

### FEATURES

- Very Wide Operating Voltage ( $V_{CC} = 1.8$  to  $5.5$  V)
- Very Low Supply Current
- Very Low Standby Current
- Miniature Package (SOT23L-8)
- Adjustable Voltage Gain ( $V_{G1} = 0$  to  $40$  dB)
- Active High On/Off Control

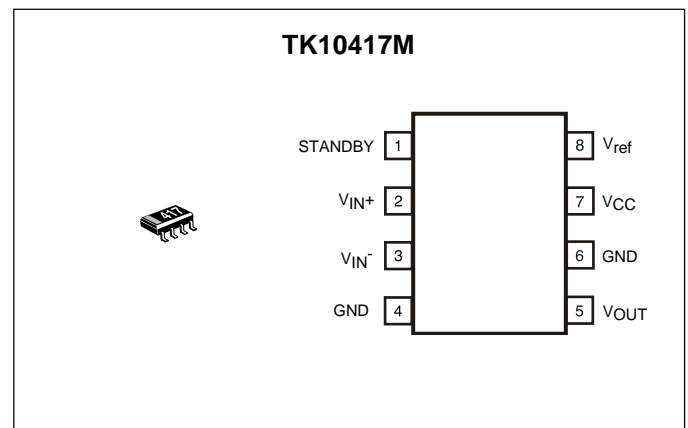
### APPLICATIONS

- Speaker Driver for Portable Equipment
- Headphone Driver
- Toys

### DESCRIPTION

The TK10417M is a very low operating voltage and current audio power amplifier. The device is in the “on” state when the standby pin is pulled to a logic high level.

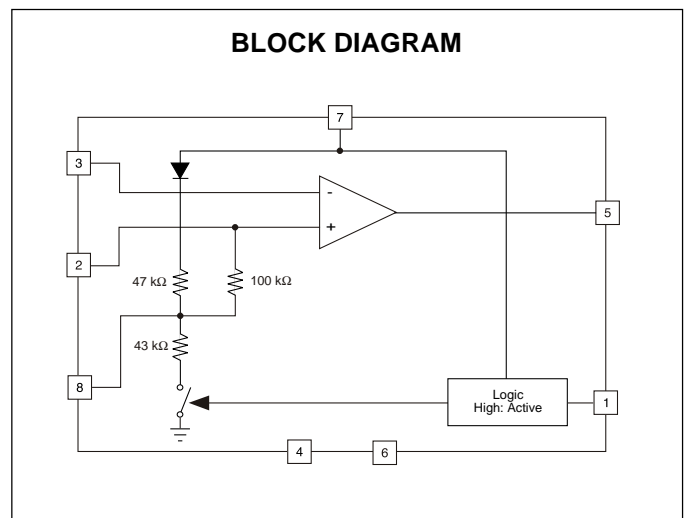
The TK10417M is available in the very small SOT23L-8 surface mount package.



**ORDERING INFORMATION**

TK10417M Tape/Reel Code

TAPE/REEL CODE  
TL: Tape Left



# TK10417

## ABSOLUTE MAXIMUM RATINGS

Supply Voltage ..... 8 V      Storage Temperature Range ..... -55 to +150 °C  
 Operating Voltage ..... 1.8 to 5.5 V      Operating Temperature Range ..... -20 to +70 °C  
 Power Dissipation (Notes 1 and 2)..... 400 mW

