700MHz Slew Enhanced VFA

The EL5104, EL5105, EL5204, EL5205, and EL5304 represent high-speed voltage feedback amplifiers based on the current feedback amplifier architecture. This gives the typical high slew rate benefits of a CFA family along with the stability and ease of use associated with the VFA type architecture. This family is available in single, dual, and triple versions, with 200MHz, 400MHz, and 700MHz versions. These are all available in single, dual and triple versions. This family operates on single 5V or ±5V supplies from minimum supply current. The EL5104 and EL5204 also feature an output enable function, which can be used to put the output in to a high-impedance mode. This enables the outputs of multiple amplifiers to be tied together for use in multiplexing applications.

Features

- Specified for 5V or ±5V applications
- Power-down to 17µA
- -3dB bandwidth = 700MHz
- ±0.1dB bandwidth = 45MHz
- Low supply current = 9.5mA
- Slew rate = 3000V/µs
- Low offset voltage = 10mV max
- Output current = 160mA
- A_{VOL} = 1400
- Diff gain/phase = 0.01%/0.02°C
- Pb-free available (RoHS compliant)

Applications

- Video amplifiers
- PCMCIA applications
- A/D drivers
- Line drivers
- Portable computers
- High speed communications
- RGB applications
- Broadcast equipment
- Active filtering

Ordering Information

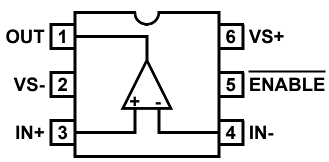
PART NUMBER	PACKAGE	TAPE & REEL	PKG. DWG. #
EL5104IS	8-Pin SO	-	MDP0027
EL5104IS-T7	8-Pin SO	7”	MDP0027
EL5104IS-T13	8-Pin SO	13”	MDP0027
EL5104IW-T7	6-Pin SOT-23	7” (3K pcs)	MDP0038
EL5104IW-T7A	6-Pin SOT-23	7” (250 pcs)	MDP0038
EL5105IC-T7	5-Pin SC-70	7” (3K pcs)	P5.049
EL5105IC-T7A	5-Pin SC-70	7” (250 pcs)	P5.049
EL5105IW-T7	5-Pin SOT-23	7” (3K pcs)	MDP0038
EL5105IW-T7A	5-Pin SOT-23	7” (250 pcs)	MDP0038
EL5204IY	10-Pin MSOP	-	MDP0043
EL5204IY-T7	10-Pin MSOP	7”	MDP0043
EL5204IY-T13	10-Pin MSOP	13”	MDP0043

PART NUMBER	PACKAGE	TAPE & REEL	PKG. DWG. #
EL5205IS	8-Pin SO	-	MDP0027
EL5205IS-T7	8-Pin SO	7”	MDP0027
EL5205IS-T13	8-Pin SO	13”	MDP0027
EL5205IY	8-Pin MSOP	-	MDP0043
EL5205IY-T7	8-Pin MSOP	7”	MDP0043
EL5205IY-T13	8-Pin MSOP	13”	MDP0043
EL5304IU	16-Pin QSOP	-	MDP0040
EL5304IU-T7	16-Pin QSOP	7”	MDP0040
EL5304IU-T13	16-Pin QSOP	13”	MDP0040
EL5304IUZ (See Note)	16-Pin QSOP (Pb-Free)	-	MDP0040
EL5304IUZ-T7 (See Note)	16-Pin QSOP (Pb-Free)	7”	MDP0040
EL5304IUZ-T13 (See Note)	16-Pin QSOP (Pb-Free)	13”	MDP0040

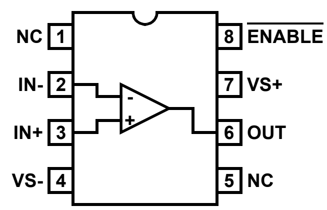
NOTE: Intersil Pb-free products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020C.

