

DESC APPROVED LOW DROPOUT NEGATIVE



Three Terminal, Fixed Voltage,
Low Dropout Negative Voltage Regulator
In Hermetic Packages

FEATURES

- Approved To DESC Standardized Military Drawings
- Low Dropout Voltage, 0.6 V @ $I_o = 1$ A
- Output Current in Excess of 1 A [ICC 20 (N2) package limited to 0.3A]
- Reverse Battery Protection
- Internal Short Circuit Protection
- Isolated and Non-Isolated Hermetic Package Types
- Output Voltages: - 5V, -5.2V, -12V, & -15V

DESCRIPTION

The OM2990 series of fixed voltage regulators are designed to provide up to 1.5A with high efficiency. It has the ability to source 1A of output current with a typical dropout voltage of 0.6V and a maximum of 1V over the entire operating temperature range. It is supplied in hermetic packages and is ideally suited for all applications where small size and high reliability are required.

ABSOLUTE MAXIMUM RATINGS, $T_c = 25^\circ\text{C}$

Input Voltage	-26 V to +0.3V
Output Voltage	-5V, -5.2 V, -12 V, -15 V dc
Operating Junction Temperature Range	- 55°C to + 125°C
Storage Temperature Range	- 65°C to + 150°C
Lead Temperature (Soldering 10 seconds)	300°C
Thermal Resistance: Junction to Case	
Case 2, ICC20	15.5°C/W
Case U&M, TO-257 (isolated) & SMD-3	3.8°C/W
Case T&N, TO-257 (non-isolated) & SMD-1	3.0°C/W
Case Y, TG-3	2.7°C/W
Maximum Output Current	
Case 2	0.3A
Case U&M	1.2A
Case T, N & Y	1.5A

APPROVED DESC DRAWING	OMNIREL P/N
5962-9571101MUA	OM2990 - 5 STM
5962-9571002MUA	OM2990 - 5.2 STM
5962-9571001MUA	OM2990 - 12 STM



ELECTRICAL CHARACTERISTICS, OM2990-5NK, NM, NT (-5 VOLTS)

Test Conditions are -55°C T_a 125°C, V_{IN} = -10V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V _{OUT}	5 mA ≤ I _b ≤ 1.0 A	1	-5.10	-4.90	V
			2	-5.25	-4.75	
Quiescent Current	I _b	I _b ≤ 1.0A	1		5	m A
			2		12	
			1,2		50	
Line Regulation	V _{R_{LN}}	-6 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±40	m V
			2		±50	
Load Regulation	V _{R_{LD}}	50 mA I _{OUT} 1.0 A	1		±50	m V
			2		±100	
Dropout Voltage	V _{DO}	I _b = 0.1 A DV _O 100 mV	1			V
			2		3	
			1		1	
			2			
Output Noise Voltage	V _{ON}	I _b = 5 mA, 10 Hz - 100 kHz	3		750	μV
Short Circuit Current	I _{SC}	R _L = 1	1	1.5		A
			2	1.3		
Maximum Output Current	I _{MAX}		1	1.5		A
Ripple Rejection	R _R	V _{ripple} = 1 V _{rms} I _{OUT} = 5 mA, f = 1 kHz	1	50		dB

Notes: 1. T_a = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.

ELECTRICAL CHARACTERISTICS, OM2990-12NK, NM, NT (-12 VOLTS)

Test Conditions are -55°C T_a 125°C, V_{IN} = -17V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V _{OUT}	5 mA ≤ I _b ≤ 1.0A	1	-12.24	-11.76	V
			2	-12.60	-11.40	
Quiescent Current	I _b	I _b ≤ 1.0A	1		5	m A
			2		12	
			1,2		50	
Line Regulation	V _{R_{LN}}	-13 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±65	m V
			2		±80	
Load Regulation	V _{R_{LD}}	50 mA I _{OUT} 1.0 A	1		±80	m V
			2		±120	
Dropout Voltage	V _{DO}	I _b = 0.1 A DV _O 100 mV	1			V
			2		3	
			1		1	
			2			
Output Noise Voltage	V _{ON}	I _b = 5 mA, 10 Hz - 100 kHz	3		1500	μV
Short Circuit Current	I _{SC}	R _L = 1	1	.90		A
			2	.75		
Maximum Output Current	I _{MAX}		1	1.4		A
Ripple Rejection	R _R	V _{ripple} = 1 V _{rms} I _{OUT} = 5 mA, f = 1 kHz	1	42		dB

Notes: 1. T_a = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.
4. The short circuit current is less than the maximum output current due to internal foldback current limiting. The -9V and -5.2V versions do not reach the foldback current limit and therefore conducts a higher short circuit level.

