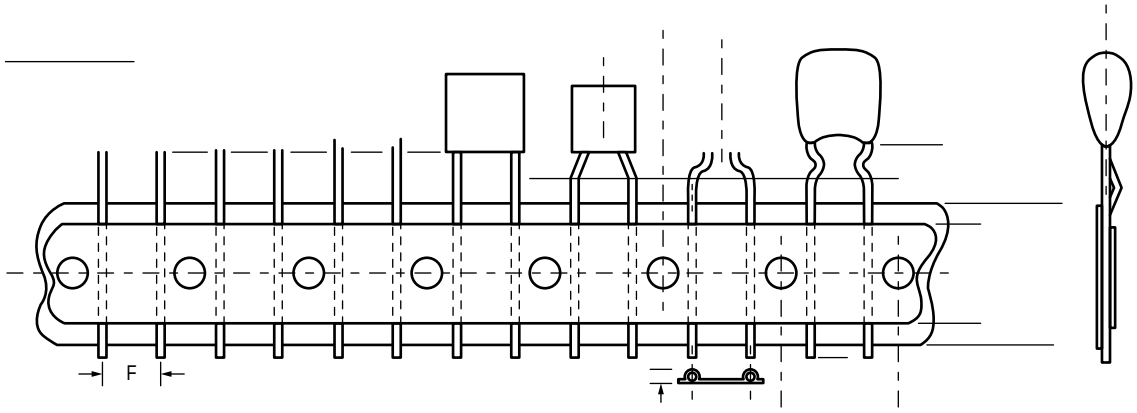
The un-mounted storage life of a leaded ceramic capacitor is dependent upon storage and atmospheric conditions as [IPP EW TEGOEKMRK QEXIVMEPW ;LMPI XLI GIVEQMG GLMTW IRZIPSTI MR QSWX IRZMVSRQIRXW WSPHIVEFMPMX] SJ XLI [MVI PIEH SR XLI ¤R high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will b HIKVEHIH F] LMKL XIQTIVEXYVI ERH I\TSWYVI XS HMVIGX WYRPMKLX i

KEMET recommends storing the un-mounted capacitors in their original packaging, in a location away from direct sunli and where the temperature and relative humidity do not exceed 40 degrees centigrade and 70% respectively. For optim WSPHIVEFMPMX] GETEGMXSV WXSGO WLSYPH FI YWIH TVSQTXP] TVIJ TVI XMRRMRK SJ GSQTSRIRXW WXSVEKI PMJI QE] FI I\XIRHIH MJ WSPI HIZMGIW MX MW MQTSVXERX XS ZIVMJ] XLEX]SYV TVSGIWW HSIW RSX XIWXMRK ERH IZEPYEXMRK XLI TIVJSVQERGI SJ E GPIERIH FSRHIH SV of these processes.

' S R W X V Y G X M S R

4 E G O E K M R K 5 Y E R X M X M I W

7 X] P I 7 X E R H E V H Size	5 Y E R X M X] Maximum	Ammo Pack 5 Y E R X M X] Maximum	6 I I P 5 Y E 6 I I P
315	500/Bag	2500	2500
316			
317			
318			
320			
321		N/A	N/A
322		2500	2500
323			
324			
325			
326			
327			
328			
330	250/Bag	1500	1500
331		N/A	N/A
333		1500	
335			
336			
340	100/Bag	1000	1000
346			
350	50/Bag	N/A	500
356			


F

'IVEQMG 6EHMEP 8ETI ERH 6IIP (MQIRWMSRW GSRX H

Metric will govern

:EVMEFPI (MQIRWMSRW j 1MPPMQIXIVW -RGLIW							
F ±0.78 (0.030)	P_1 ±0.30 (0.012)	P ±0.3 (0.012)	P_2 ±1.3 (0.51)	H		H_0	
				7XVEMKLX 0IEH 'SR¤ KYVEXMSR [2] *SVQI			
				Packaging C-Spec [3]			
				7301/7305	7303/7317	7301/7305	7303/7317
2.54 (0.100)	5.08 (0.200)	12.7 (0.500)	6.35 (0.250)	16.0±0.5 (0.630±0.020)	18.0 (0.709) Minimum	16.0±0.5 (0.630±0.020)	18.0 (0.709) Minimum
4.32 (0.170)	3.89 (0.153)	12.7 (0.500)	6.35 (0.250)				
5.08 (0.200)	3.81 (0.150)	12.7 (0.500)	6.35 (0.250)				
5.59 (0.220)	3.25 (0.128)	12.7 (0.500)	6.35 (0.250)				
6.98 (0.275)	2.54 (0.100)	12.7 (0.500)	6.35 (0.250)				
7.62 (0.300)	2.24 (0.088)	12.7 (0.500)	6.35 (0.250)				
9.52 (0.375)	7.62 (0.300)	12.7 (0.500)	6.35 (0.250)				
10.16 (0.400)	7.34 (0.290)	25.4 (1.000)	N/A				
12.06 (0.475)	6.35 (0.250)	25.4 (1.000)	N/A				
14.60 (0.575)	5.08 (0.200)	25.4 (1.000)	N/A				
17.14 (0.675)	3.81 (0.15)	25.4 (1.000)	N/A				

[1] 1IEWYVIH EX XLI IKVIWW JVSQ XLI GEVVMIV XETI SR XLI GSQTSRIRX WMHI
[2] *SVQIH PIEH GSR¤ KYVEXMSR MRGPYHIW WLSYPHIV FIRH MRWMHI OMRO SYXW GSR¤ KYVEXMSRW WII (MQIRWMSRW WIGXMSR SJ XLMW HSGYQIRX

/)1)8)PIGXVSRMG 'SVTSVEXMSR 7EPIW 3J¤ GIW

*SV E GSQTPIXI PMWX SJ SYV KPSFEP WEPIW SJ¤ GIW TPIEWI ZMWMX

(MWGPEMQIV

%PP TVSHYGX WTIGM¤ GEXMSRW WXEXIQIRXW MRJSVQEXMSR ERH HEXE GSPPIGXMZIP] XLI p
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ETTPMGEXMSRW FYX EVI RSX MRXIRHIH XS GSRWXMXYXI i ERH /)1)8 WTIGM¤ GEPP] HMWGPEMQ
8LI -RJSVQEXMSR MW MRXIRHIH JSV YWI SRP] F] GYWXSQIVW [LS LEZI XLI VIUYMWMXI I\TIVMIR
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%PXLSYKL /)1)8 HIWMKRW ERH QERYJEGXYVIW MXW TVSHYGXW XS XLI QSWX WXVMRKIRX UYEPI
JEMPYVIW QE] WXMPP SGGYV %GGSVHMRKP] GYWXSQIV ETTPMGEXMSRW [LMGL VIUYMVI E LMK
(such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal inju
property damage.

%PXLSYKL EPP TVSHYGXiVIPEXIH [EVRMRKW GEYXMSRW ERH RSXIW QYWX FI SFWIVZIH XLI GY
QIEWYVIW QE] RSX FI VIUYMVIH

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