Pinouts

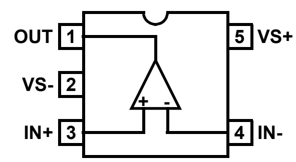
EL5104
(6-PIN SOT-23)
TOP VIEW



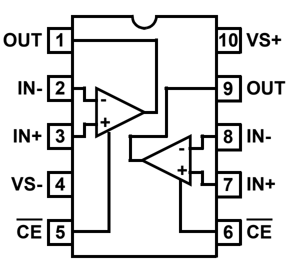
EL5104
(8-PIN SO)
TOP VIEW



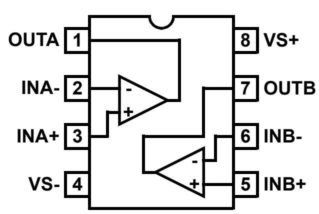
EL5105
(5-PIN SOT-23, SC-70)
TOP VIEW



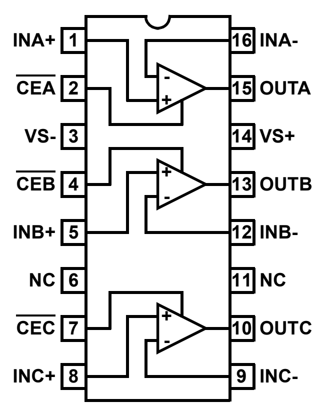
EL5204
(10-PIN MSOP)
TOP VIEW



EL5205
(8-PIN SO, MSOP)
TOP VIEW



EL5304
(16-PIN QSOP)
TOP VIEW



Absolute Maximum Ratings (T_A = 25°C)

Supply Voltage between V_S+ and GND 13.2V
Input Voltage . . . .±V_S
Differential Input Voltage . . . .±4V
Maximum Output Current. 80mA

Storage Temperature Range . . . .-65°C to +150°C
Ambient Operating Temperature Range . . . .-40°C to +85°C
Operating Junction Temperature . . . . 150°C

CAUTION: Stresses above those listed in “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typical values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore: $T_J = T_C = T_A$

DC Electrical Specifications

V_S = ±5V, GND = 0V, T_A = 25°C, V_{CM} = 0V, V_{OUT} = 0V, V_{ENABLE} = GND or OPEN, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITIONS	MIN	TYP	MAX	UNIT
V_{OS}	Offset Voltage	EL5104, EL5105, EL5204, EL5205	-10	3	10	mV
		EL5304	-18	5	18	mV
TCV_{OS}	Offset Voltage Temperature Coefficient	Measured from T_{MIN} to T_{MAX}		10		µV/°C
IB	Input Bias Current	V_{IN} = 0V		8	30	µA
I_{OS}	Input Offset Current	V_{IN} = 0V		4	15	µA
TCI_{OS}	Input Bias Current Temperature Coefficient	Measured from T_{MIN} to T_{MAX}		50		nA/°C
PSRR	Power Supply Rejection Ratio		60	70		dB
CMRR	Common Mode Rejection Ratio	V_{CM} from -3V to +3V	56	62		dB
CMIR	Common Mode Input Range	Guaranteed by CMRR test	-3		+3	V
R_{IN}	Input Resistance	Common mode	50	120		KΩ
C_{IN}	Input Capacitance	SO package		1		pF
$I_{S,ON}$	Supply Current - Enabled	Per amplifier	8.5	9.5	11	mA
$I_{S,OFF}$	Supply Current - Shut Down	V_S+, per amplifier	+1	0	+25	µA
		V_S-, per amplifier	-25	17	-1	µA
PSOR	Power Supply Operating Range		4		13.2	V
AVOL	Open Loop Gain	R_L = 1kΩ to GND	55	65		dB
		R_L = 150Ω to GND		60		dB
V_{OP}	Positive Output Voltage Swing	R_L = 150Ω to 0V	3.6	3.8		V
V_{ON}	Negative Output Voltage Swing	R_L = 150Ω to 0V		-3.8	-3.6	V
I_{OUT}	Output Current	R_L = 10Ω to 0V	±90	±160		mA
V_{IH-EN}	ENABLE Pin Voltage for Power Up		(V_S+) -5		(V_S+) -3	V
V_{IL-EN}	ENABLE Pin Voltage for Shut Down		(V_S+) -1		V_S+	V

