



FINAL PRODUCT/PROCESS CHANGE NOTIFICATION
Generic Copy

14-NOV-2003

SUBJECT: ON Semiconductor Final Product/Process Change Notification #13215

TITLE: Phase#2 Die Design Change (Die Shrink) for Bipolar Power Products

EFFECTIVE DATE: 14-Jan-2004

AFFECTED CHANGE CATEGORY: Die Shrink

AFFECTED PRODUCT DIVISION: Bipolar Discretes Products Div

ADDITIONAL RELIABILITY DATA: Available

Contact your local ON Semiconductor Sales Office or Laura Rivers <S20636@onsemi.com>

SAMPLES: Contact your local ON Semiconductor Sales Office

or Mike Schager <RMF150@onsemi.com>

FOR ANY QUESTIONS CONCERNING THIS NOTIFICATION:

Contact Sales Office or Jose Ramirez <RVEG40@onsemi.com>

NOTIFICATION TYPE:

Final Product/Process Change Notification (FPCN)

Final change notification sent to customers. FPCNs are issued at least 60 days prior to implementation of the change.

ON Semiconductor will consider this change approved unless specific conditions of acceptance are provided in writing within 30 days of receipt of this notice. To do so, contact your local ON Semiconductor Sales Office.

DESCRIPTION AND PURPOSE:

This is the Final Notification for the Phase #2 of IPCN#12868. ON Semiconductor wishes to notify its Customers that some Bipolar Power Transistors have been subjected to a Die size reduction.

Electrical characterization and qualification data have been completed, device parametric specifications and ratings have not changed.

RELIABILITY DATA SUMMARY:

QUALIFICATION PLAN:

***Per AEC-Q101 Guidelines.**

Test*	Conditions
Parametric verification	Per device specification @ 25DegC
HTRB	1008 hrs Vcb=80% T=150DegC
H3TRB	1008 hrs RH=85% Temp=85DegC
Temp Cycle	1K cycles -65DegC to 150DegC
Autoclave	96 hrs RH=100% P=15psi Ta=121DegC
IOL	8572 cycles Dtj=100DegC



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Mask#1

TEST	BD244C*		BD243C	
	Lot A	Control	Lot A	Control
HTRB	0/77	0/77	0/77	0/77
H3TRB	0/77	0/77	0/77	0/77
IOL	0/77	0/77	0/77	0/77
TC	0/77	0/77	0/77	0/77
AC	0/77	0/77	0/77	0/77

Mask#2

TEST	Lot A	TIP102		TIP107*		
		Lot B	Control	Lot A	Lot B	Control
HTRB	0/77	0/77	0/77	0/77	0/77	0/77
H3TRB	0/77	0/77	0/77	0/77	0/77	0/77
IOL	0/77	0/77	0/77	0/77	0/77	0/77
TC	0/77	0/77	0/77	0/77	0/77	0/77
AC	0/77	0/77	0/77	0/77	0/77	0/77

Mask#3

TEST	Lot A	MJD127		2N6388	
		Lot B	Control	Lot A	Control
HTRB	0/77	0/77	0/77	0/77	0/77
H3TRB	0/77	0/77	0/77	0/77	0/77
IOL	0/77	0/77	0/77	0/77	0/77
TC	0/77	0/77	0/77	0/77	0/77
AC	0/77	0/77	0/77	0/77	0/77

Mask#4

TEST	Lot A	2N6488		2N6491	
		Control	Lot A	Control	Lot A
HTRB	0/77	0/77	0/77	0/77	0/77
H3TRB	0/77	0/77	0/77	0/77	0/77
IOL	0/77	0/77	0/77	0/77	0/77
TC	0/77	0/77	0/77	0/77	0/77
AC	0/77	0/77	0/77	0/77	0/77

Mask#5

TEST	Lot A	MJD41C			TIP41C		
		Lot B	Control	Lot A	Lot B	Lot C	
HTRB	0/77	0/77	0/77	0/77	0/77	0/77	
H3TRB	0/77	0/77	0/77	0/77	0/77	0/77	
IOL	0/77	0/77	0/77	0/77	0/77	0/77	
TC	0/77	0/77	0/77	0/77	0/77	0/77	
AC	0/77	0/77	0/77	0/77	0/77	0/77	

