

POWER AMPLIFIER

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

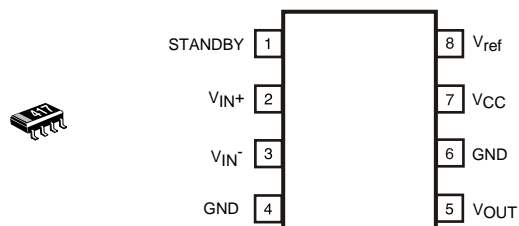
- Speaker Driver for Portable Equipment
- Headphone Driver
- Toys

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.

TK10417M



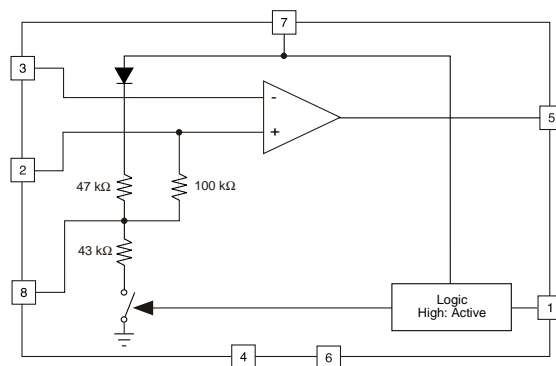
ORDERING INFORMATION

TK10417M □□

Tape/Reel Code

TAPE/REEL CODE
TL: Tape Left

BLOCK DIAGRAM



TK10417

ABSOLUTE MAXIMUM RATINGS

Supply Voltage 8 V
Operating Voltage 1.8 to 5.5 V
Power Dissipation (Notes 1 and 2) 400 mW

Storage Temperature Range -55 to +150 °C
Operating Temperature Range -20 to +70 °C

TK10417 ELECTRICAL CHARACTERISTICS

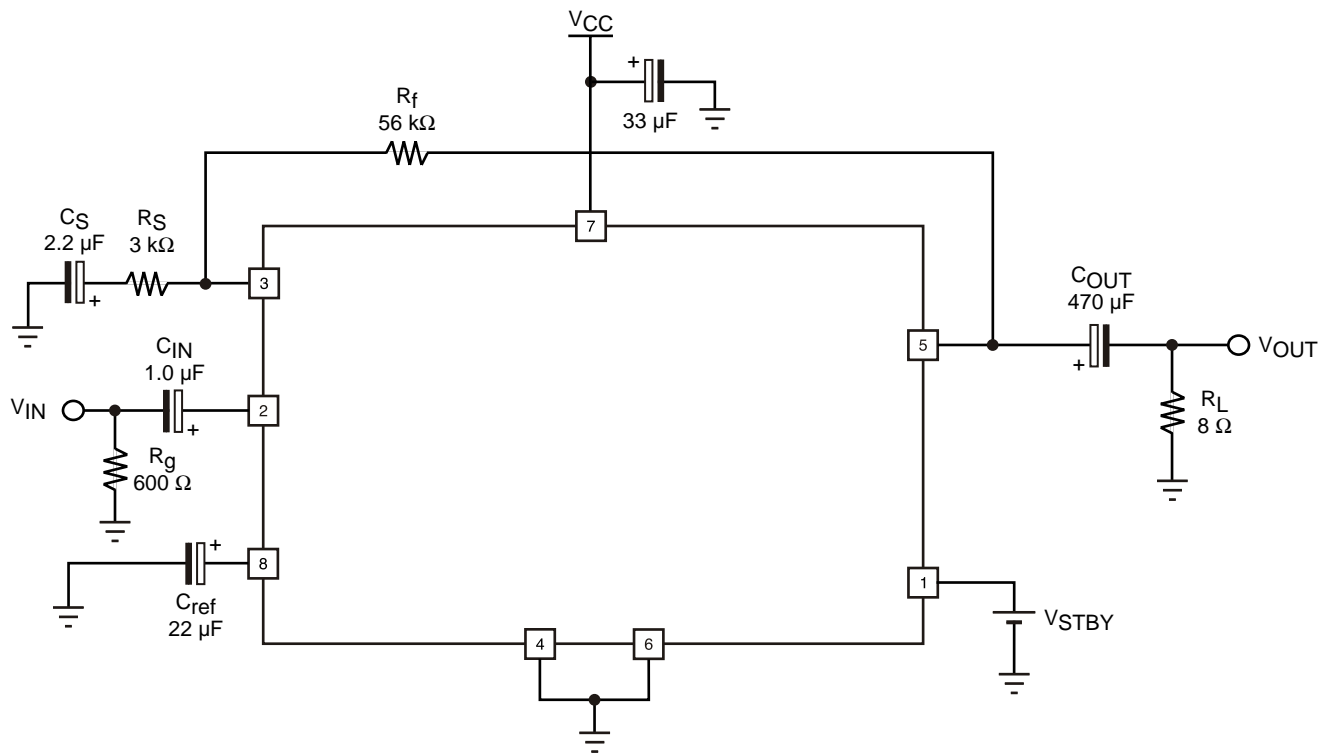
Test Conditions: $V_{CC} = 3.6\text{ V}$, $f = 1.0\text{ kHz}$, $R_L = 8\ \Omega$, $C_{OUT} = 470\ \mu\text{F}$, $T_A = 25\text{ °C}$, unless otherwise specified.