Closed Loop AC Electrical Specifications V_S = +5V, GND = 0V, T_A = 25°C, V_{CM} = +1.5V, V_{OUT} = +1.5V, V_{CLAMP} = +5V, V_{ENABLE} = +5V, A_V = +1, R_F = 0Ω, R_L = 150Ω to GND pin, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITIONS	MIN	TYP	MAX	UNIT
BW	-3dB Bandwidth (V_{OUT} = 200mV_{P-P})	V_S = ±5V, A_V = 1, R_F = 0Ω		700		MHz
SR	Slew Rate	R_L = 100Ω, V_{OUT} = -3V to +3V	2000	3000	5000	V/µs
t_R,t_F	Rise Time, Fall Time	±0.1V step		0.4		ns
OS	Overshoot	±0.1V step		10		%
t_{PD}	Propagation Delay	±0.1V step		0.4		ns
t_S	0.1% Settling Time	V_S = ±5V, R_L = 500Ω, A_V = 1, V_{OUT} = ±2.5V		7		ns
dG	Differential Gain	A_V = 2, R_L = 150Ω, V_{INDC} = -1 to +1V		0.01		%
dP	Differential Phase	A_V = 2, R_L = 150Ω, V_{INDC} = -1 to +1V		0.02		°
e_N	Input Noise Voltage	f = 10kHz		10		nV/√Hz
i_N	Input Noise Current	f = 10kHz		54		pA/√Hz
t_{DIS}	Disable Time			180		ns
t_{EN}	Enable Time			650		ns
I_{EN}	Enable Pin Current	Enabled, V_{EN} = 0V	-1		1	µA
		Disabled, V_{EN} = 5V	1		25	µA

