



## UR6515A

### LINEAR INTEGRATED CIRCUIT

## 3A DDR BUS TERMINATION REGULATOR

### DESCRIPTION

The **UR6515A** is a linear regulator providing up to 3A transient peak current sourcing and sinking capability for DDR SDRAM bus terminator applications while regulating an output voltage to within 40mV. It contains a high speed operational amplifier which provides fast load transient response and only requires 10uF of ceramic output capacitance.

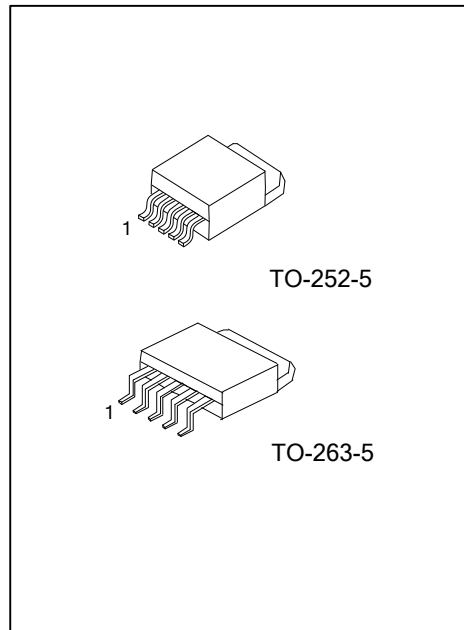
The **UR6515A** output termination voltage tracks the reference voltage applied at  $V_{REF}$  pin. A resistor divider connected to  $V_{IN}$ , GND and  $V_{REF}$  pins is used to force the reference voltage to  $V_{REF}$  pin. Additional features include current limiting protection and thermal shutdown protection.

### FEATURES

- \*DDR1/ DDR2 termination voltage applications
- \*Low output voltage offset within 20mV
- \*Source and sink 3A peak current
- \*Adjustable output voltage by external resistors
- \*Integrated power MOS devices
- \*Suspend to RAM(STR) functionality
- \*Current Limiting Protection
- \*Thermal Shutdown Protection
- \*Cost-effective and easy to use

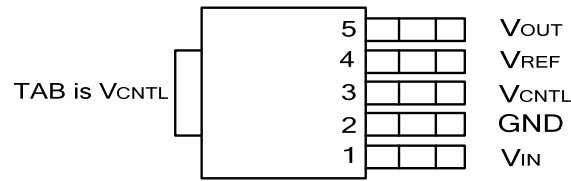
### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
UR6515L-TN5-R	UR6515G-TN5-R	TO-252-5	Tape Reel
UR6515L-TQ5-R	UR6515G-TQ5-R	TO-263-5	Tape Reel
UR6515L-TQ5-T	UR6515G-TQ5-T	TO-263-5	Tube