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	μA
I_{CONT}	Control Terminal Current	Pin 1 = $V_{CC} = 3.6\text{ V}$, Sink Current		42	100	μA
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	μV
$V_{OUT(DC)}$	DC Voltage at Output Terminal		1.20	1.40	1.60	V

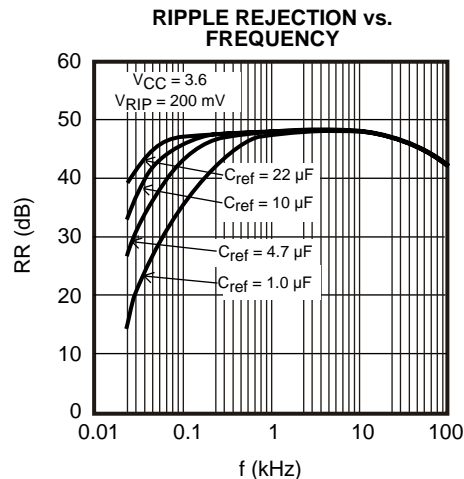
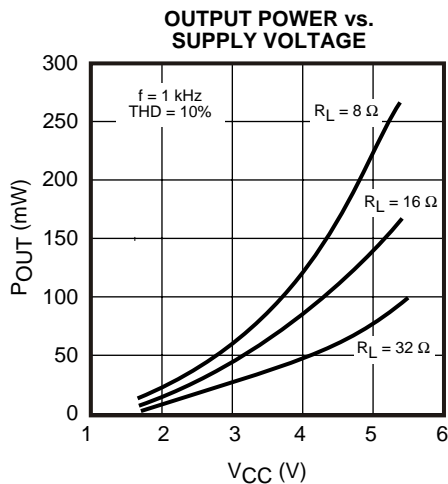
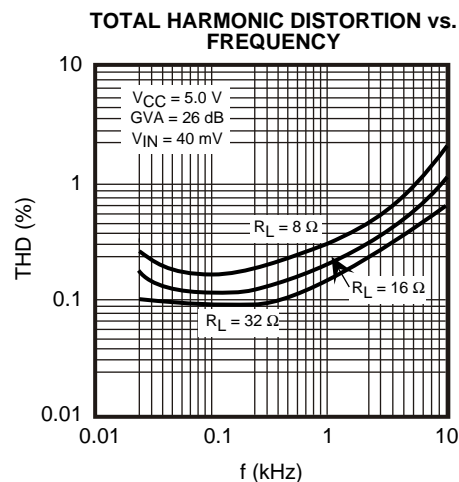
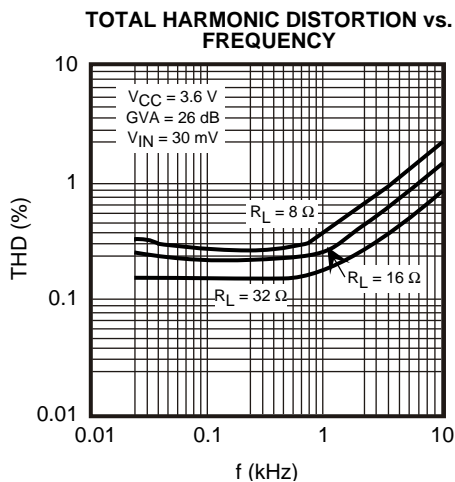
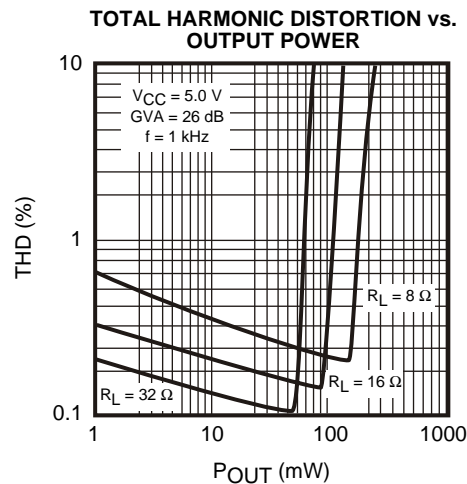
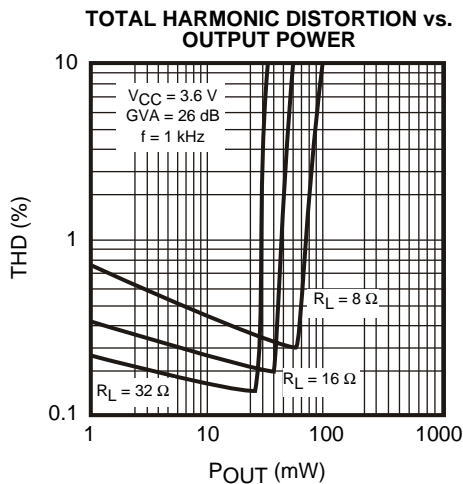
Note 1: Power dissipation is 400 mW in free air. Derate at 3.2 mW/°C for operation above 25 °C.

