



# PCN Report

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**Prepared By** : Maggie Xu, Thyristor Product Engineer  
**Date** : February 7<sup>th</sup>, 2018  
**Products** : Thyristor Products acquired from ON Semiconductor  
**Revision** : A

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## 1.0 Objective:

This report covers manufacturing site transfer activities of Thyristor products acquired from ON Semiconductor. Site transfer includes backend assembly, final test and packaging operations.

## 2.0 Applicable Products:

Thyristor products acquired from ON Semiconductor in package of SOT23, SOT223, TO-225AA (case 77), TO-251, TO-252, TO-220 Isolated and TO-220AB.

Please see the attached Appendix I for a full list of affected part numbers.

Some part numbers in TO-251, TO-252 and TO-225AA (case 77) are not covered by this report. These part numbers will be covered by separate PCN report issued later. A list of part numbers not covered by this report is attached Appendix II.

## 3.0 Physical Differences/Changes:

Format of Date code section of component marking is changed as follows.

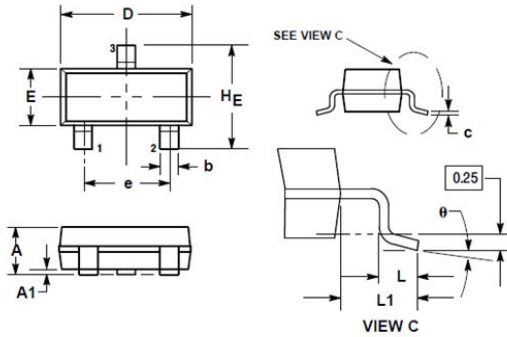
PACKAGE	Date Code Format by ON Semiconductor (Old)	Date Code Format by Littelfuse (New)	Symbols
SOT23	M	YMA	Y: Year of Manufacturing M: Month of Manufacturing WW: Week of manufacturing A: Assembly location XX: Lot serial code
SOT223	AYW	YMA	
TO-225AA	YWW	YMAXX	
TO-251	YWW	YMAXX	
TO-252	YWW	YMAXX	
TO-220 Iso	AYWW	YMAXX	
TO-220AB	AYWW	YMAXX	

#### 4.0 Comparison of Package outline dimensions specifications

There are slight differences in package outline dimensions but all of new specifications are still within applicable JEDEC specifications.

##### 4.1 SOT23 Outline

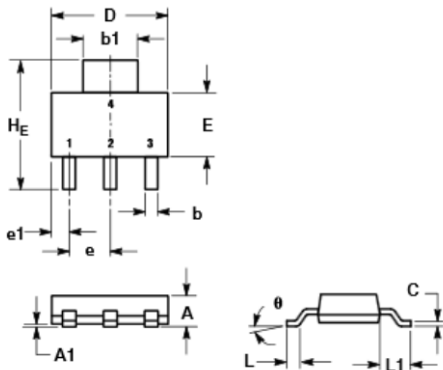
---Dimensions A, A1, b, c, L are different



DIM	ON Semi Specification			Littelfuse Specification (New)		
	MILLIMETERS			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.89	1.03	1.17
A1	0.01	0.06	0.10	0.05	0.10	0.15
b	0.37	0.44	0.50	0.30	0.40	0.50
c	0.09	0.13	0.18	0.08	0.14	0.20
D	2.80	2.90	3.04	2.80	2.90	3.00
E	1.20	1.30	1.40	1.20	1.30	1.40
e	1.78	1.90	2.04	1.90 BSC		
L	0.10	0.20	0.30	0.40	0.49	0.58
L1	0.35	0.54	0.69	0.46	0.55	0.64
HE	2.10	2.40	2.64	2.10	2.30	2.49
∅	0°		10°	0°		8°

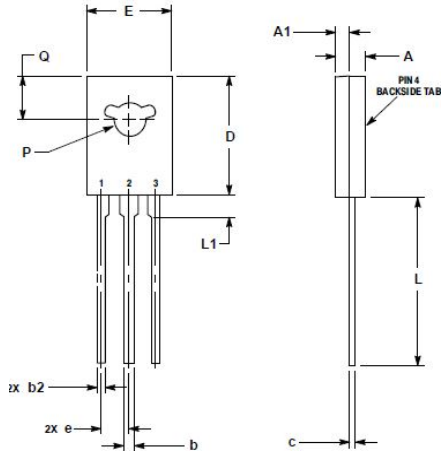
##### 4.2 SOT223 Outline

---Dimensions A, A1, c, D, e1 are different.