## TK10417 ELECTRICAL CHARACTERISTICS

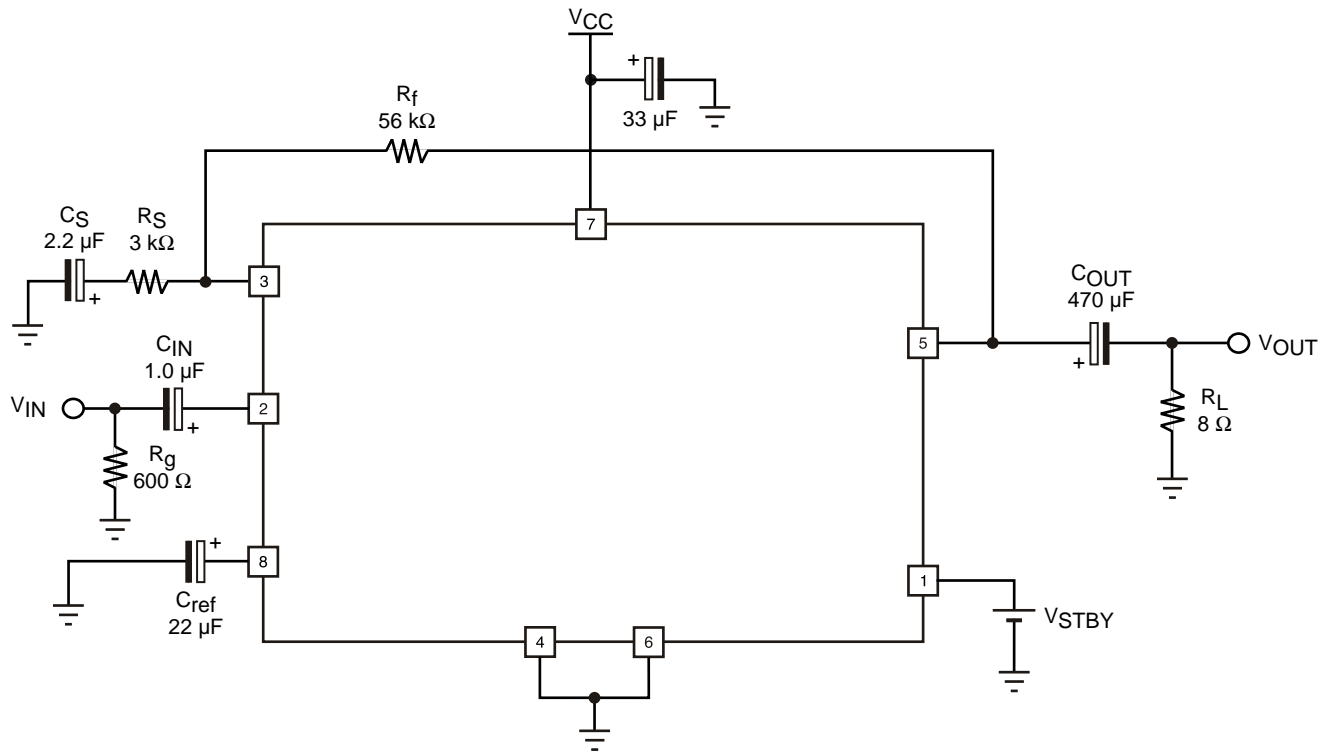
Test Conditions:  $V_{CC} = 3.6\text{ V}$ ,  $f = 1.0\text{ kHz}$ ,  $R_L = 8\ \Omega$ ,  $C_{OUT} = 470\ \mu\text{F}$ ,  $T_A = 25\ ^\circ\text{C}$ , unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
$I_{CC}$	Supply Current	$V_{CC} = 3.6\text{ V}$ , $R_L = \infty$		2.0	3.0	mA
		$V_{CC} = 5.0\text{ V}$ , $R_L = \infty$		2.1	3.2	mA
$I_{STBY}$	Standby Supply Current	Pin 1 = GND, $R_L = \infty$		0.1	1.0	$\mu\text{A}$
$I_{CONT}$	Control Terminal Current	Pin 1 = $V_{CC} = 3.6\text{ V}$ , Sink Current		42	100	$\mu\text{A}$
$V_{THL}$	Threshold Voltage (High to Low)	Pin 1, Operation to Standby	0.0		0.5	V
$V_{TLH}$	Threshold Voltage (Low to High)	Pin 1, Standby to Operation	1.8		$V_{CC}$	V
GVA	Voltage Gain		24.0	26.0	27.0	dB
THD	Total Harmonic Distortion	$V_{CC} = 3.6\text{ V}$ , $P_{OUT} = 40\text{ mW}$		0.5	1.0	%
		$V_{CC} = 5.0\text{ V}$ , $P_{OUT} = 90\text{ mW}$		0.5	1.0	%
$P_{OUT(MAX)}$	Maximum Output Power	$V_{CC} = 3.6\text{ V}$ , THD $\leq 10\%$	60	90		mW
		$V_{CC} = 5.0\text{ V}$ , THD $\leq 10\%$	140	200		mW
RR	Ripple Rejection Ratio	$C_{ref} = 22\ \mu\text{F}$ , $f = 1\text{ kHz}$		45.0		dB
$V_{OUT(NOISE)}$	Output Noise Voltage	$R_g = 600\ \Omega$ , $V_{IN} = 0\text{ V}$		100	500	$\mu\text{V}$
$V_{OUT(DC)}$	DC Voltage at Output Terminal		1.20	1.40	1.60	V

