TelCom Semiconductor, Inc.

VOLTAGE REGULATOR (MEDIUM CURRENT)

FEATURES

- **Low Power CMOS**
- **Extremely Low Power Consumption ..... 1.1μA Typ**
- **Dropout Voltage ..... 0.5V Typ at 60mA**
- **High Output Current ..... 120mA Typ**
- **High Accuracy Output Voltage ..... ± 2.5%**
- **Low Temp. Coefficient of Output Voltage ..... ± 100ppm/°C Typ**
- **Wide Choice of V_{OUT} ..... 2.0V to 6.0V in 0.1V Steps**
- **Compact Package TO-92, SOT-89-3**

APPLICATIONS

- **Constant-voltage power supply for battery-powered devices**
- **Constant-voltage power supply for communications, and video equipment**
- **Stable standard voltage supply**

GENERAL DESCRIPTION

The TC45 Series are high accuracy 3-terminal CMOS voltage regulators. Output currents extend to 120mA, with quiescent currents around 1μA. The design features very low dropout voltage and overcurrent protection. Available output voltages extend from 2.0V to 6.0V in 0.1V steps. The device is available in TO-92 and SOT-89-3 packages.

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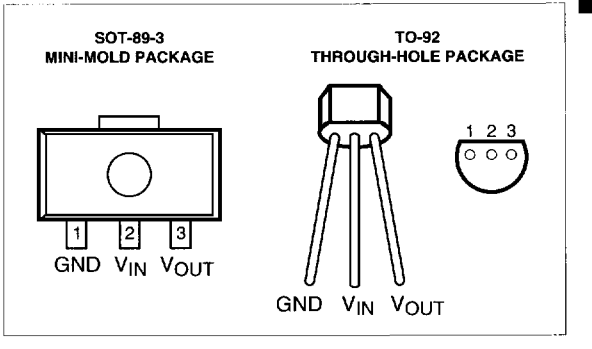
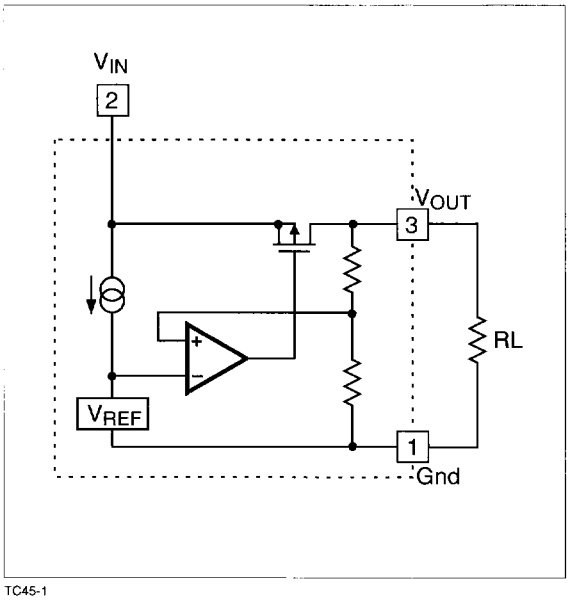
PIN CONFIGURATION



FUNCTIONAL BLOCK DIAGRAM



TC45-1

ORDERING INFORMATION

PART CODE **TC45ER XX X X X XX XXX**

Output Voltage:
Ex: 20 = 2.0V; 60 = 6.0V

Extra Feature Code: Fixed: 0

Tolerance:
3: ±2.5%

Temperature: E: – 40°C to +85°C

Package Type and Pin Count:
MB: SOT-89-3
ZB: TO-92-3

Taping Direction:
723: Left Taping
713: Right Taping
no suffix: TO-92 Bulk

TC45 Series

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Limit	Unit
Input Voltage	V_{IN}	+ 12	V
Output Current	I_{OUT}	150	mA
Output Voltage	V_{OUT}	(V_{SS} – 0.3) to (V_{IN} + 0.3)	V
Power Dissipation	Pd	300	mW
Operating Temperature Range	T_A	– 40 to +85	°C
Storage Temperature Range	T_{stg}	– 65 to +150	°C
Soldering Temperature	T_{solder}	260°C, 10 sec	