<p>UR6515AL-TN5-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Plating</p>	<p>(1) R: Tape Reel, T:Tube</p> <p>(2) TN5: TO-252-5, TQ5: TO-263-5</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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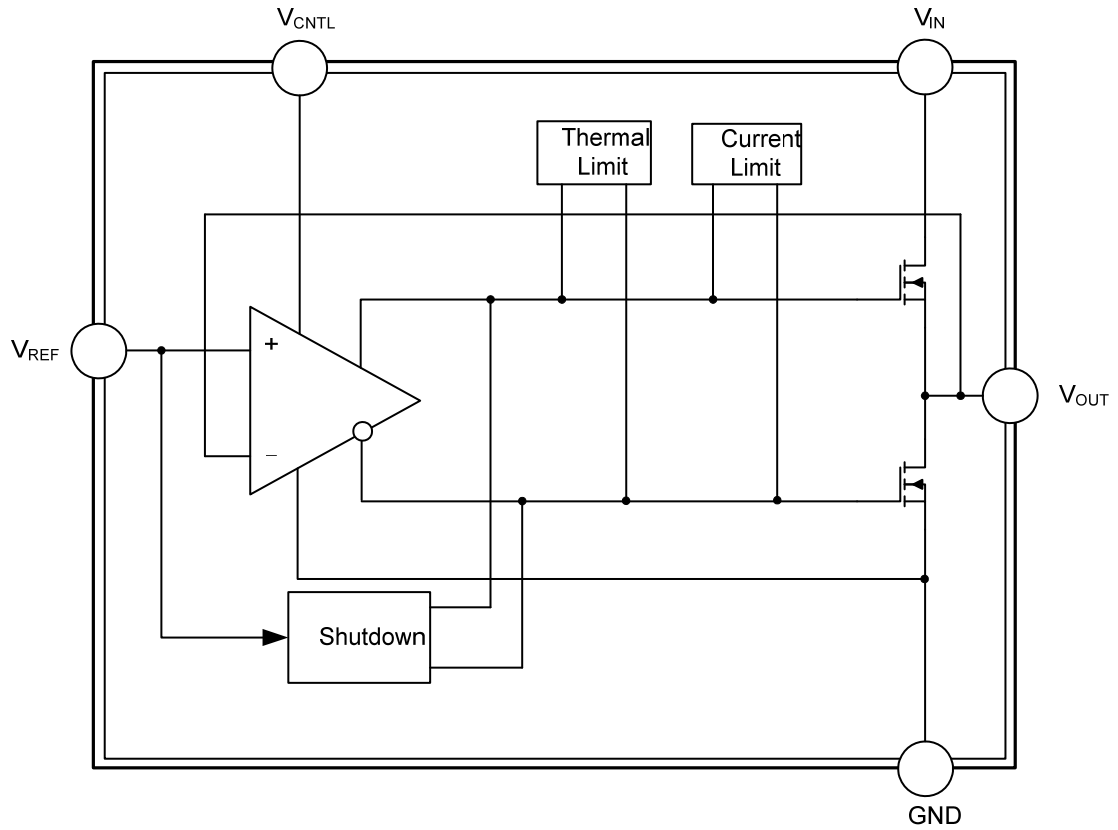
### ■ PIN CONFIGURATIONS



### ■ PIN DESCRIPTION

PIN NAME	PIN TYPE	PIN DESCRIPTION
VIN	I	Power supply pin for the VOUT output
GND	O	Ground pin
VCNTL	I	Power supply pin for the internal control circuits
VREF	I	Reference voltage input and active-low shutdown control pin
VOUT	O	Output voltage pin

### ■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
V <sub>CNTL</sub> Control Voltage	V <sub>CNTL</sub>	7	V
V <sub>IN</sub> Supply Voltage	V <sub>IN</sub>	7	V
Power Dissipation (Ta=25°C)	TO-252-5	1.471	W
	TO-263-5	1.923	
Junction Temperature	T <sub>J</sub>	125	°C
Storage Temperature	T <sub>STG</sub>	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 1)	TO-252-5	68	°C/W
	TO-263-5	52	
Junction to Case	TO-252-5	8	°C/W
	TO-263-5	7.7	

Note: 1.  $\theta_{JA}$  is measured in the natural convection at Ta = 25°C on a high effective thermal conductivity test board of JEDEC 51-7 thermal measurement standard

■ RECOMMENDED OPERATING CONDITIONS (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
V <sub>CNTL</sub> Control Voltage	V <sub>CNTL</sub>	5 or 3 ± 5%	V
V <sub>IN</sub> Supply Voltage	V <sub>IN</sub>	2.5~1.5 ± 3%	V
V <sub>REF</sub> Input Voltage	V <sub>REF</sub>	1.25~0.75 ± 3%	V
Junction Temperature	T <sub>J</sub>	-40~+125	°C

Notes: 1. All voltage values are with respect to the network ground terminal unless otherwise noted.

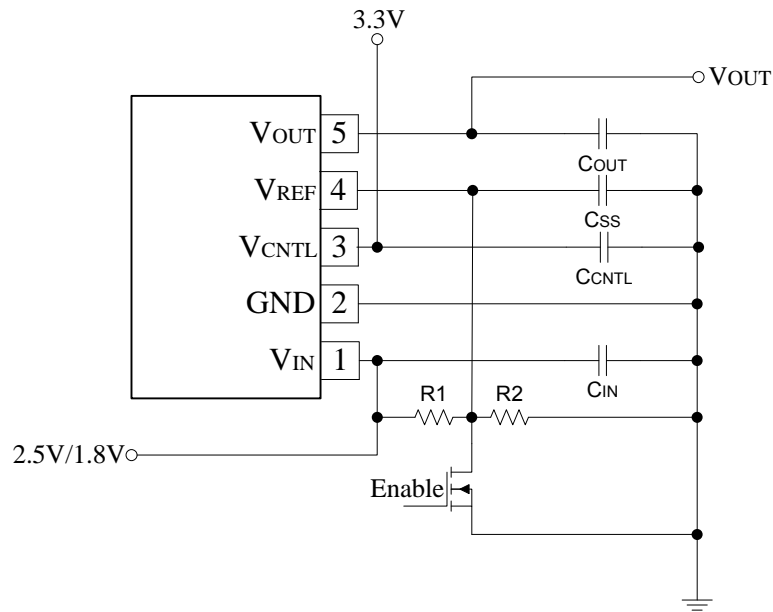
2. The V<sub>OUT</sub> tracks the V<sub>REF</sub> with additional voltage offset and load regulation.