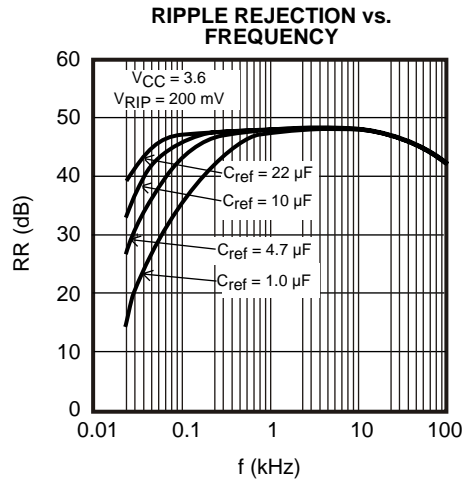
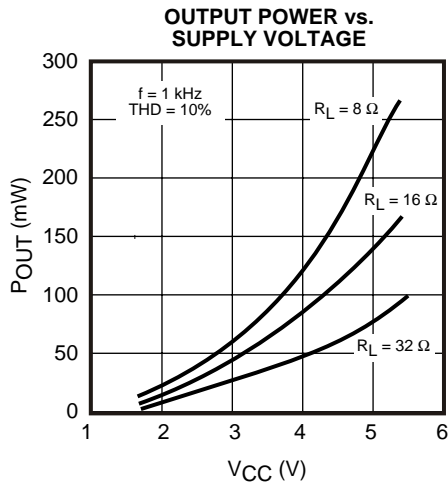
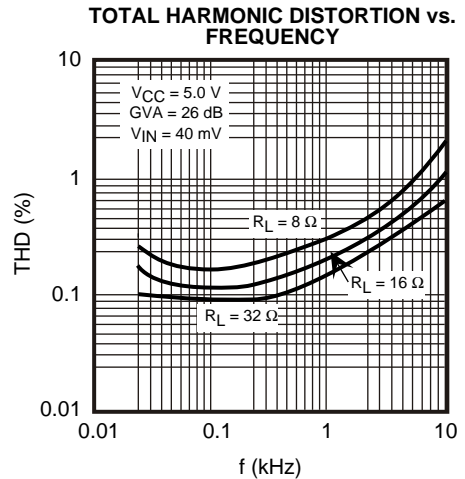
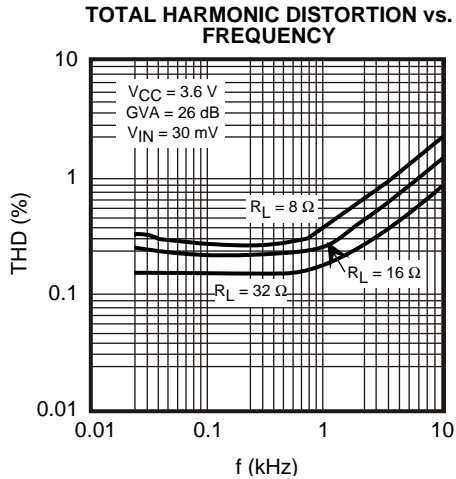
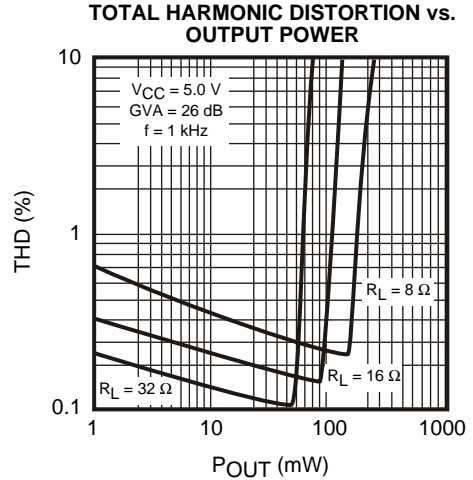
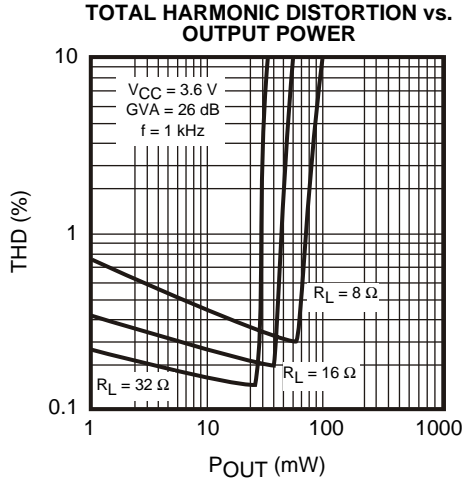
Note 1: Power dissipation is 400 mW in free air. Derate at 3.2 mW/°C for operation above 25 °C.