ELECTRICAL CHARACTERISTICS:
TC45ER30 (V_{OUT} = 3.0V, T_A = 25°C)

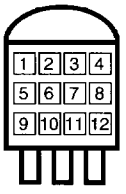
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	I_{OUT} = 10mA	2.925	3.000	3.075	V
I_{OUT}	Output Current	V_{IN} = 5.0V	50	80		mA
ΔV_{OUT}	Load Regulation	V_{IN} = 5.0V, 1mA ≤ I_{OUT} ≤ 60mA		40	80	mV
Vdif	I/O Voltage Difference	I_{OUT} = 40mA		0.5	0.7	V
I_{SS}	Operating Current	V_{IN} = 5.0V		1.1	3.3	µA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	I_{OUT} = 10mA $\lvert V_{OUT}\rvert$ +1.0V ≤ $\lvert V_{IN}\rvert$ ≤ 10V		0.1		% /V
V_{IN}	Input Voltage				10	V
Ilim	Current Limit			240		mA
$\Delta V_{OUT}/\Delta T_A$	Temperature Coefficient	I_{OUT} = 10mA – 40°C ≤ T_A ≤ 85°C		±100		ppm/°C

ELECTRICAL CHARACTERISTICS:
TC45ER50 (V_{OUT} = 5.0V, T_A = 25°C)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	I_{OUT} = 10mA	4.875	5.000	5.125	V
I_{OUT}	Output Current	V_{IN} = 7.0V	80	120		mA
ΔV_{OUT}	Load Regulation	V_{IN} = 7.0V, 1mA ≤ I_{OUT} ≤ 80mA		40	80	mV
Vdif	I/O Voltage Difference	I_{OUT} = 60mA		0.5	0.7	V
I_{SS}	Operating Current	V_{IN} = 7.0V		1.3	3.9	µA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	I_{OUT} = 10mA $\lvert V_{OUT}\rvert$ + 1.0V ≤ $\lvert V_{IN}\rvert$ ≤ 10V		0.1		% /V
V_{IN}	Input Voltage				10	V
Ilim	Current Limit			240		mA
$\Delta V_{OUT}/\Delta T_A$	Temperature Coefficient	I_{OUT} = 10mA – 40°C ≤ T_A ≤ 85°C		±100		ppm/°C

MARKING

TO-92



①, ②, ③ & ④ represent 45ER: Fixed

⑤ represents first digit of voltage

Mark ⑤	Volt	Mark ⑤	Volt
2	2. ⑥ (V)	5	5. ⑥ (V)
3	3. ⑥ (V)	6	6. ⑥ (V)
4	4. ⑥ (V)		

⑥ represents first decimal place of voltage

Mark ⑥	Volt	Mark ⑥	Volt
0	⑤ .0 (V)	5	⑤ .5 (V)
1	⑤ .1 (V)	6	⑤ .6 (V)
2	⑤ .2 (V)	7	⑤ .7 (V)
3	⑤ .3 (V)	8	⑤ .8 (V)
4	⑤ .4 (V)	9	⑤ .9 (V)

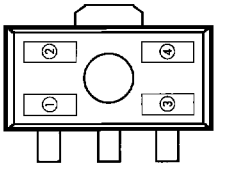
⑦ Extra Feature Code: Fixed: 0

⑧ represents regulation accuracy

Mark ⑧	Regulation Accuracy
3	±2.5% (Standard)

⑨, ⑩, ⑪ & ⑫ represent assembly lot number

SOT-89-3



① represents first decimal place of voltage

Mark ①	Volt	Mark ①	Volt
0	②. 0 (V)	5	② .5 (V)
1	②.1 (V)	6	② .6 (V)
2	②.2 (V)	7	② .7 (V)
3	②.3 (V)	8	② .8 (V)
4	②.4 (V)	9	② .9 (V)

