DATE: 14th April, 2010

PCN #: 2001

PCN Title: ZLLS1000TA, ZLLS2000TA, and ZLLS410TA Datasheet Specification Change

Dear Customer:

This is an announcement of change(s) to products that are currently being offered by Diodes Incorporated.

We kindly request that you acknowledge receipt of this notification immediately upon receipt. If you require samples for evaluation purposes, please let us know as soon as possible. Please refer to the implementation date of this change as it is stated in the attached PCN form. Please contact your local Diodes sales representative to acknowledge receipt of this PCN and for any sample requests.

Previously agreed upon customer specific change process requirements or device specific requirements will be addressed separately.

For questions or clarification regarding this PCN, please contact your local Diodes sales representative.

Sincerely,

Diodes Incorporated PCN Team

PRODUCT CHANGE NOTICE

PCN-2001-F
REV00

Notification Date:	Implementation Date:	Product Family:	Change Type:	PCN #:
April 14, 2010	Immediate	Schottky Diodes	Electrical Specification	**2001**

TITLE

ZLLS1000TA, ZLLS2000TA, and ZLLS410TA Datasheet Specification Change

DESCRIPTION OF CHANGE

Updates to the manufacturing environments have led to the necessity of an increase of specification limits for certain parameters to aid in manufacturability and capability. Differences between the previous version and the current version are high-lighted in the attached documents.

IMPACT

Increase in Specification Limits

PRODUCTS AFFECTED

ZLLS1000TA
ZLLS2000TA
ZLLS410TA

WEB LINKS

Manufacturer's Notice:	http://www.diodes.com/quality/pcns
For More Information Contact:	http://www.diodes.com/contacts
Data Sheet:	http://www.diodes.com/products

DISCLAIMER

Unless a Diodes Incorporated Sales representative is contacted in writing within 30 days of the posting of this notice, all changes described in this announcement are considered approved.

Details of Change to ZLLS1000 Datasheet Specification

Updates to the manufacturing environments have led to the necessity to increase specification limits for certain parameters to aid manufacturability and capability.

Application:
Application testing has shown that the behavior of the ZLLS1000 version 4 in selected parameters (below) is identical to the LED typical application in Version 3.

Results using the ZXLD1366EV1 evaluation board:
1) 30V single LED→ the diode is in blocking
2) 18V 4LEDs → the diode is mainly conducting

	30V single LED (blocking)		18V 4LEDs (Conducting)	
ILED [mA]	**Version 4**	**Version 3**	**Version 4**	**Version 3**
200	67.40%	67.10%	91%	91%
500	67.30%	68.20%	90.10%	90.50%
1000	60.00%	61.20%	85.27%	86.10%

Differences:
Differences between version 3 and version 4 of the ZLLS1000 datasheet are as follows:

From (Version 3):

ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	VALUE	UNIT
Schottky diode				
Continuous reverse voltage		V_R	40	V
Forward current		I_F	1.16	A
Peak repetitive forward current Rectangular pulse duty cycle		I_{FPK}	1.88	A
Non repetitive forward current	t=≤100µs t=≤10ms	I_{FSM}	22 6.4	A A
Package				
Power dissipation at T_{amb}=25°C single die continuous single die measured at t<5 secs		P_D	625 840	mW mW
Storage temperature range		T_{stg}	-55 to +150	°C
Junction temperature		T_j	150	°C

From (Version 3 cont'd):

ELECTRICAL CHARACTERISTICS (at Tamb = 25°C unless otherwise stated)

SCHOTTKY DIODE CHARACTERISTICS						
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**	**CONDITIONS**
Reverse breakdown voltage	$V_{(BR)R}$	40			V	I_R=500µA
Forward voltage	V_F		280	310	mV	I_F=50 mA*
			310	340	mV	I_F=100 mA*
			355	390	mV	I_F=250mA*
			405	460	mV	I_F=500mA*
			450	510	mV	I_F=750mA*
			490	560	mV	I_F=1A*
			570	660	mV	I_F=1.5A*
			475		mV	I_F=1000mA*,Ta = 100°C
Reverse current	I_R		11	20	µA	V_R=30V
			750		µA	V_R=30V,Ta = 85°C
Diode capacitance	C_D		26		pF	f=1MHz,VR=30V
Reverse recovery time	t_{rr}		4		ns	Switched from I_F = 500mA to V_R = 5.5V Measured @ I_R 50mA. di /d t = 500mA/ ns. Rsource = 6Ω;Rload= 10Ω
Reverse recovery charge	Q_{rr}		335		nC	

*Measured under pulsed conditions. Pulse width = 300µS. Duty Cycle ≤ 2%.