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise specified)

(V<sub>IN</sub>=2.5V/1.8V, V<sub>CNTL</sub>=3.3V, V<sub>REF</sub>=1.25V/0.9V, C<sub>OUT</sub> = 10μF (Ceramic))

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>INPUT CURRENT</b>						
Operation Current of V <sub>CNTL</sub>	I <sub>CNTL</sub>	I <sub>OUT</sub> = 0A		1	2.5	mA
Standby Current	I <sub>STB</sub>	V <sub>REF</sub> < 0.2V, R <sub>LOAD</sub> = 180Ω		50	90	μA
<b>OUTPUT VOLTAGE (DDR/DDR II/DDR III)</b>						
Output Voltage Offset (V <sub>REF</sub> -V <sub>OUT</sub> )	V <sub>OS</sub>	I <sub>OUT</sub> = 0A	-20		20	mV
Load Regulation(DDR1/2)	ΔV <sub>LOAD</sub>	I <sub>OUT</sub> = ±1.5A		0.8/1.2	2/3	%
<b>PROTECTION</b>						
Current Limit	I <sub>LIMIT</sub>	V <sub>IN</sub> = 2.5V/1.8V	3			A
Thermal Shutdown Temperature	T <sub>SD</sub>	V <sub>CNTL</sub> = 3.3V~5V	125	150		°C
Thermal Shutdown Hysteresis	ΔT <sub>SD</sub>	V <sub>CNTL</sub> = 3.3V~5V		50		°C
<b>V<sub>REF</sub> Shutdown</b>						
Shutdown Threshold	V <sub>IH</sub>	Enable	0.8			V
	V <sub>IL</sub>	Shutdown			0.2	V