② represents first digit of voltage

Mark ②	Volt	Mark ②	Volt
J	2. ① (V)	M	5.① (V)
K	3. ① (V)	N	6.① (V)
L	4. ① (V)		

③ & ④ represent assembly lot number

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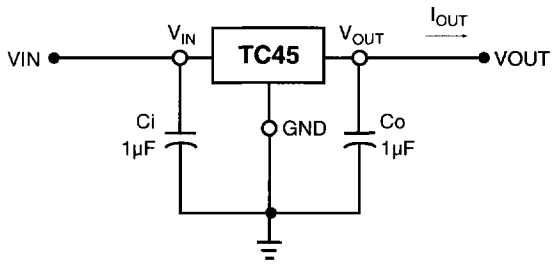
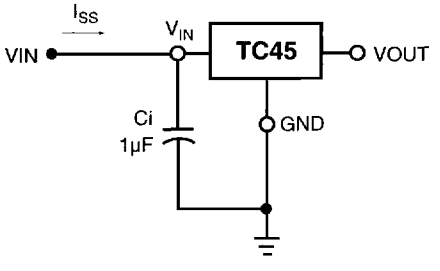
TC45 Series

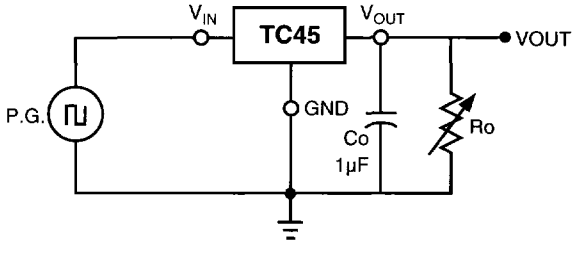
TEST CIRCUITS
TC45ER50



STATIC CHARACTERISTICS



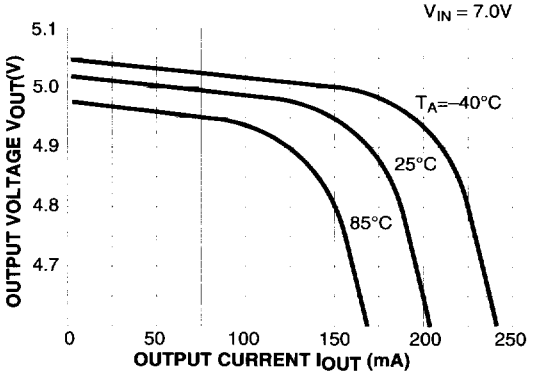
QUIESCENT CURRENT



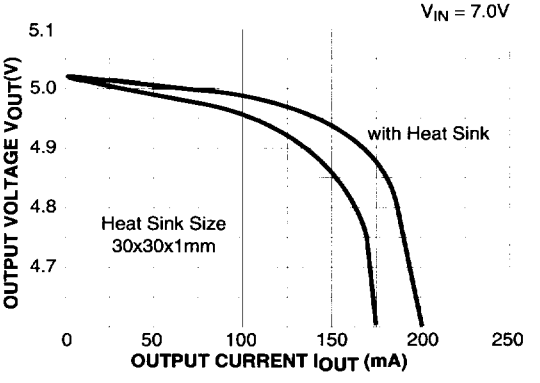
LINE TRANSIENT RESPONSE

TYPICAL CHARACTERISTICS
TC45ER50

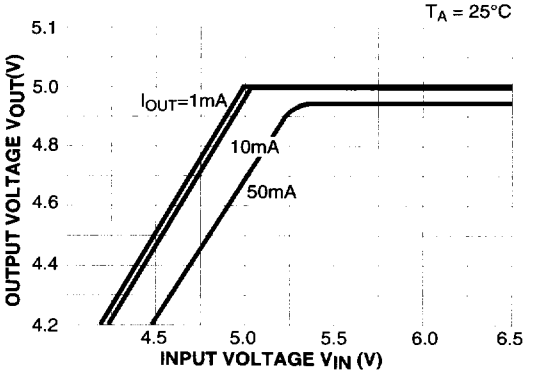