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.

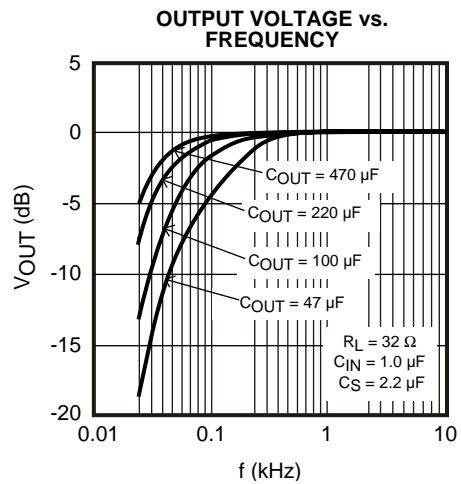
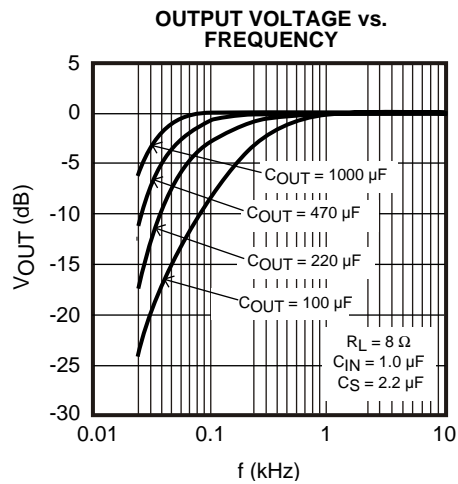
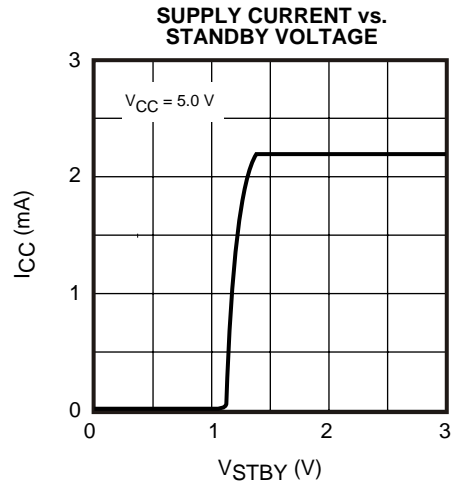
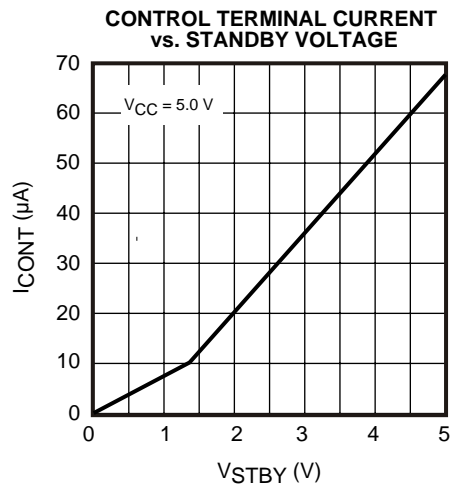
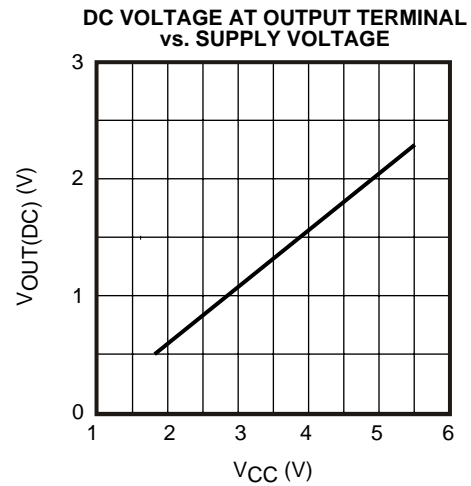
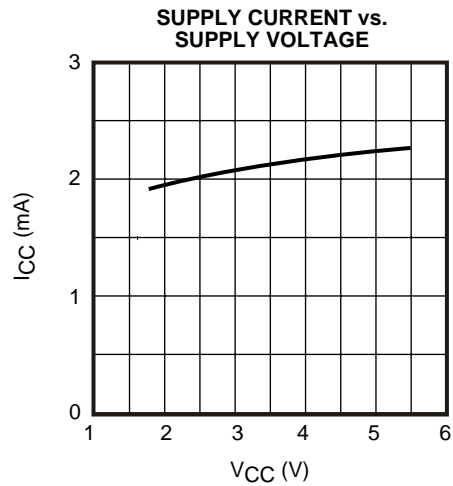
TEST CIRCUIT