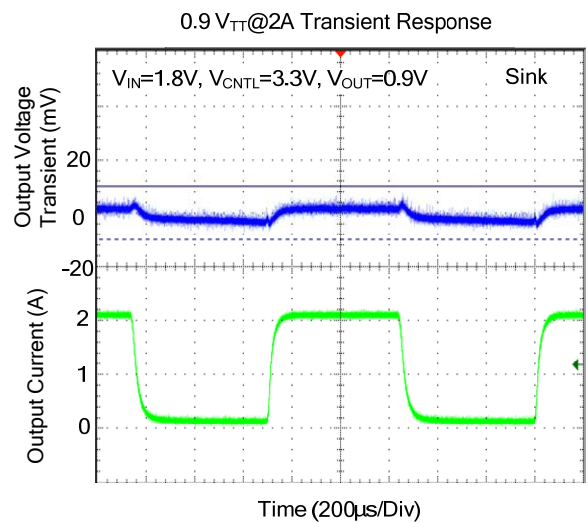
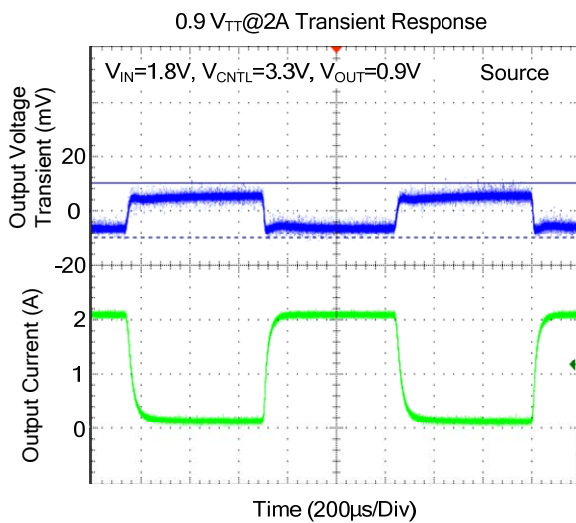
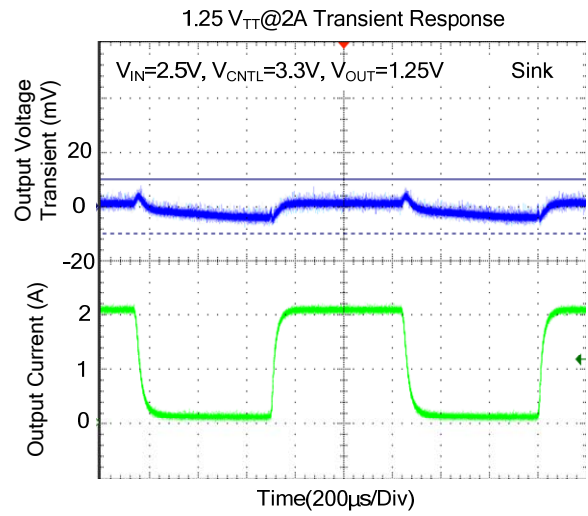
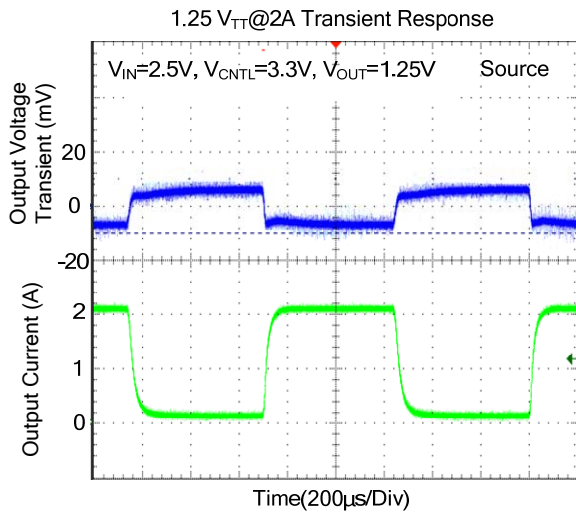
### ■ TYPICAL APPLICATIONS CIRCUITS



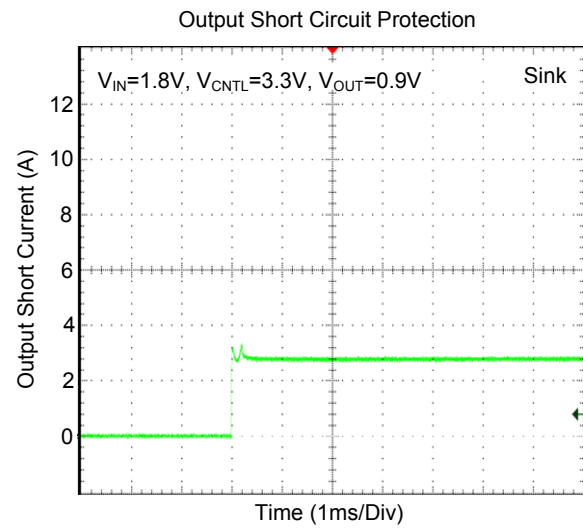
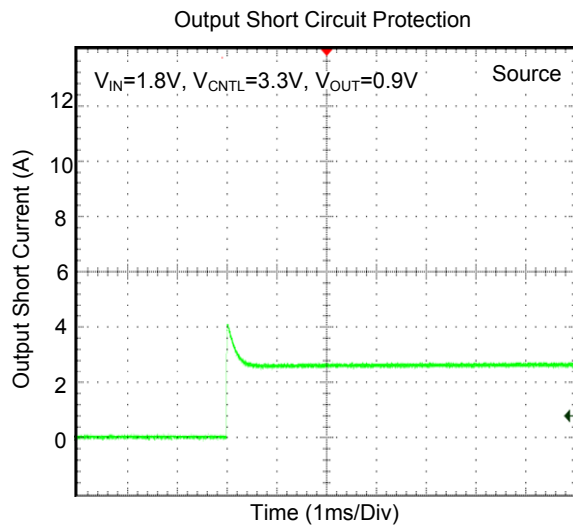
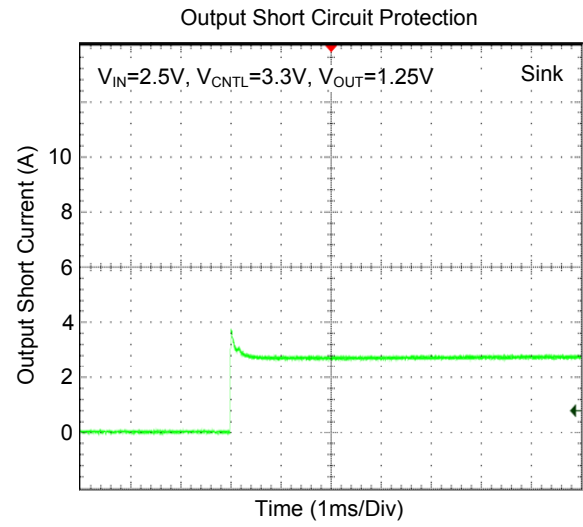
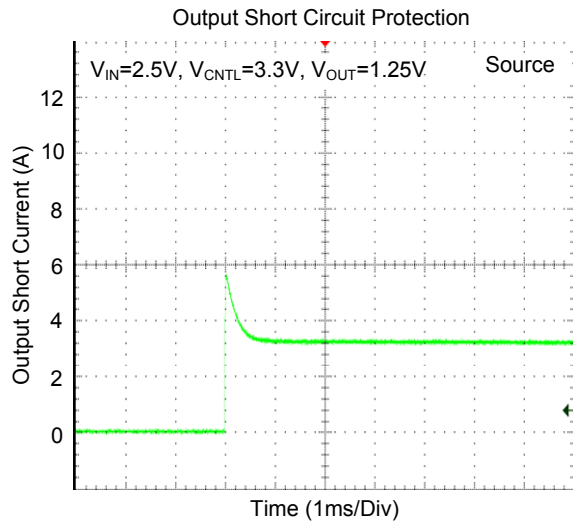
$R1=R2=100K\Omega$ ,  $C_{OUT}=10\mu F(\text{Ceramic})+1000\mu F$  under the worst case testing condition  
 $C_{SS}=1\mu F$ ,  $C_{IN}=470\mu F(\text{Low ESR})$ ,  $C_{CNLT}=47\mu F$