ELECTRICAL CHARACTERISTICS, OM2990-15NK, NM, NT (-15 VOLTS)

Test Conditions are -55°C T_a 125°C, V_{IN} = -20V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V _{OUT}	5 mA ≤ I _b ≤ 1.0 A	1	-15.30	-14.70	V
			2	-15.75	-14.25	
Quiescent Current	I _b	I _b ≤ 1.0A	1		15	m A
			2		20	
			1,2		50	
Line Regulation	V _{R_{LN}}	-16 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±75	m V
			2		±120	
Load Regulation	V _{R_{LD}}	50 mA I _{OUT} 1.0 A	1		±120	m V
			2		±190	
Dropout Voltage	V _{DO}	I _b = 0.1 A DV _O 100 mV	1			V
			2		3	
			1		1	
			2			
Output Noise Voltage	V _{ON}	I _b = 5 mA, 10 Hz - 100 kHz	3		1800	μV
Short Circuit Current	I _{SC}	R _L = 1	1	.75		A
			2	.62		
Maximum Output Current	I _{MAX}		1	1.4		A
Ripple Rejection	R _R	V _{ripple} = 1 V _{rms} I _{OUT} = 5 mA, f = 1 kHz	1	42		dB

Notes: 1. T_a = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.
4. The short circuit current is less than the maximum output current due to internal foldback current limiting. The -9V and -5.2V versions do not reach the foldback current limit and therefore conducts a higher short circuit level.

ELECTRICAL CHARACTERISTICS, OM2990-5SM, ST (-5 VOLTS)

Test Conditions are -55°C T_a 125°C, V_{IN} = -10V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit	
Output Voltage	V _{OUT}	5 mA ≤ I _b ≤ 1.0 A	1	-5.10	-4.90	V	
			2	-5.25	-4.75		
Quiescent Current	I _q	I _b ≤ 1.0A	1		5	m A	
			2		12		
			1,2		50		
Line Regulation	V _{RLN}	-6 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±45	m V	
			2		±55		
Load Regulation	V _{RLD}	50 mA I _{OUT} 1.0 A	1		±70	m V	
			2		±110		
Dropout Voltage	V _{DO}	I _b = 0.1 A DV _O 100 mV	1			V	
			2		.3		
			1	I _b = 1.0 A DV _O 100 mV			1
					2		
Output Noise Voltage	V _{ON}	I _b = 5 mA, 10 Hz - 100 kHz	3		750	μV	
Short Circuit Current	I _{SC}	R _L = 1	1,2	1.27		A	
Maximum Output Current	I _{MAX}		1	1.27		A	
Ripple Rejection	R _R	V _{ripple} = 1 V _{rms} I _{OUT} = 5 mA, f = 1 kHz	1	50		dB	

Notes: 1. T_a = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.

ELECTRICAL CHARACTERISTICS, OM2990-12SM, ST (-12 VOLTS)

Test Conditions are -55°C T_a 125°C, V_{IN} = -17V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit	
Output Voltage	V _{OUT}	5 mA ≤ I _b ≤ 1.0A	1	-12.24	-11.76	V	
			2	-12.60	-11.40		
Quiescent Current	I _q	I _b ≤ 1.0A	1		5	m A	
			2		12		
			1,2		50		
Line Regulation	V _{RLN}	-13 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±65	m V	
			2		±80		
Load Regulation	V _{RLD}	50 mA I _{OUT} 1.0 A	1		±80	m V	
			2		±120		
Dropout Voltage	V _{DO}	I _b = 0.1 A DV _O 100 mV	1			V	
			2		.3		
			1	I _b = 1 A DV _O 100 mV			1
					2		
Output Noise Voltage	V _{ON}	I _b = 5 mA, 10 Hz - 100 kHz	3		1500	μV	
Short Circuit Current	I _{SC}	R _L = 1	1,2	.75		A	
Maximum Output Current	I _{MAX}		1 4	1.18		A	
Ripple Rejection	R _R	V _{ripple} = 1 V _{rms} I _{OUT} = 5 mA, f = 1 kHz	1	42		dB	

Notes: 1. T_a = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.
4. The short circuit current is less than the maximum output current due to internal foldback current limiting. The -5V and -5.2V versions do not reach the foldback current limit and therefore conducts a higher short circuit level.