To (Version 4):

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Continuous Reverse Voltage	V_R	40	V
Forward Current	I_F	1.16	A
Peak Repetitive Forward Current Rectangular Pulse Duty Cycle 50% 100µs pulse width	I_{FPK}	2.6	A
Non Repetitive Forward Current t≤100µs t≤10ms	I_{FSM}	22 6.4	A A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation @T_A = 25°C Single Die Continuous Single Die Measured at t<5 secs	P_D	0.8 1.18	W
Thermal Resistance Junction to Ambient (Note 3)	$R_{\theta JA}$	155	°C/W
Thermal Resistance Junction to Ambient (Note 4)	$R_{\theta JA}$	106	°C/W
Thermal Resistance Junction to Lead (Solder Point)	$R_{\theta JL}$	80	°C/W
Storage temperature range	T_{STG}	-55 to +150	°C
Junction temperature	T_J	150	°C

Notes: 3. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
4. For a device mounted on FRB PCB measured at t<5secs.

To (Version 4 cont'd):

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse breakdown voltage	$V_{(BR)R}$	40	-	-	V	I_R = 500µA
Forward voltage (Note 5)	V_F	-	320	355	mV	I_F = 50mA
			335	380		I_F = 100mA
			380	425		I_F = 250mA
			410	460		I_F = 500mA
			440	510		I_F = 750mA
			470	560		I_F = 1A
			530	660		I_F = 1.5A
			430	-		I_F = 1000mA, T_A = 100°C
Reverse current	I_R	-	5	20	µA	V_R = 30V
			500	-	µA	V_R = 30V, T_A = 85°C
Diode capacitance	C_D	-	28	-	pF	f = 1MHz, V_R = 30V
Reverse recovery time	t_{rr}	-	5	-	ns	Switched from I_F = 500mA to V_R = 5.5V
Reverse recovery charge	Q_{rr}		350		nC	Measured @ I_R 50mA. di /dt = 500mA/ ns. R_{source} = 6Ω; R_{load} = 10Ω

Notes: 5. Measured under pulsed conditions. Pulse width = 300µs. Duty cycle < 2%

All graphs in version 4 have been updated to reflect revised typical performance.

Details of Change to ZLLS2000 Datasheet Specification

Updates to the manufacturing environments have led to the necessity to increase specification limits for certain parameters to aid manufacturability and capability.

A small increase in the typical performance is seen for lower currents. For operating currents from 500mA and higher, the Voltage drop across the forward bias diode is lower thus minimizing power dissipation. The reverse bias leakage is reduced by 50%. This further implies that there is a reduction in power dissipation and an increase in maximum operating temperature during significant reverse bias duty.

Application:
Application testing has shown that the behavior of the ZLLS2000 version 5 in selected parameters (below) is identical to the LED typical application in Version 4.

Results using the ZXLD1322 evaluation board:
1) Data from 2 LED @350mA with Vin @ 8V

DS version	**Efficiency**
Version 4	**76.1%**
Version 5	**75.3%**

Differences:
Differences between version 4 and version 5 of the ZLLS2000 datasheet are as follows:

From (Version 4):

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

SCHOTTKY DIODE CHARACTERISTICS						
PARAMETER	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**	**CONDITIONS**
Reverse breakdown voltage	$V_{(BR)R}$	40			V	I_R=1mA
Forward voltage	V_F		260	-	mV	I_F=50 mA*
			290	-	mV	I_F=100 mA*
			322	-	mV	I_F=250mA*
			345	370	mV	I_F=500mA*
			395	430	mV	I_F=1000mA*
			440	490	mV	I_F=1500mA*
			475	540	mV	I_F=2000mA*
			550	640	mV	I_F=3000mA*
			465			I_F=2000mA*,Ta = 100°C
Reverse current	I_R		25	40	µA	V_R=30V
			1.7		mA	V_R=30V, Ta=85°C
Diode capacitance	C_D		65		pF	f=1MHz,V_R=30V
Reverse recovery time	t_{rr}		6		ns	Switched from I_F = 500mA to V_R = 5.5V Measured @ I_R 50mA. di / dt > 500mA / ns. Rsource = 6Ω; Rload= 10Ω
Reverse recovery charge	Q_{rr}		685		pC	

*Measured under pulsed conditions. Pulse width=300µs. Duty cycle ≤ 2%

To (Version 5):