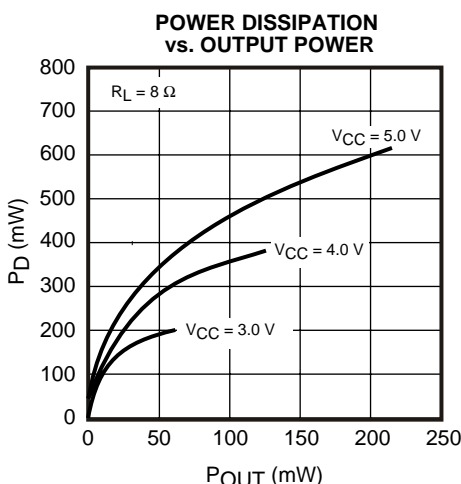
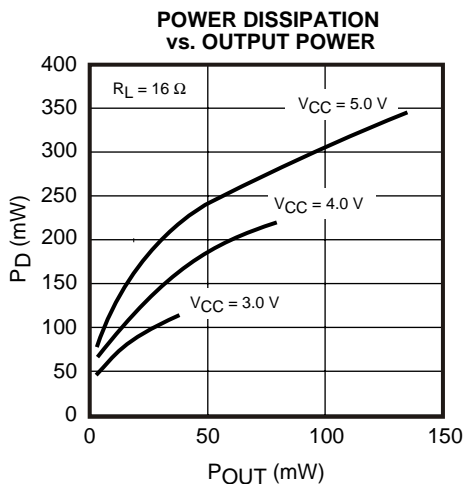
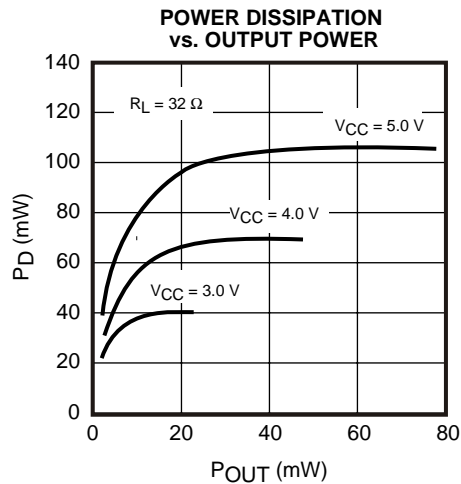
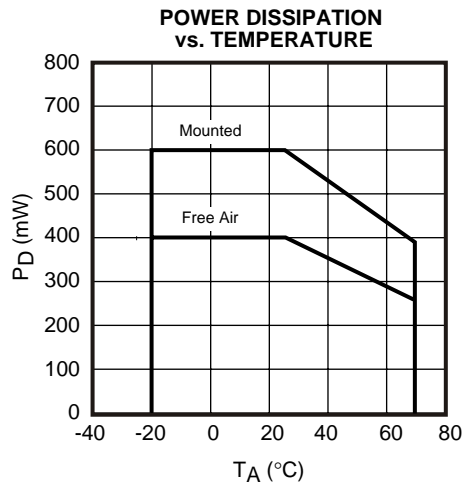
TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