ELECTRICAL CHARACTERISTICS, OM2990-15SM, ST (-15 VOLTS)

Test Conditions are -55°C T_a 125°C, V_{IN} = -20V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit	
Output Voltage	V _{OUT}	5 mA ≤ I _b ≤ 1.0 A	1	-15.30	-14.70	V	
			2	-15.75	-14.25		
Quiescent Current	I _q	I _b ≤ 1.0A	1		15	m A	
			2		20		
			1,2		50		
Line Regulation	V _{RLN}	-16 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±75	m V	
			2		±120		
Load Regulation	V _{RLD}	50 mA I _{OUT} 1.0 A	1		±120	m V	
			2		±190		
Dropout Voltage	V _{DO}	I _b = 0.1 A DV _O 100 mV	1			V	
			2		.3		
			1	I _b = 1.0 A DV _O 100 mV			1
					2		
Output Noise Voltage	V _{ON}	I _b = 5 mA, 10 Hz - 100 kHz	3		1800	μV	
Short Circuit Current	I _{SC}	R _L = 1	1 2	.60 .50		A	
Maximum Output Current	I _{MAX}		1 4	1.4		A	
Ripple Rejection	R _R	V _{ripple} = 1 V _{rms} I _{OUT} = 5 mA, f = 1 kHz	1	42		dB	

Notes: 1. T_a = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.
4. The short circuit current is less than the maximum output current due to internal foldback current limiting. The -5V and -5.2V versions do not reach the foldback current limit and therefore conducts a higher short circuit level.

ELECTRICAL CHARACTERISTICS, OM2990-5N2 (-5 VOLTS)

Test Conditions are -55°C , T_A , 125°C , $V_{IN} = -10\text{V}$, $C_{OUT} = 47\ \mu\text{F}$ (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit		
Output Voltage	V_{OUT}	$5\ \text{mA} \leq I_L \leq 300\ \text{mA}$	1	-5.10	-4.90	V		
			2	-5.25	-4.75			
Quiescent Current	I_Q	$I_L \leq 300\ \text{mA}$	1		7	m A		
			2		14			
			1,2		55			
Line Regulation	V_{RLN}	$-6\ \text{V} \leq V_{IN} \leq -26\ \text{V}$, $I_{OUT} = 5\ \text{mA}$	1		± 45	m V		
			2		± 60			
Load Regulation	V_{RLD}	$50\ \text{mA} \leq I_{OUT} \leq 300\ \text{mA}$	1		± 80	m V		
			2		± 120			
Dropout Voltage	V_{DO}	$I_L = 100\ \text{mA}$ $DV_{DO} = 100\ \text{mV}$	1		3	V		
			2					
			1	$I_L = 300\ \text{mA}$ $DV_{DO} = 100\ \text{mV}$		1		
					2		1	
Output Noise Voltage	V_{ON}	$I_L = 5\ \text{mA}$, 10 Hz - 100 kHz	3		800	μV		
Short Circuit Current	I_{SC}	$R_L = 1$	1	300		m A		
			2	250				
Maximum Output Current	I_{MAX}		1	300		m A		
Ripple Rejection	R_R	$V_{ripple} = 1\ \text{V}_{rms}$ $I_{OUT} = 5\ \text{mA}$, $f = 1\ \text{kHz}$	1	50		dB		

Notes: 1. $T_A = 25^{\circ}\text{C}$.
2. Over full operating temperature range.
3. Guaranteed, not tested.