Typical Performance Curves

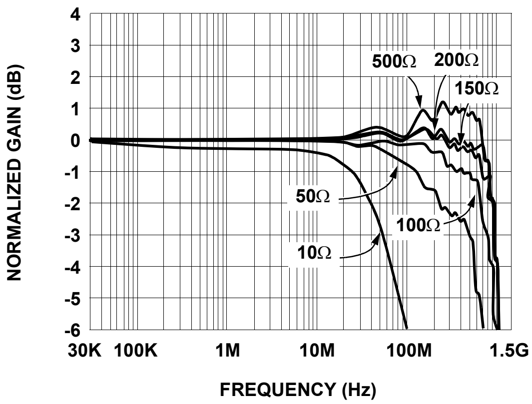


FIGURE 1. GAIN vs FREQUENCY FOR VARIOUS R_L

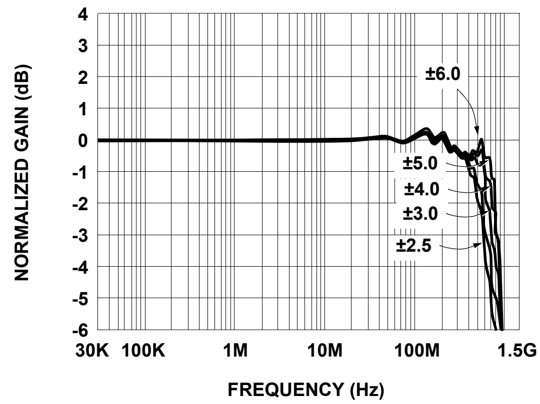


FIGURE 2. GAIN vs FREQUENCY FOR VARIOUS SUPPLY VOLTAGE

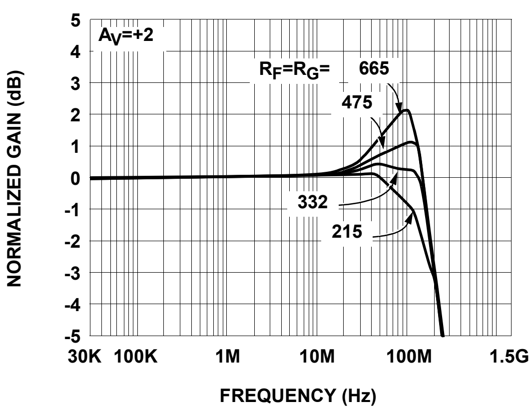


FIGURE 3. GAIN vs FREQUENCY FOR VARIOUS R_F/R_G

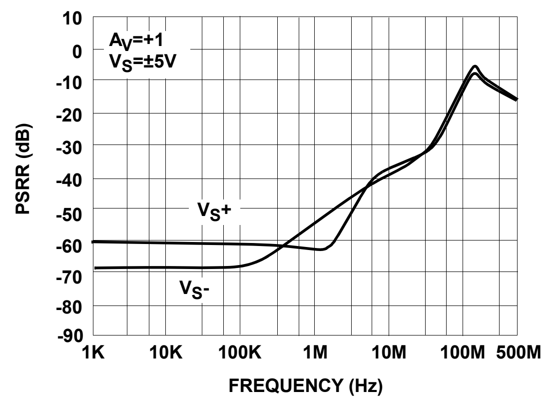


FIGURE 4. PSRR vs FREQUENCY

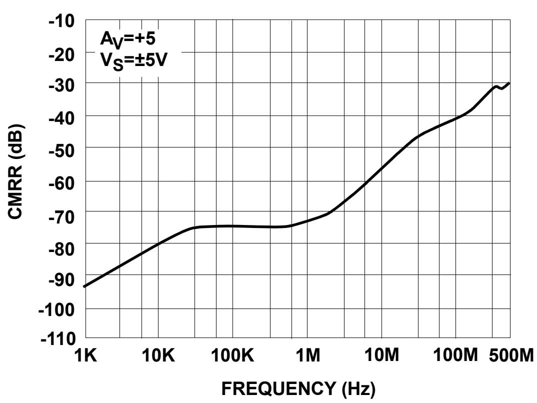


FIGURE 5. CMRR vs FREQUENCY

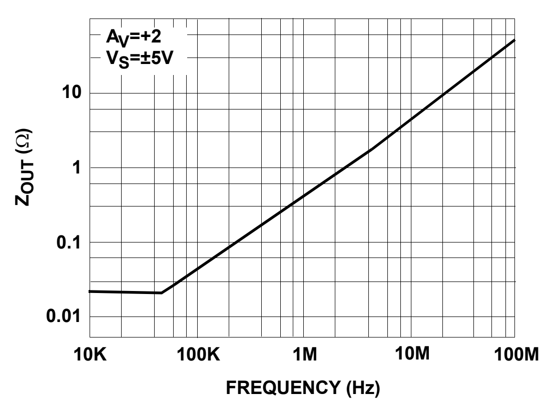


FIGURE 6. Z_{OUT} vs FREQUENCY

Typical Performance Curves (Continued)