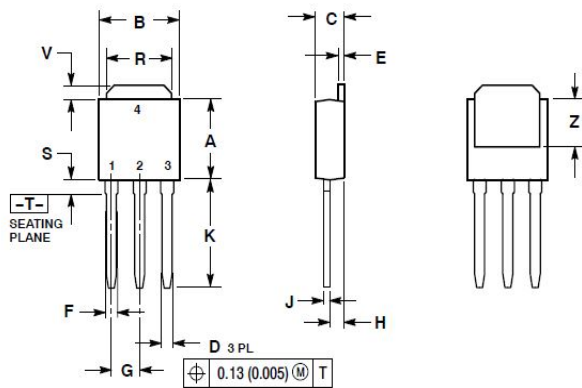
DIM	ON Semi Specification			Littelfuse Specification (New)		
	MILLIMETERS			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	-	-	1.80
A1	0.02	0.60	0.10	0.02	0.07	0.13
b	0.60	0.75	0.89	0.66	0.75	0.84
b1	2.90	3.06	3.20	2.90	3.00	3.10
c	0.24	0.29	0.35	0.23	0.29	0.35
D	6.30	6.50	6.70	6.60	6.60	6.71
E	3.30	3.50	3.70	3.30	3.50	3.70
e	2.20	2.30	2.40	2.30 BSC		
e1	0.85	0.94	1.05	0.75	0.95	1.15
L1	1.50	1.75	2.00	1.50	1.75	2.00
He	6.70	7.00	7.30	6.80	7.00	7.20
∅	0°	-	10°	0°	-	10°

4.3 TO-255AA (case 77) Outline  
 ---Dimensions D, E, L, L1, P, Q are different.



DIM	ON Semi Specification		Littelfuse Specification (New)	
	MILLIMETERS		MILLIMETERS	
	MIN	MAX	MIN	MAX
C	2.40	3.00	2.60	2.80
A1	1.00	1.50	1.20	1.40
b	0.60	0.90	0.70	0.86
b2	0.51	0.88	0.70	0.86
c	0.39	0.63	0.49	0.57
D	10.60	11.10	10.60	11.40
E	7.40	7.80	7.40	8.20
e	2.04	2.54	2.29 TYP.	
L	14.50	16.63	14.00	16.00
L1	1.27	2.54	2.30	2.70
P	2.90	3.30	3.00	3.40
Q	3.80	4.20	3.60	4.00

4.4 TO-251 Outline  
 ---Dimensions A, C, D, E, F, H, J, K, R, S, V are different.



DIM	ON Semi Specification		Littelfuse Specification (New)	
	MILLIMETERS		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	5.97	6.35	5.40	5.70
B	6.35	6.73	6.40	6.60
C	2.19	2.38	2.20	2.40
D	0.69	0.88	0.60	0.75
E	0.46	0.58	0.55	0.65
F	0.94	1.14	0.78	0.98
G	2.29 BSC		2.30	
H	0.87	1.01	1.18	1.28
J	0.46	0.58	0.49	0.59
K	8.89	9.65	7.40	8.00
R	4.45	5.45	5.30	5.50
S	0.63	1.01	1.60	
V	0.89	1.27	1.35	1.65
Z	3.93	-	3.80	





## 5.0 Qualification Test Result

All samples passed parametric and reliability test standard by Littelfuse.