Note 2: Power dissipation is 600 mW when mounted. Derate at 4.8 mW/°C for operation above 25 °C. Maximum junction temperature is limited to 150 °C.

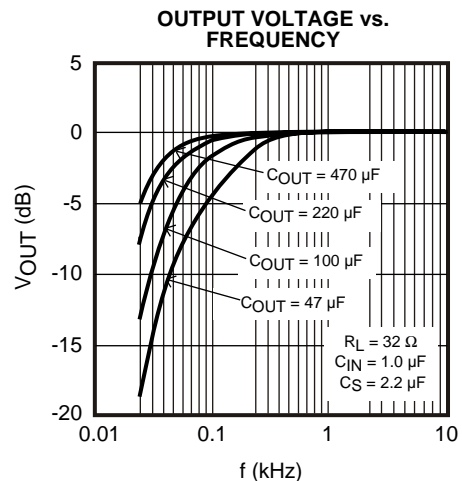
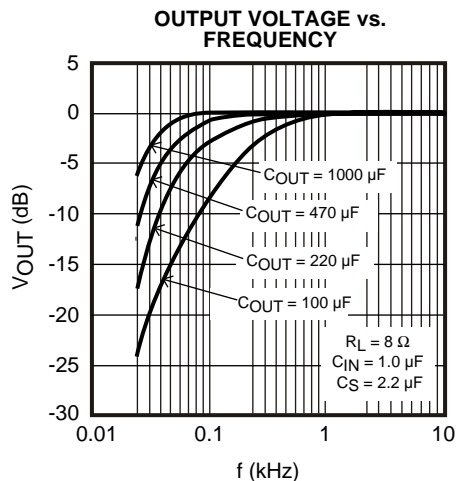
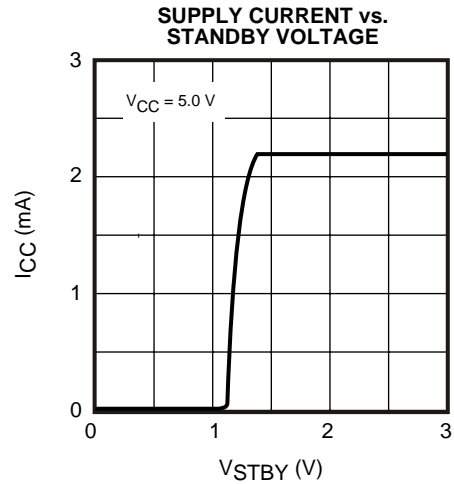
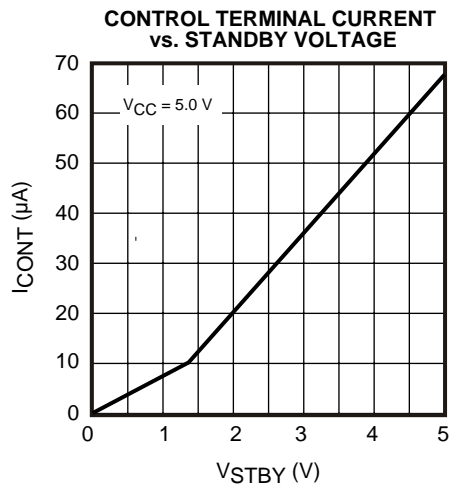
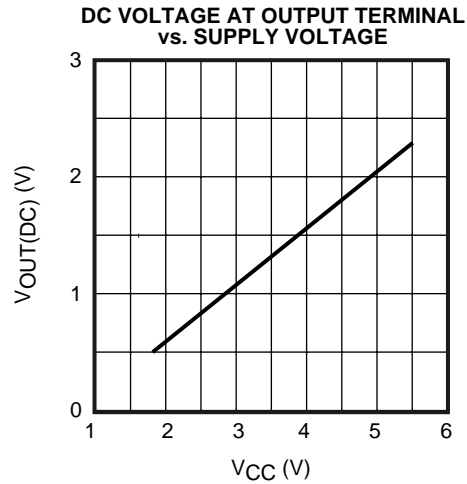
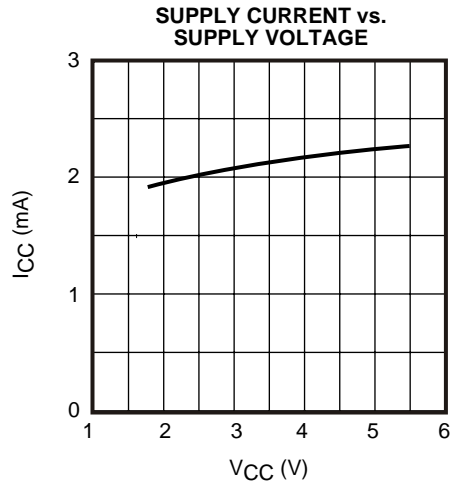
## TEST CIRCUIT