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage	$V_{(BR)R}$	40	-	-	V	I_R = 1mA
Forward Voltage (Note 5)	V_F	-	285	-	mV	I_F = 50mA
		-	305	-		I_F = 100mA
		-	335	-		I_F = 250mA
		-	365	390		I_F = 500mA
		-	403	430		I_F = 1A
		-	433	490		I_F = 1.5A
		-	461	540		I_F = 2A
		-	509	600		I_F = 3A
		-	450	-		I_F = 2A,T_A = 100°C
Reverse Current	I_R	-	10	40	µA	V_R = 30V
		-	0.6	-	mA	V_R = 30V, T_A = 85°C
Diode Capacitance	C_D	-	65	-	pF	f = 1MHz, V_R = 30V
Reverse Recovery Time	t_{rr}	-	6	-	ns	Switched from I_F = 500mA to V_R = 5.5V Measured @ I_R 50mA. di /dt = 500mA/ ns. R_{source} = 6Ω; R_{load} = 10Ω
Reverse Recovery Charge	Q_{rr}	-	685	-	nC	

Notes: 5. Measured under pulsed conditions. Pulse width = 300µs. Duty cycle < 2%

All graphs in version 5 have been updated to reflect revised typical performance.

Details of Change to ZLLS410 Datasheet Specification

Updates to the manufacturing environments have led to the necessity to increase specification limits for certain parameters to aid manufacturability and capability.

Significant enhancements to the device performance have been made including (a) improvement to the device performance with respect to reverse bias leakage current improving reverse power, (b) an improvement in high current Vf performance over previous version of devices, (c) improvement in SOA and maximum ambient operating temperature for a wide range of duty cycle, and (d) an increase in very low current Vf performance over previous version of devices.

Differences:
Differences between version 1 and version 2 of the ZLLS410 datasheet are as follows:

From (Version 1):

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Continuous reverse voltage	V_R	10	V
Forward current	I_F	570	mA
Peak repetitive forward current Rectangular pulse duty cycle 50%, Pulse width = 100µs	I_{FPK}	1.25	A
Non repetitive forward current t ≤ 100µs t ≤ 10ms	I_{FSM}	17 4	A
Power dissipation at T_{amb} = 25ºC Continuous t ≤ 5 secs	P_D	 330 390	 mW mW
Operating and storage temperature range	T_j, T_{stg}	-55 to 150	°C

Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Reverse breakdown voltage	$BV_{(BR)R}$	10			V	I_R = 200µA
Forward voltage	V_F		250	290	mV	I_F = 10mA (*)
			330	380	mV	I_F = 100mA(*)
			535	580	mV	I_F = 1A(*)
Reverse current	I_R		1.8	4	µA	V_R = 5V
			2.2	5	µA	V_R = 8V
			2.5	6	µA	V_R = 10V
				300	µA	V_R = 8V, T_A = 85°C
Diode capacitance	C_D		26		pF	f = 1MHz, V_R = 10V
Reverse recovery time	t_{rr}		3		ns	Switched from I_F = 500mA to V_R = 5.5V measured @ I_R 50mA di/dt = 500mA/ns R_{source} = 6Ω< R_{load}= 10Ω
Reverse recovery charge	Q_{rr}		210		pC	

NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300µs; duty cycle ≤2%.

To (Version 2):

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Continuous Reverse Voltage	V_R	10	V
Forward Current	I_F	750	mA
Peak Repetitive Forward Current Rectangular Pulse Duty Cycle 50% 100µs Pulse Width	I_{FPK}	1.35	A
Non Repetitive Forward Current t ≤ 100µs t ≤ 10ms	I_{FSM}	17 4	A A

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Reverse Breakdown Voltage	$V_{(BR)R}$	10	–	–	V	I_R = 200µA
Forward Voltage (Note 5)	V_F	–	285	300	mV	I_F = 10mA
		–	350	380	mV	I_F = 100mA
		–	500	580	mV	I_F = 1A
Reverse Current	I_R	–	0.5	4	µA	V_R = 5V
		–	0.7	5	µA	V_R = 8V
		–	1	6	µA	V_R = 10V
		–	–	200	µA	V_R = 8V, T_A = 85°C
Diode Capacitance	C_D	–	37	–	pF	f = 1MHz, V_R = 10V
Reverse Recovery Time	t_{rr}	–	3	–	ns	Switched from I_F = 500mA to V_R = 5.5V
Reverse Recovery Charge	Q_{rr}	–	210	–	pC	Measured @ I_R = 50mA. di/dt = 500mA/ns, R_{source} = 6Ω; R_{load} = 10Ω

Notes: 5. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle < 2%

All graphs in version 2 have been updated to reflect revised typical performance.