ELECTRICAL CHARACTERISTIC SUMMARY:

Mask#1	Test	Condition	Limit	Unit	Stat	BD243C - NPN		BD244C* - PNP	
						Lot A	Control	Lot A	Control
	Iebo	Veb=5V	<10uA	nA	Avg/Sd	0.58/0.38	0.32/0.08	0.38/0.06	0.40/0.06
	Ices	Vcb=100V	<400uA	nA	Avg/Sd	9.5/8.6	8.6/0.7		
	Iceo	Vce=60V	<700uA	uA	Avg/Sd	0.43/0.22	1.32/0.17		
	Icex	Vce= 60V	<100uA	nA	Avg/Sd			0.32/0.22	1.1/0.8
	BVceo	IC=30mA	>100V	Volt	Avg/Sd	107.8/2.2	114.3/1.3	134.9/0.4	136.9/0.3
	hFE	0.3A/4V	>30		Avg/Sd	330.1/18.4	322.2/10.5		



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Test	Condition	Limit	Unit	Stat	Lot A	Control	Lot A	Control
hFE	3A/4V	>15		Avg/Sd	80.8/4.7	58.3/1.8		
hFE	0.5A/4V	>100		Avg/Sd			218.8/1.3	189.4/2.7
hFE	1.5A/4V	>60		Avg/Sd			126.3/0.7	104.6/1.4
VCE (sat)	6A/0.1A	<1.5V	Volt	Avg/Sd	0.361/0.006	0.664/0.004		
VCE (sat)	1.5A/50mA	<0.7V	Volt	Avg/Sd			0.235/0.002	0.220/0.002
VBE (on)	6A/4V	<2.0V	Volt	Avg/Sd	1.06/0.006	1.31/0.007		
VBE (sat)	1.5A/50mA	<1.0V	Volt	Avg/Sd			0.855/0.0003	0.886/0.0006

Mask#2

Test	Condition	Limit	Unit	Stat	Lot A	Lot B	Control
Iebo	Veb=5V	<2mA	mA	Avg/Sd	1.11/0.03	0.73/0.02	0.96/0.03
Icbo	Vcb=100V	<50uA	nA	Avg/Sd	4.85/0.70	3.87/0.51	6.8/1.2
Iceo	Vce=50V	<50uA	nA	Avg/Sd	2.75/0.69	2.17/0.24	4.37/0.82
BVceo	IC=30mA	>100V	Volt	Avg/Sd	152.2/2.1	151.1/2.1	141.6/3.0
hFE	3A/4V	1K-20K		Avg/Sd	8576/493	10707/888	9156/561
hFE	8A/4V	>200		Avg/Sd	3019/421	2296/389	3805/486
VCE(sat)	3A/6mA	<2.0V	Volt	Avg/Sd	0.881/0.005	0.893/0.006	0.937/0.007
VCE(sat)	8A/80mA	<2.5V	Volt	Avg/Sd	1.173/0.014	1.229/0.019	1.316/0.014
VBE(on)	8A/4V	<1.0V	Volt	Avg/Sd	1.818/0.013	1.864/0.018	1.974/0.014

TIP102 - NPN

Mask#2

Test	Condition	Limit	Unit	Stat	Lot A	Lot B	Control
Iebo	Veb=5V	<2mA	mA	Avg/Sd	0.518/0.016	0.534/0.023	0.384/0.11
Icbo	Vcb=25V	<100uA	nA	Avg/Sd	3.11/0.37	2.87/0.01	3.73/0.03
Iceo	Vce=25V	<50uA	nA	Avg/Sd	3.24/0.33	2.96/0.01	3.83/0.31
BVceo	IC=30mA	>80V	Volt	Avg/Sd	157.6/7.3	184.1/6.5	187.9/7.5
hFE	3A/4V	1K-30K		Avg/Sd	12160/1626	10153/183	7745/1019
hFE	8A/4V	>200		Avg/Sd	2409/499	1788/298	1050/186
VCE(sat)	3A/6mA	<2.0V	Volt	Avg/Sd	0.971/0.007	0.977/0.006	0.993/0.009
VCE(sat)	8A/80mA	<2.5V	Volt	Avg/Sd	1.369/0.02	1.413/0.016	1.498/0.026
VBE(on)	8A/4V	<1.0V	Volt	Avg/Sd	1.885/0.019	1.906/0.016	1.960/0.018