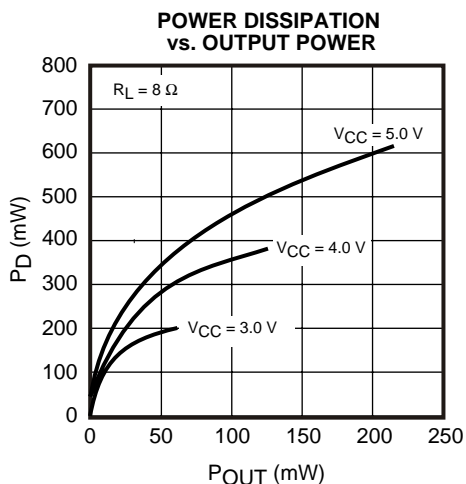
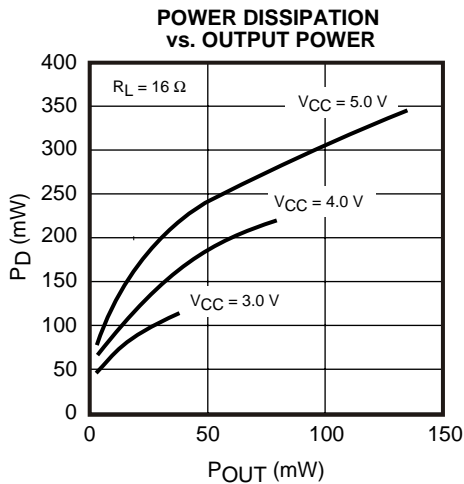
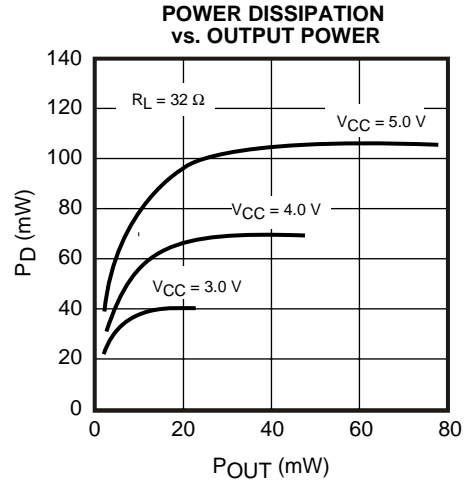
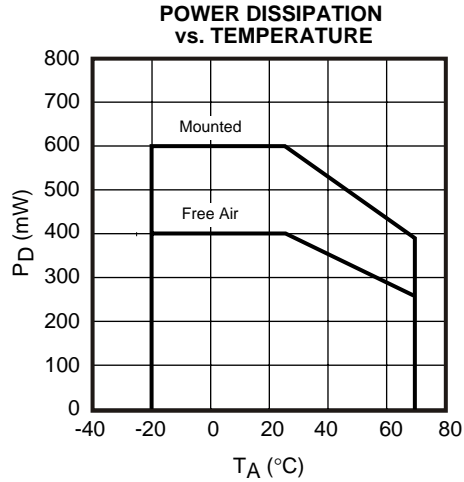
TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



PIN FUNCTION DESCRIPTION

PIN NO.	SYMBOL	TERMINAL VOLTAGE (V)	INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
1	STANDBY	$V_{CC}$		<p>Circuit is in the ON mode when Pin 1 is high.</p> <p>Circuit is in the OFF mode with supply current less than 0.1 <math>\mu</math>A when Pin 1 is low (GND level).</p>