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ELECTRICAL CHARACTERISTICS, OM2990-12N2 (-12 VOLTS)

Test Conditions are -55°C , T_A , 125°C , $V_{IN} = -17\text{V}$, $C_{OUT} = 47\ \mu\text{F}$ (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit		
Output Voltage	V_{OUT}	$5\ \text{mA} \leq I_L \leq 300\ \text{mA}$	1	-12.24	-11.76	V		
			2	-12.60	-11.40			
Quiescent Current	I_Q	$I_L \leq 300\ \text{mA}$	1		7	m A		
			2		14			
			1,2		60			
Line Regulation	V_{RLN}	$-13\ \text{V} \leq V_{IN} \leq -26\ \text{V}$, $I_{OUT} = 5\ \text{mA}$	1		± 75	m V		
			2		± 110			
Load Regulation	V_{RLD}	$50\ \text{mA} \leq I_{OUT} \leq 300\ \text{mA}$	1		± 120	m V		
			2		± 190			
Dropout Voltage	V_{DO}	$I_L = 100\ \text{mA}$ $DV_{DO} = 100\ \text{mV}$	1		3	V		
			2					
			1	$I_L = 300\ \text{mA}$ $DV_{DO} = 100\ \text{mV}$		1		
					2		1	
Output Noise Voltage	V_{ON}	$I_L = 5\ \text{mA}$, 10 Hz - 100 kHz	3		1650	μV		
Short Circuit Current	I_{SC}	$R_L = 1$	1	200		m A		
			2	175				
Maximum Output Current	I_{MAX}		1	280		m A		
Ripple Rejection	R_R	$V_{ripple} = 1\ \text{V}_{rms}$ $I_{OUT} = 5\ \text{mA}$, $f = 1\ \text{kHz}$	1	42		dB		

Notes: 1. $T_A = 25^{\circ}\text{C}$.
2. Over full operating temperature range.
3. Guaranteed, not tested.
4. The short circuit current is less than the maximum output current due to internal foldback current limiting. The -9V and -5.2V versions do not reach the foldback current limit and therefore conducts a higher short circuit level.

ELECTRICAL CHARACTERISTICS, OM2990-15 N2 (-15 VOLTS)

Test Conditions are -55°C , T_A , 125°C , $V_{IN} = -20\text{V}$, $C_{OUT} = 47\ \mu\text{F}$ (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit		
Output Voltage	V_{OUT}	$5\ \text{mA} \leq I_L \leq 300\ \text{mA}$	1	-15.30	-14.70	V		
			2	-15.75	-14.25			
Quiescent Current	I_Q	$I_L \leq 300\ \text{mA}$	1		20	m A		
			2		25			
			1,2		60			
Line Regulation	V_{RLN}	$-16\ \text{V} \leq V_{IN} \leq -26\ \text{V}$, $I_{OUT} = 5\ \text{mA}$	1		± 85	m V		
			2		± 130			
Load Regulation	V_{RLD}	$50\ \text{mA} \leq I_{OUT} \leq 300\ \text{mA}$	1		± 135	m V		
			2		± 205			
Dropout Voltage	V_{DO}	$I_L = 100\ \text{mA}$ $DV_{DO} = 100\ \text{mV}$	1		3	V		
			2					
			1	$I_L = 300\ \text{mA}$ $DV_{DO} = 100\ \text{mV}$		1		
					2		1	
Output Noise Voltage	V_{ON}	$I_L = 5\ \text{mA}$, 10 Hz - 100 kHz	3		1900	μV		
Short Circuit Current	I_{SC}	$R_L = 1$	1	150		m A		
			2	140				
Maximum Output Current	I_{MAX}		1	280		m A		
Ripple Rejection	R_R	$V_{ripple} = 1\ \text{V}_{rms}$ $I_{OUT} = 5\ \text{mA}$, $f = 1\ \text{kHz}$	1	42		dB		

Notes: 1. $T_A = 25^{\circ}\text{C}$.
2. Over full operating temperature range.
3. Guaranteed, not tested.
4. The short circuit current is less than the maximum output current due to internal foldback current limiting. The -9V and -5.2V versions do not reach the foldback current limit and therefore conducts a higher short circuit level.