TIP107* - PNP

* Special device

Mask#3

Test	Condition	Limit	Unit	Stat	Lot A	Lot B	Control
Iebo	Veb=5V	2mA	uA	Avg/Sd	540/9	560/8.4	465/4
Icbo	Vcb=100V	<10uA	nA	Avg/Sd	11.4/14.5	3.5/1.0	3.6/0.55
Iceo	Vce= 50V	<10uA	nA	Avg/Sd	6.8/8.3	2.4/4.9	2.6/0.27
BVceo	Ic=100mA	>100V	Volts	Avg/Sd	161.2/1.1	170.6/6.2	170.3/3.5
hFE	4A/4V	1K-12K		Avg/Sd	5859/169	5108/788	2551/126
hFE	8A/4V	>100		Avg/Sd	675/26	582/120	146/5.4
Vce(sat)	4A/16mA	<2.0V	Volts	Avg/Sd	1.320/0.006	1.316/0.014	1.517/0.005
Vce(sat)	8A/80mA	<4.0V	Volts	Avg/Sd	2.100/0.015	2.085/0.064	3.279/0.055
Vbe(sat)	8A/80mA	<4.5V	Volts	Avg/Sd	2.707/0.011	2.681/0.037	3.007/0.004
Vbe(on)	4A/4V	<2.8V	Volts	Avg/Sd	1.842/0.003	1.845/0.012	1.947/0.004

MJD127T4 - PNP

Mask#3

Test	Condition	Limit	Unit	Stat	Lot A	Control
Iebo	Veb=5V	<5mA	uA	Avg/Sd	487/13.7	421/11.5
Icex	Vcb=80V	<300uA	nA	Avg/Sd	3.0/1.2	3.9/0.4
Iceo	Vce=80V	<1mA	nA	Avg/Sd	3.1/1.2	4.0/0.4

2N6388 - NPN



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Test	Condition	Limit	Unit	Stat	Lot A	Control
BVceo	Ic=10mA	>80V	Volt	Avg/Sd	119.9/1.6	115.9/1.8
hFE	5A/3V	1K-20K		Avg/Sd	6499/570	4664/588
hFE	10A/3V	>100		Avg/Sd	421/48	341/78
Vce(sat)	5A/10mA	<2.0V	Volt	Avg/Sd	1.160/0.01	1.303/0.01
Vce(sat)	10A/0.1A	<3.0V	Volt	Avg/Sd	1.740/0.03	1.937/0.03
Vbe(on)	5A/3V	<2.8V	Volt	Avg/Sd	1.778/0.009	1.926/0.011
Vbe(on)	10A/3V	<4.5V	Volt	Avg/Sd	2.401/0.027	2.593/0.021

Mask#4

Test	Condition	Limit	Unit	Stat	2N6488 - NPN		2N6491 - PNP	
					Lot A	Control	Lot A	Control
Iebo	Veb=5V	<1mA	nA	Avg/Sd	0.16/0.05	0.24/0.12	0.56/0.13	0.76/0.17
Iceo	Vce=40V	<1mA	uA	Avg/Sd	0.58/0.07	0.57/0.16	0.21/0.04	0.16/0.03
Ices	Vce= 85V	<500uA	nA	Avg/Sd	2.6/0.19	4.4/0.94	2.79/0.68	3.63/0.66
BVceo	Ic=200mA	>80V	Volt	Avg/Sd	104.9/1.9	113.7/1.6	126.7/2.3	130.7/2.7
hFE	5/4V	20-150		Avg/Sd	104.0/5.5	101.0/2.7	65.3/3.6	54.3/3.9
hFE	15A/4V	>15		Avg/Sd	14.2/0.8	26.4/0.3	16.4/0.9	15.6/1.1
VCE (sat)	5A/0.5A	<1.3V	Volt	Avg/Sd	0.222/0.003	0.287/0.012	0.332/0.018	0.361/0.008
VCE (sat)	15A/5A	<3.5V	Volt	Avg/Sd	0.696/0.008	1.065/0.059	0.994/0.023	1.412/0.022
VBE (on)	5A/4V	<1.3V	Volt	Avg/Sd	0.913/0.002	0.972/0.001	0.983/0.003	1.049/0.008
VBE (on)	15A/4V	<3.5V	Volt	Avg/Sd	1.374/0.008	1.766/0.048	1.561/0.006	2.143/0.042