Output Voltage vs. Output Current



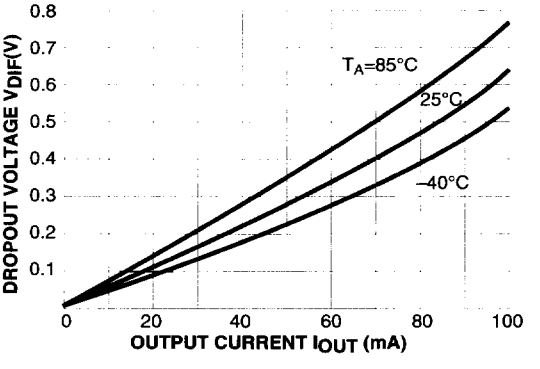
Output Voltage vs. Output Current



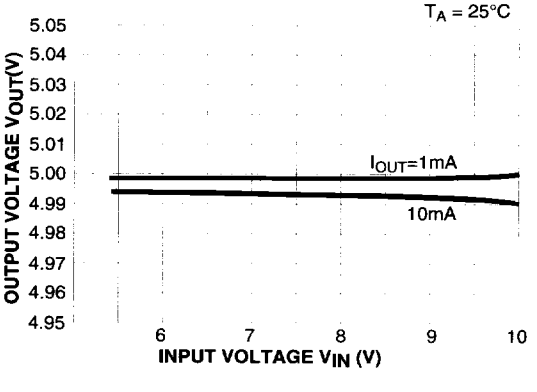
Output Voltage vs. Input Voltage



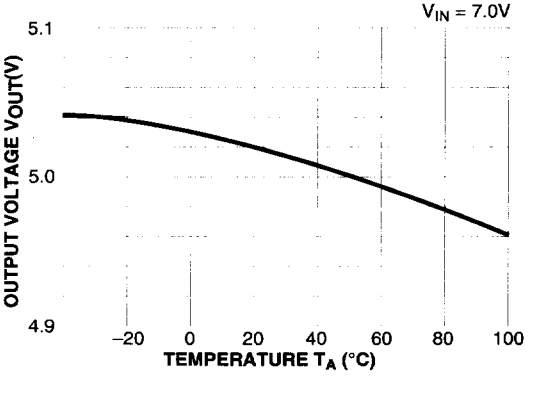
Dropout Voltage vs. Output Current



Output Voltage vs. Input Voltage



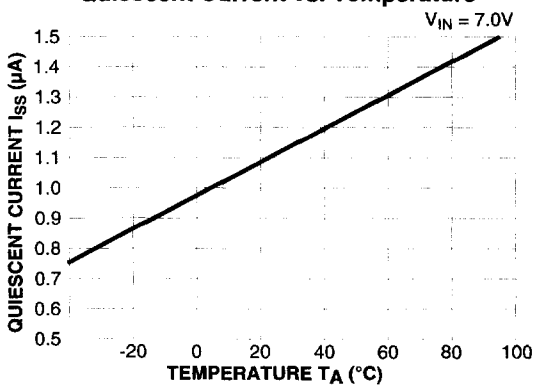
Output Voltage vs. Temperature



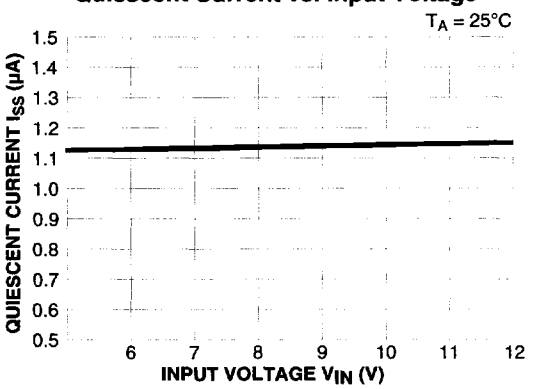
TC45 Series

TYPICAL CHARACTERISTICS
TC45ER50

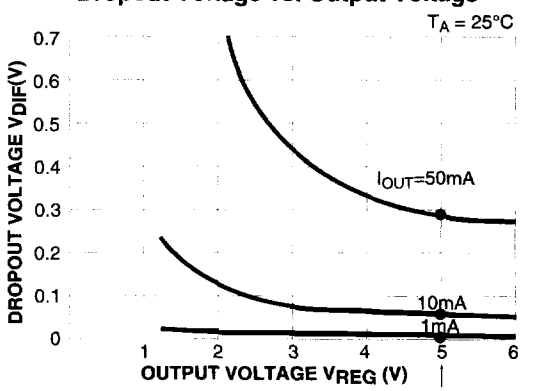
Quiescent Current vs. Temperature