### 5.1 Package SOT23 Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	NYC0102BLT1G	77 x 3	103936	At T <sub>J</sub> max, Reverse biased at 100%V <sub>DRM</sub>	1,008hrs	0 failure
Pre-conditioning	NYC0102BLT1G	77 x 12	103936	24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 x IR reflow		0 failure
H3TRB	NYC0102BLT1G	77 x 3	103936	T <sub>A</sub> =85°C, RH=85%, Reverse biased at 100V <sub>DC</sub>	1,008hrs	0 failure
TC	NYC0102BLT1G	77 x 3	103936	-50°C&150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
UHAST	NYC0102BLT1G	77 x 3	103936	T <sub>A</sub> =130°C, RH=85%	96hrs	0 failure
IOL	NYC0102BLT1G	77 x 3	103938	T <sub>A</sub> =25°C, T <sub>J</sub> (ΔT <sub>J</sub> )>=100°C)	15,000 cycles	0 failure
RSH	NYC0102BLT1G	30 x 3	103936	260°C	10 secs	0 failure
Solderability	NYC0102BLT1G	10 x 3	103936	245°C	10 secs	0 failure
ESD	NYC0102BLT1G	30 x 1	103936	HBM 30KV, MM 8KV		0 failure



5.2 Package SOT223 Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	MCR08MT1G	77 x 3	105246	At T <sub>J</sub> max, Reverse biased at 100%V <sub>DRM</sub>	1,008hrs	0 failure
	NYC228STT1G	77 x 1	101032			
	Z0103MNT1G	77 x 3	105248			
Pre-conditioning	MCR08MT1G	77 x 24	105246	24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 x IR reflow		0 failure
	NYC228STT1G	77 x 24	101032			
	Z0103MNT1G	77 x 24	105248			
H3TRB	MCR08MT1G	77 x 3	105246	T <sub>A</sub> =85°C, RH=85%, Reverse biased at 100V <sub>DC</sub>	1,008hrs	0 failure
	NYC228STT1G	77 x 1	101032			
	Z0103MNT1G	77 x 3	105248			
TC	MCR08MT1G	77 x 3	105246	-50°C & 150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
	NYC228STT1G	77 x 1	101032			
	Z0103MNT1G	77 x 3	105248			
UHASt	MCR08MT1G	77 x 3	105246	T <sub>A</sub> =130°C, RH=85%	96hrs	0 failure
	NYC228STT1G	77 x 1	101032			
	Z0103MNT1G	77 x 3	105248			
IOL	Z0103MNT1G	77 x 3	105252	T <sub>A</sub> =25°C, T <sub>J</sub> (ΔT <sub>J</sub> )>=100°C)	15,000 cycles	0 failure
RSH	MCR08MT1G	30 x 3	105246	260°C	10 secs	0 failure
	NYC228STT1G	30 x 3	101032			
	Z0103MNT1G	30 x 3	105248			
Solderability	MCR08MT1G	10 x 3	105246	245°C	10 secs	0 failure
	NYC228STT1G	10 x 3	101032			
	Z0103MNT1G	10 x 3	105248			
ESD	MCR08MT1G	30 x 1	105246	HBM 30KV, MM 8KV		0 failure
	NYC228STT1G	30 x 1	101032			
	Z0103MNT1G	30 x 1	105248			



5.3 Package TO-225AA (case 77) Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	C106M1G	77 x 3	103936	At T <sub>J</sub> max, Reverse biased at 100%V <sub>DRM</sub>	1,008hrs	0 failure
H3TRB	C106M1G	77 x 3	103936	T <sub>A</sub> =85°C, RH=85%, Reverse biased at 100V <sub>DC</sub>	1,008hrs	0 failure
TC	C106M1G	77 x 3	103936	-50°C&150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
UHASt	C106M1G	77 x 3	103936	T <sub>A</sub> =130°C, RH=85%	96hrs	0 failure
RSH	C106M1G	30 x 3	103936	260°C	10 secs	0 failure
Solderability	C106M1G	10 x 3	103936	245°C	10 secs	0 failure
ESD	C106M1G	30 x 1	103936	HBM 30KV, MM 8KV		0 failure