ELECTRICAL CHARACTERISTICS, OM2990-5.2NK, NM, NT (-5.2 VOLTS)

Test Conditions are -55°C T_A, 125°C, V_{IN} = -10.2V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V _{OUT}	5 mA ≤ I _L ≤ 1.0 A	1	-5.30	-5.10	V
			2	-5.46	-4.94	
Quiescent Current	I _Q	I _L ≤ 1.0A	1		5	mA
			2		12	
			1,2	I _L = 1.0A, V _{IN} = -5.2 V	50	
Line Regulation	V _{RLN}	-6.2 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±40	mV
			2		±50	
Load Regulation	V _{RLD}	50 mA I _{OUT} 1.0 A	1		±50	mV
			2		±100	
Dropout Voltage	V _{DO}	I _L = 0.1 A DV _O 100 mV	1		3	V
			2			
			1	I _L = 1.0 A DV _O 100 mV	1	
Output Noise Voltage	V _{ON}	I _L = 5 mA, 10 Hz - 100 kHz	3		750	μV
Short Circuit Current	I _{SC}	R _L = 1	1	1.5		A
			2	1.3		
Maximum Output Current	I _{MAX}		1	1.5		A
Ripple Rejection	R _R	V _{ripple} = 1 V _{ms} I _{OUT} = 5 mA, f = 1 kHz	1	50		dB

Notes: 1. T_A = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.

ELECTRICAL CHARACTERISTICS, OM2990-5.2SM, ST (-5.2 VOLTS)

Test Conditions are -55°C T_A, 125°C, V_{IN} = -10.2V, C_{OUT} = 47 μF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V _{OUT}	5 mA ≤ I _L ≤ 1.0 A	1	-5.30	-5.10	V
			2	-5.46	-4.94	
Quiescent Current	I _Q	I _L ≤ 1.0A	1		5	mA
			2		12	
			1,2	I _L = 1.0A, V _{IN} = -5.2 V	50	
Line Regulation	V _{RLN}	-6.2 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±45	mV
			2		±55	
Load Regulation	V _{RLD}	50 mA I _{OUT} 1.0 A	1		±70	mV
			2		±110	
Dropout Voltage	V _{DO}	I _L = 0.1 A DV _O 100 mV	1		3	V
			2			
			1	I _L = 1.0 A DV _O 100 mV	1	
Output Noise Voltage	V _{ON}	I _L = 5 mA, 10 Hz - 100 kHz	3		750	μV
Short Circuit Current	I _{SC}	R _L = 1	1,2	1.27		A
Maximum Output Current	I _{MAX}		1	1.27		A
Ripple Rejection	R _R	V _{ripple} = 1 V _{ms} I _{OUT} = 5 mA, f = 1 kHz	1	50		dB

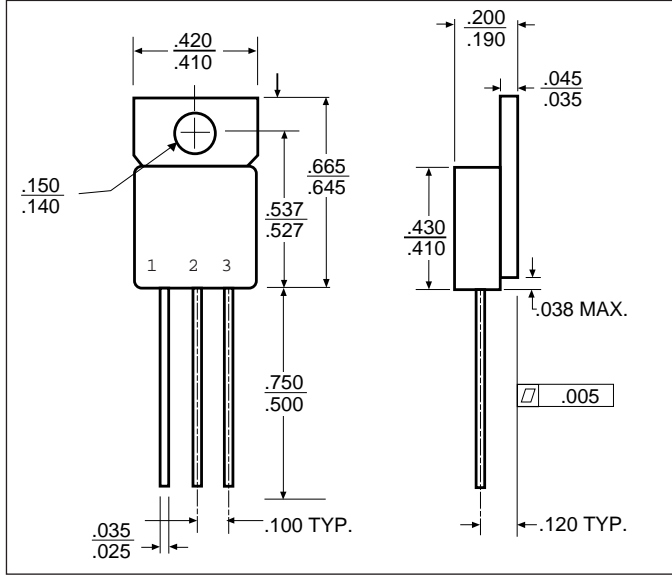
Notes: 1. T_A = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.

ELECTRICAL CHARACTERISTICS, OM2990-5.2N2 (-5.2 VOLTS)

Test Conditions are -55°C T_A, 125°C, V_{IN} = -10.2V, C_{OUT} = 47 μF (unless otherwise specified).