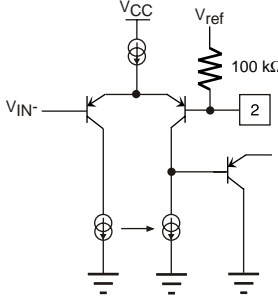
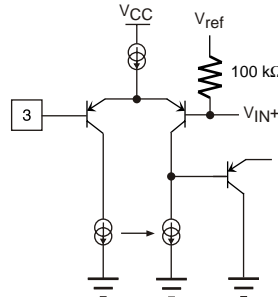
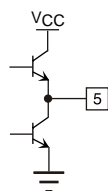
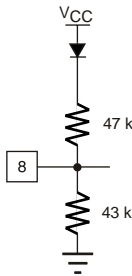
TYPICAL PERFORMANCE CHARACTERISTICS (CONT.)



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 μA when Pin 1 is low (GND level).</p>

PIN FUNCTION DESCRIPTION (CONT.)

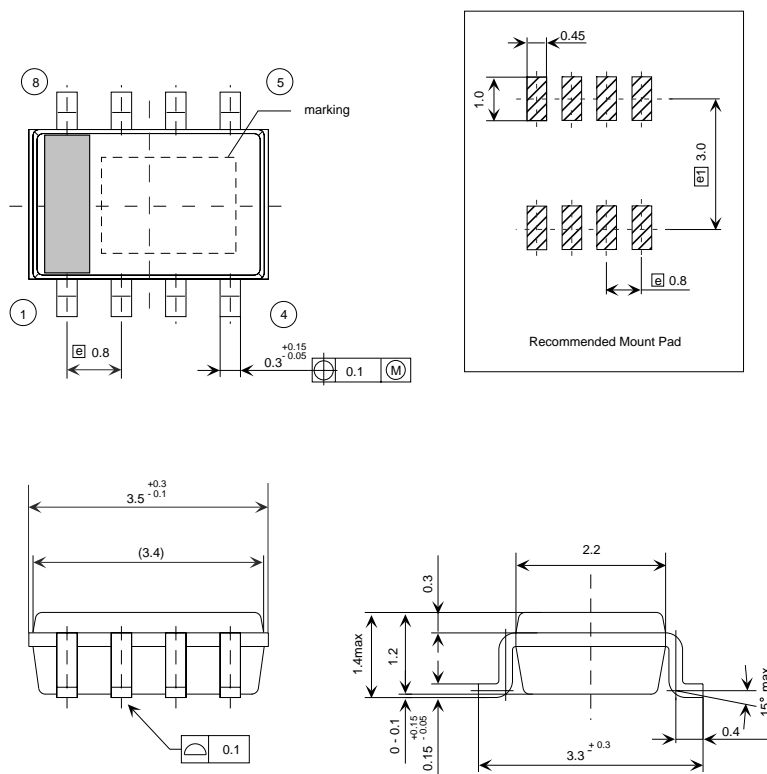
PIN NO.	SYMBOL	TERMINAL VOLTAGE (V)	INTERNAL EQUIVALENT CIRCUIT	DESCRIPTION
2	V_{IN+}	V_{OUT}		<p>Amplifier Non-inverting Input Terminal.</p> <p>Terminal is connected via 100 kΩ to V_{ref}.</p>
3	V_{IN-}	V_{OUT}		Amplifier Inverting Input Terminal.
4,6	GND	0 V		GND Terminal
5	V_{OUT}	V_{OUT}		Output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

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

PACKAGE OUTLINE

SOT23L-8



Dimensions are shown in millimeters
Tolerance: x.x = ± 0.2 mm (unless otherwise specified)

Marking Information

TK10417

Marking
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