5.4 Package TO-251 Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	MCR708A1G	77 x 3	104776	At T <sub>J</sub> max, Reverse biased at 100%V <sub>DRM</sub>	1,008hrs	0 failure
H3TRB	MCR708A1G	77 x 3	104776	T <sub>A</sub> =85°C, RH=85%, Reverse biased at 100V <sub>DC</sub>	1,008hrs	0 failure
TC	MCR708A1G	77 x 3	104776	-50°C&150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
UHASt	MCR708A1G	77 x 3	104776	T <sub>A</sub> =130°C, RH=85%	96hrs	0 failure
IOL	MCR708A1G	77 x 3	104777	T <sub>A</sub> =25°C, T <sub>J</sub> (ΔT <sub>J</sub> >=100°C)	15,000 cycles	0 failure
RSH	MCR708A1G	30 x 3	104776	260°C	10 secs	0 failure
Solderability	MCR708A1G	10 x 3	104776	245°C	10 secs	0 failure
ESD	MCR708A1G	30 x 1	104776	HBM 30KV, MM 8KV		0 failure





5.5 Package TO-252 Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	MCR718T4G	77 x 3	106610	At T <sub>J</sub> max, Reverse biased at 100%V <sub>DRM</sub>	1,008hrs	0 failure
Pre-conditioning	MCR708A1G	77 x 12	106610	24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 x IR reflow		0 failure
H3TRB	MCR718T4G	77 x 3	106610	T <sub>A</sub> =85°C, RH=85%, Reverse biased at 100V <sub>DC</sub>	1,008hrs	0 failure
TC	MCR718T4G	77 x 3	106610	-50°C&150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
UHAST	MCR718T4G	77 x 3	106610	T <sub>A</sub> =130°C, RH=85%	96hrs	0 failure
RSH	MCR718T4G	30 x 3	106610	260°C	10 secs	0 failure
Solderability	MCR718T4G	10 x 3	106610	245°C	10 secs	0 failure
ESD	MCR718T4G	30 x 1	106610	HBM 30KV, MM 8KV		0 failure



5.6 Package TO-220 Isolated Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	BTA25H-600CW3G	77 x 1	104863	At T <sub>J</sub> max, Reverse biased at 100%V <sub>DRM</sub>	1,008hrs	0 failure
	BTA08-800CW3G	77 x 1	104863			
	BTA30-600CW3G	77 x 3	104829			
H3TRB	BTA25H-600CW3G	77 x 1	104863	T <sub>A</sub> =85°C, RH=85%, Reverse biased at 100V <sub>DC</sub>	1,008hrs	0 failure
	BTA08-800CW3G	77 x 1	104863			
	BTA30-600CW3G	77 x 3	104829			
TC	BTA25H-600CW3G	77 x 1	104863	-50°C&150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
	BTA08-800CW3G	77 x 1	104863			
	BTA30-600CW3G	77 x 3	104829			
UHAST	BTA25H-600CW3G	77 x 1	104863	T <sub>A</sub> =130°C, RH=85%	96hrs	0 failure
	BTA08-800CW3G	77 x 1	104863			
	BTA30-600CW3G	77 x 3	104829			
IOL	BTA30-600CW3G	77 x 3	104831	T <sub>A</sub> =25°C, T <sub>J</sub> (ΔT <sub>J</sub> ≥100°C)	15,000 cycles	0 failure
RSH	BTA25H-600CW3G	30 x 1	104863	260°C	10 secs	0 failure
	BTA08-800CW3G	30 x 1	104863			
	BTA30-600CW3G	30 x 3	104829			
Solderability	BTA25H-600CW3G	10 x 1	104863	245°C	10 secs	0 failure
	BTA08-800CW3G	10 x 1	104863			
	BTA30-600CW3G	10 x 3	104829			
ESD	BTA25H-600CW3G	30 x 1	104863	HBM 30KV, MM 8KV		0 failure
	BTA08-800CW3G	30 x 1	104863			
	BTA30-600CW3G	30 x 1	104829			