$$V_{REF} = \frac{R_2}{R_1 + R_2} V_{IN}(V), V_{OUT} \text{ track } V_{REF}$$

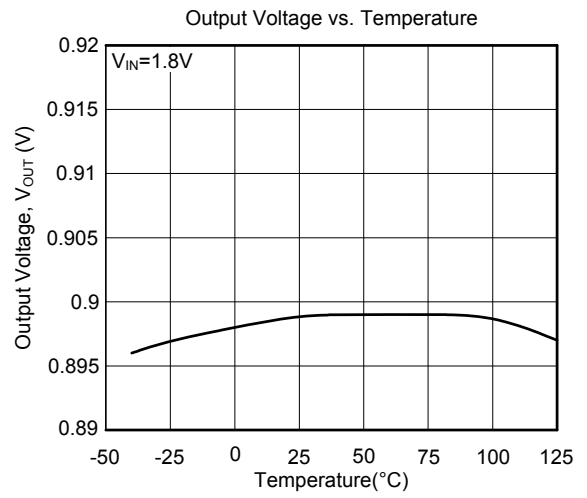
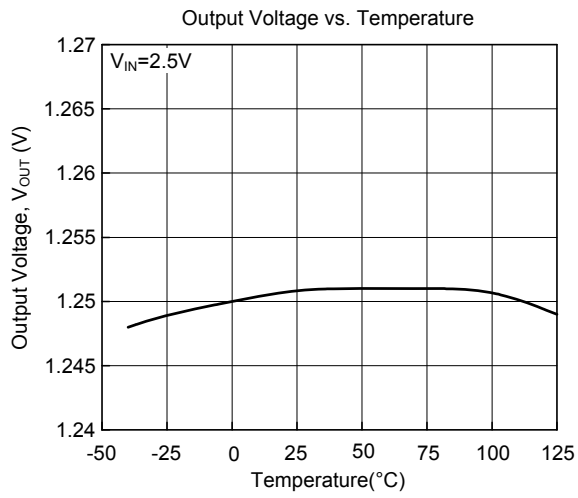
## ■ TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS(Cont.)



### ■ TYPICAL CHARACTERISTICS(Cont.)





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