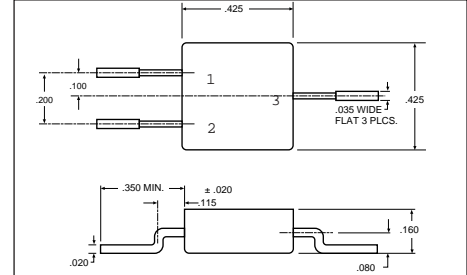
Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V _{OUT}	5 mA ≤ I _L ≤ 300 mA	1	-5.30	-5.10	V
			2	-5.46	-4.94	
Quiescent Current	I _Q	I _L ≤ 300 mA	1		7	mA
			2		14	
			1,2	I _L = 300 mA, V _{IN} = -5.2 V	55	
Line Regulation	V _{RLN}	-6.2 V V _{IN} -26 V, I _{OUT} = 5 mA	1		±45	mV
			2		±60	
Load Regulation	V _{RLD}	50 mA I _{OUT} 300 mA	1		±80	mV
			2		±120	
Dropout Voltage	V _{DO}	I _L = 100 mA DV _O 100 mV	1		3	V
			2			
			1	I _L = 300 mA DV _O 100 mV	1	
Output Noise Voltage	V _{ON}	I _L = 5 mA, 10 Hz - 100 kHz	3		800	μV
Short Circuit Current	I _{SC}	R _L = 1	1	300		mA
			2	250		
Maximum Output Current	I _{MAX}		1	300		mA
Ripple Rejection	R _R	V _{ripple} = 1 V _{ms} I _{OUT} = 5 mA, f = 1 kHz	1	50		dB

Notes: 1. T_A = 25°C.
2. Over full operating temperature range.
3. Guaranteed, not tested.



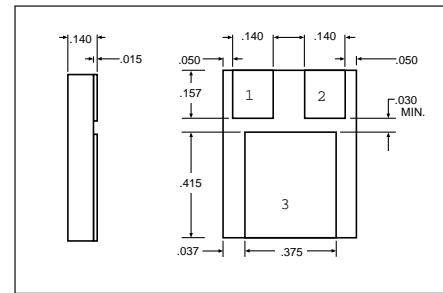
TO-257AA

OM2990STM	OM2990NTM
Isolated	Non-Isolated
Front View	Front View
Pin 1 - Ground	Pin 1 - Ground
Pin 2 - Input	Pin 2 - Input
Pin 3 - Output	Pin 3 - Output
Tab - Isolated	Tab - Input



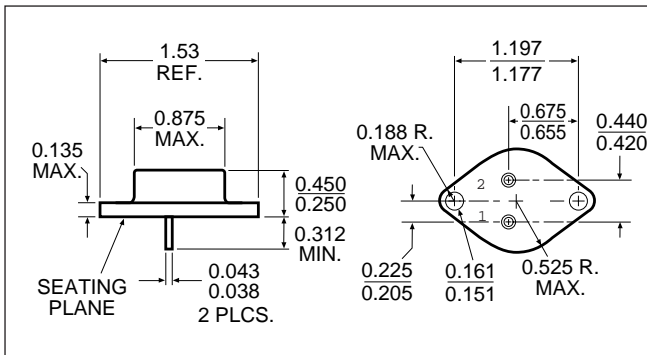
SMD-3 OM2990SMM

Front View
 Pin 1 - Ground
 Pin 2 - Output
 Pin 3 - Input
 Case - Isolated



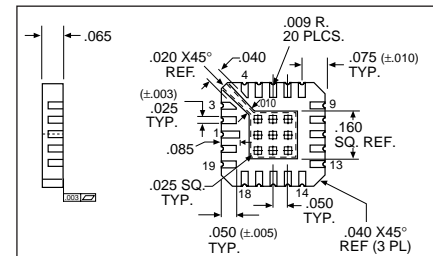
SMD 1 OM2990NMM
 "N" PACKAGE

Pin 1 - Ground
 Pin 2 - Output
 Pin 3 - Input



TO-204AA (TO-3)

OM2990NKM
 Pin 1 - Ground
 Pin 2 - Output



LCC 20 OM2990N2M

Pin 1 NC	Pin 11 V _{OUT}
Pin 2 NC	Pin 12 V _{OUT}
Pin 3 NC	Pin 13 NC
Pin 4 NC	Pin 14 NC
Pin 5 NC	Pin 15 V _{IN}
Pin 6 Ground	Pin 16 V _{IN}
Pin 7 NC	Pin 17 V _{IN}
Pin 8 NC	Pin 18 NC
Pin 9 V _{OUT} (Sense)	Pin 19 NC