5.7 Package TO-220AB Reliability test result summary

Test Item	Sample P/N	Sample QTY	Littelfuse test Ref#	Contents/Conditions	Duration	Result Summary
ACBV (HTRB)	2N6509TG	77 x 3	102005	At T <sub>J</sub> max, Reverse biased at 100%V <sub>DRM</sub>	1,008hrs	0 failure
	MCR310-010	77 x 1	99809			
H3TRB	2N6509TG	77 x 3	102005	T <sub>A</sub> =85°C, RH=85%, Reverse biased at 100V <sub>DC</sub>	1,008hrs	0 failure
	MCR310-010	77 x 1	99809			
TC	2N6509TG	77 x 3	102005	-50°C & 150°C (air to air), Dwell time 15mins	1,000 cycles	0 failure
	MCR310-010	77 x 1	99809			
UHAST	2N6509TG	77 x 3	102005	T <sub>A</sub> =130°C, RH=85%	96hrss	0 failure
	MCR310-010	77 x 1	99809			
IOL	2N6509TG	77 x 3	99809	T <sub>A</sub> =25°C, T <sub>J</sub> (ΔT <sub>J</sub> >=100°C)	15,000 cycles	0 failure
RSH	2N6509TG	30 x 3	102005	260°C, 10 seconds	10 secs	0 failure
	MCR310-010	30 x 1	99809			
Solderability	2N6509TG	10 x 3	102005	245°C, 10 seconds	10 secs	0 failure
	MCR310-010	10 x 1	99809			
ESD	2N6509TG	30	102005	HBM 30KV, MM 8KV		0 failure
	MCR310-010	30	99809			



5.8 Parametric Test

There is no change in absolute ratings and parametric specifications

Test Item	Sample P/N	Sample Qty	Littelfuse test Ref#	Contents/Conditions	Result Summary
Electrical Parameters	NYC0102BLT1G	10 x 3	106730	IGT/VGT/IH/VT>IDRM/IRRM	Meet datasheet spec
	MCR08MT1G	10 x 3	101034		
	NYC228STT1G	10 x 1	101035		
	Z0103MNT1G	10 x 3	101036		
	C106M1G	10 x 3	102811		
	MCR708A1G	10 x 3	104778		
	MCR718T4G	10 x 3	106613		
	2N6509TG	10 x 3	102006		
	MCR310-010	10 x 1	102678		
	BTA25H-600CW3G	10 x 1	104864		
	BTA08-800CW3G	10 x 1	104864		
	BTA30-600CW3G	10 x 3	104838		
	ITSM	NYC0102BLT1G	5 x 3		
MCR08MT1G		5 x 3	101034		
NYC228STT1G		10 x 1	101035		
Z0103MNT1G		5 x 3	101036		
C106M1G		5 x 3	102811		
MCR708A1G		5 x 3	104778		
MCR718T4G		5 x 3	106613		
2N6509TG		5 x 3	102006		
MCR310-010		10 x 1	102678		
BTA25H-600CW3G		10 x 1	104864		
BTA08-800CW3G		10 x 1	104864		
BTA30-600CW3G		5 x 3	104838		
Thermal Resistance		NYC0102BLT1G	5 x 3	103940	
	MCR08MT1G	5 x 3	102680		
	NYC228STT1G	10 x 1	102682		
	Z0103MNT1G	5 x 3	102683		
	C106M1G	5 x 3	102812		
	MCR708A1G	5 x 3	104779		
	MCR718T4G	5 x 3	106614		
	2N6509TG	5 x 3	102007		
	MCR310-010	10 x 1	102679		
	BTA25H-600CW3G	10 x 1	104839		
	BTA08-800CW3G	10 x 1	104865		
	BTA30-600CW3G (*)	5 x 3	104839		

Note:

\* BTA30-600CW3G manufactured by Littelfuse has typical R<sub>thJ-C</sub> value 20% higher than the original.



## **6.0 Recommendations & Conclusions:**

Base on the above qualification test results, Littelfuse judged that manufacturing site transfer activities have been successfully completed and results were verified by qualification tests.

Littelfuse released new manufacturing sites to production.