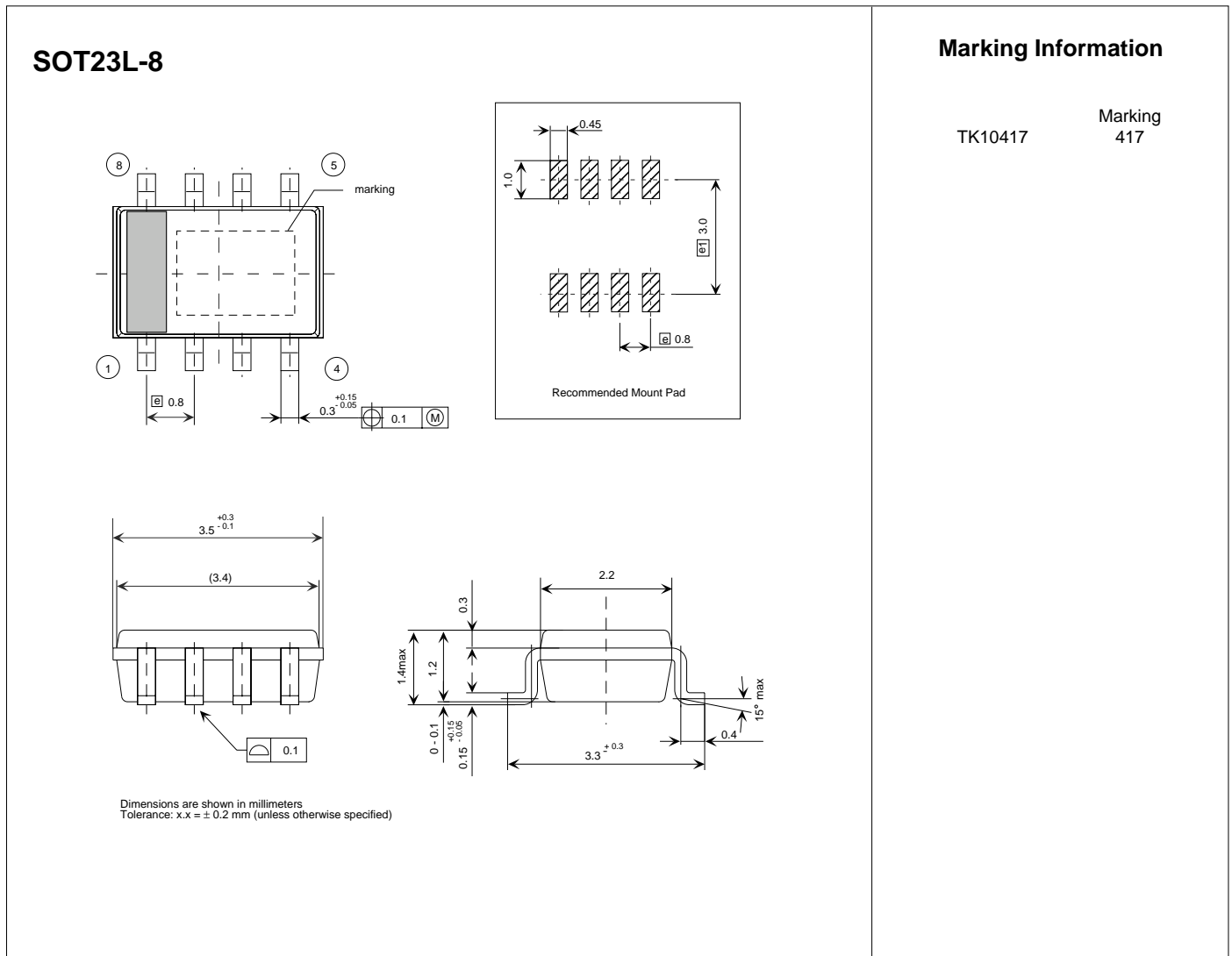
## PIN FUNCTION DESCRIPTION (CONT.)

PIN NO.	SYMBOL	TERMINAL VOLTAGE (V)	INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
2	$V_{IN+}$	$V_{OUT}$		<p>Amplifier Non-inverting Input Terminal.</p> <p>Terminal is connected via 100 kΩ to <math>V_{ref}</math>.</p>
3	$V_{IN-}$	$V_{OUT}$		Amplifier Inverting Input Terminal.
4,6	GND	0 V		GND Terminal
5	$V_{OUT}$	$V_{OUT}$		Output Terminal
7	$V_{CC}$	$V_{CC}$		Power Supply Terminal
8	$V_{ref}$	$V_{OUT}$		Reference Voltage Terminal

Note 1: Terminal voltage with no input signal is calculated by the following equation:

$$V_{OUT} = (V_{CC} - 0.56) \times \frac{43 \text{ k}}{43 \text{ k} + 47 \text{ k}}$$

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