Mask#5

Test	Condition	Limit	Unit	Stat	MJD41C		
					Lot A	Lot B	Control
Iebo	Veb=5V	<0.5mA	nA	Avg/Sd	0.24/0.03	0.25/0.04	0.16/0.05
Ices	Vce=100V	<10uA	nA	Avg/Sd	3.4/0.25	3.3/0.31	1.4/0.17
Iceo	Vce= 60V	<50uA	uA	Avg/Sd	0.22/0.002	0.22/0.004	0.04/0.001
BVceo	Ic=30mA	>100V	Volts	Avg/Sd	112.2/1.2	114.0/0.7	123.3/1.3
hFE	0.3A/4V	>30		Avg/Sd	311.9/11.2	289.5/7.1	220.4/9.3
hFE	3A/4V	15-75		Avg/Sd	63.5/1.5	61.3/1.0	50.7/0.8
Vce(sat)	6A/0.6A	<1.5V	Volts	Avg/Sd	0.480/0.011	0.504/0.009	0.659/0.012
Vbe(on)	6A/4V	<2.0V	Volts	Avg/Sd	1.112/0.008	1.126/0.004	1.319/0.008

Mask#5

Test	Condition	Limit	Unit	Stat	TIP42C - PNP			
					Lot A	Lot B	Lot C	Control
Iebo	Veb=5V	<500uA	nA	Avg/Sd	0.31/0.03	0.25/0.03	0.20/0.04	0.25/0.09
Ices	Vce=100V	<10uA	nA	Avg/Sd	2.2/0.09	1.8/0.06	1.5/0.08	7.1/0.38
Iceo	Vce= 60V	<50uA	uA	Avg/Sd	0.19/0.02	0.20/0.01	0.08/0.01	0.24/0.06
BVceo	Ic=30mA	>100V	Volts	Avg/Sd	133.5/0.7	133.0/0.7	135.4/3.0	120.8/2.1
hFE	0.3A/4V	>30		Avg/Sd	240.7/6.7	257.7/4.1	233.9/14.4	232.9/21.4
hFE	3A/4V	15-75		Avg/Sd	62.1/1.9	65.2/1.3	63.0/4.0	58.5/3.2
Vce (sat)	6A/0.6A	<1.5V	Volts	Avg/Sd	0.882/0.034	0.882/0.015	0.951/0.06	0.972/0.059
Vbe (on)	6A/4V	<2.0V	Volts	Avg/Sd	1.176/0.004	1.147/0.002	1.154/0.007	1.288/0.015

CHANGED PART IDENTIFICATION:

Product marked with date code 0404 and later may have new Die design.



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AFFECTED DEVICE LIST (WITHOUT SPECIALS):

PART

2N6040
2N6042
2N6107
2N6109
2N6111
2N6288
2N6292
2N6387
2N6388
2N6487
2N6488
2N6490
2N6491
2N6667
2N6668
BD243B
BD243C
BD244B
BD244C
BD809
BD810
BDW42
BDW46
BDW47
BDX33B
BDX33C
BDX34B
BDX34C
BDX53B
BDX53C
BDX54B
BDX54C
MJB41C
MJB41CT4
MJB42C
MJB42CT4
MJD127
MJD127T4
MJD128T4
MJD2955
MJD2955-001
MJD2955T4
MJD3055
MJD3055T4
MJD41CRL
MJD41CT4
MJD42C
MJD42C1
MJD42CRL
MJD42CT4
MJE2955T
MJE3055T
MJF2955



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MJF3055
MJF6388
MJF6668
SJB42C
SJB42CT4
SJD127T4
SJE4021
SJE5384
TIP100
TIP101
TIP102
TIP105
TIP106
TIP107
TIP125
TIP126
TIP127
TIP41
TIP41A
TIP41B
TIP41C
TIP42
TIP42A
TIP42B
TIP42C
TIPC127WP