## **7.0 Approvals:**

**Maggie Xu**  
Thyristor Product Engineer  
Littelfuse, Inc.

**Sewall Wang**  
Product Engineer Manager  
Littelfuse, Inc.



**8.0 Appendix I - List of part numbers affected by this PCN report**

2N6344AG	MCR16NG	BTA08-800CW3G	MAC12SNG	Z0109MNT1G
2N6344G	MCR218-2G	BTA08-800CW3LFG	MAC15-10G	SAC187G
2N6348AG	MCR218-4G	BTA12-600BW3G	MAC15-8G	SAC319MTG
2N6349AG	MCR218-6G	BTA12-600CW3G	MAC15A10G	SAC320MTG
2N6394G	MCR25DG	BTA12-800BW3G	MAC15A6G	SAC396-7G
2N6394TG	MCR25MG	BTA12-800CW3G	MAC15A8G	SAC847-8LFBJG
2N6395G	MCR25NG	BTA16-600BW3G	MAC15MG	MAC8NG-LFAJ
2N6397G	MCR310-10G	BTA16-600CW3G	MAC15NG	MAC8NG-LFAD-WR
2N6397TG	MCR68-2G	BTA16-600SW3G	MAC16CMG	
2N6399G	MCR69-2G	BTA16-800BW3G	MAC16CNG	
2N6399TG	MCR69-3G	BTA16-800CW3G	MAC16DG	
2N6400G	MCR703AT4G	BTA16-800SW3G	MAC16HCDG	
2N6401G	MCR706AT4G	BTA25-600CW3G	MAC16HCMG	
2N6402G	MCR708A1G	BTA25-800CW3G	MAC16HCNG	
2N6403G	MCR708AG	BTA25H-600CW3G	MAC16MG	
2N6403TG	MCR708AT4G	BTA30-600CW3G	MAC16NG	
2N6404G	MCR716T4G	BTB08-600BW3G	MAC210A10G	
2N6405G	MCR718T4G	BTB08-600CW3G	MAC210A8G	
2N6504G	MCR72-3G	BTB08-800BW3G	MAC212A10G	
2N6505G	MCR72-6G	BTB08-800CW3G	MAC212A8G	
2N6505TG	MCR72-6TG	BTB12-600BW3G	MAC228A10G	
2N6507G	MCR72-8G	BTB12-600CW3G	MAC228A4G	
2N6507TG	MCR72-8TG	BTB12-600TW3G	MAC228A6G	
2N6508G	MCR8NG	BTB12-800BW3G	MAC228A6TG	
2N6508TG	MCR8SDG	BTB12-800CW3G	MAC228A8G	
2N6509G	MCR8SMG	BTB12H-600CW3G	MAC228A8TG	
2N6509TG	MCR8SNG	BTB16-600BW3G	MAC3030-8G	
C106BG	NYC0102BLT1G	BTB16-600CW3G	MAC8DG	
C106D1G	NYC222STT1G	BTB16-800BW3G	MAC8MG	
C106DG	NYC226STT1G	BTB16-800CW3G	MAC8NG	
C106M1G	NYC228STT1G	BTB16H-600BW3G	MAC8SDG	
C106MG	SCR1666G	MAC08BT1G	MAC8SMG	
C122F1G	SCR888LFDZG	MAC08MT1G	MAC8SNG	
MCR08BT1G	SYC0102BLT1G	MAC12DG	MAC9DG	
MCR08MT1G	SYC17143LFBPG	MAC12HCDG	MAC9MG	
MCR106-6G	TPA0233G	MAC12HCMG	MAC9NG	
MCR106-8G	TPA0234G	MAC12HCNG	T2500DG	
MCR12DG	BTA08-600BW3G	MAC12MG	T2800DG	
MCR12MG	BTA08-600CW3G	MAC12NG	Z0103MNT1G	
MCR12NG	BTA08-800BW3G	MAC12SMG	Z0107MNT1G	



**9.0 Appendix II - List of part numbers not covered by this PCN report**

2N6071AG
2N6071ATG
2N6071BG
2N6071BTG
2N6073AG
2N6073BG
2N6075AG
2N6075BG
MCR12DCMT4G
MCR12DCNT4G
MCR12DSMT4G
MCR12DSMT4H
MCR12DSN-1G
MCR12DSNT4G
MCR8DCMT4G
MCR8DCNT4G
MCR8DSMT4G
MCR8DSNT4G
SCR12DCMT4G
MAC4DCM-1G
MAC4DCMT4G
MAC4DCN-1G
MAC4DCNT4G
MAC4DHM-1G
MAC4DHMT4G
MAC4DLM-1G
MAC4DLMT4G
MAC4DSM-1G
MAC4DSMT4G
MAC4DSN-1G
MAC4DSNT4G
T2322BG