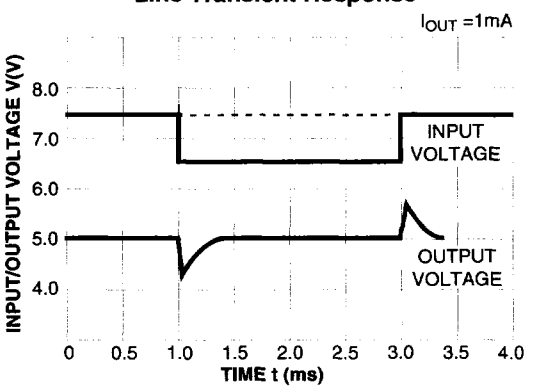
Quiescent Current vs. Input Voltage



Dropout Voltage vs. Output Voltage

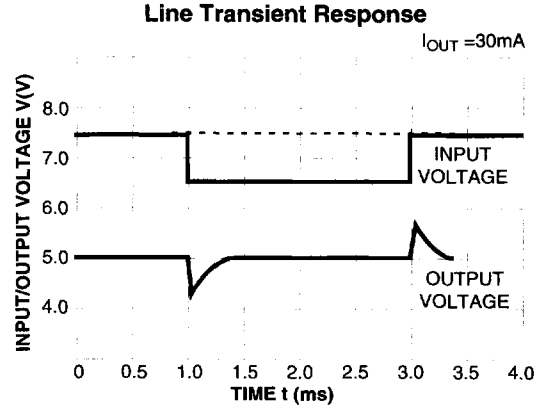


Line Transient Response

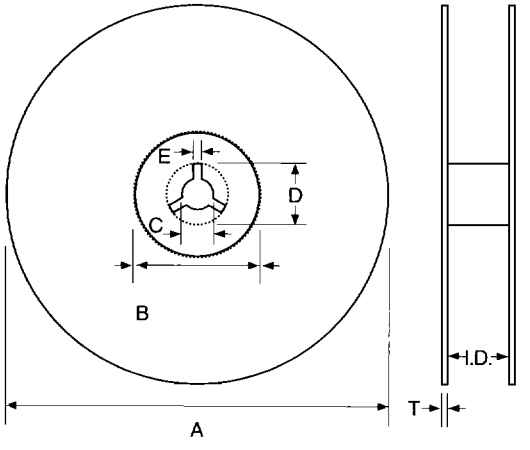


e.g., TC45ER5003EMB

Line Transient Response



TAPING REEL



	SOT-89-3	TO-92
A	178 ±2.0	360
B	80 ±1.0	80
C	13 ±0.05	30
D	21 ±0.5	45
E	2 ±0.2	2
I.D.	14.0 +1/-1.5	43
T	2.0 ±0.5	5

(unit = mm)

Reel Materials: SOT-89-3: Plastic
TO-92: Cardboard + Plastic Hub

SOT-89-3: 1,000 pcs/Reel
TO-92: 2,000 pcs/Reel

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TAPING FORM