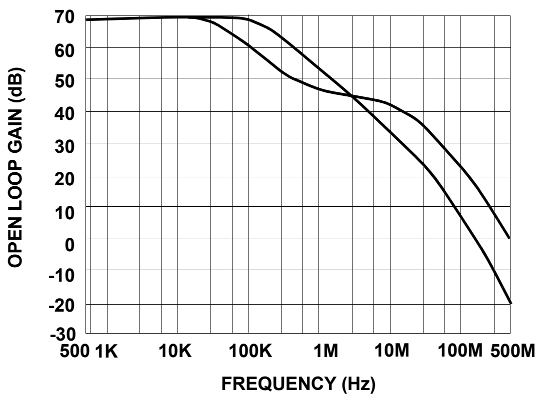


FIGURE 7. OPEN LOOP GAIN AND PHASE vs FREQUENCY

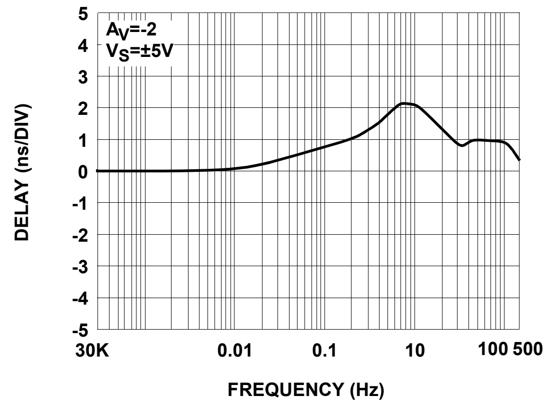


FIGURE 8. GROUP DELAY

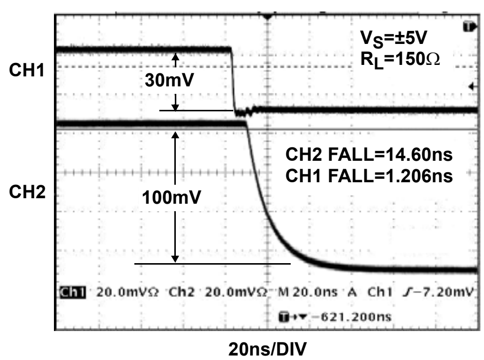


FIGURE 9. SMALL SIGNAL RESPONSE FALLING EDGE

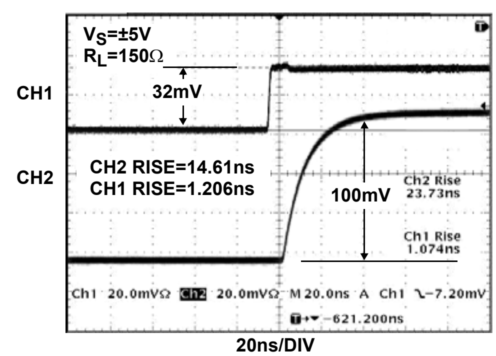


FIGURE 10. SMALL SIGNAL RESPONSE RISING EDGE

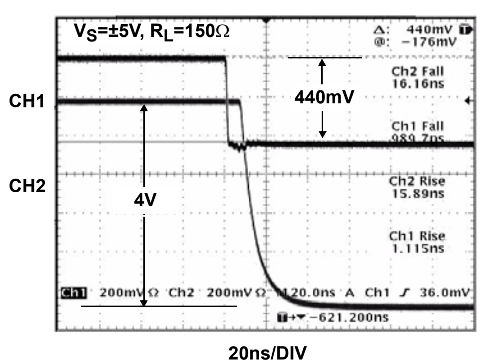


FIGURE 11. LARGE SIGNAL RESPONSE FALLING EDGE

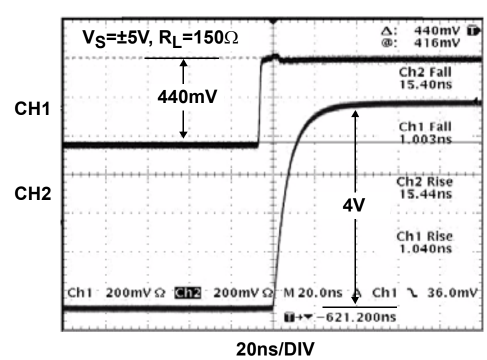


FIGURE 12. LARGE SIGNAL RESPONSE RISING EDGE

Typical Performance Curves (Continued)

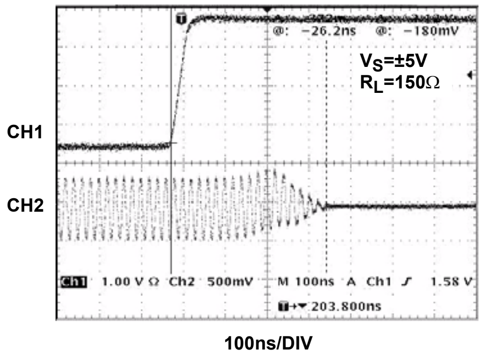


FIGURE 13. TURN-OFF TIME

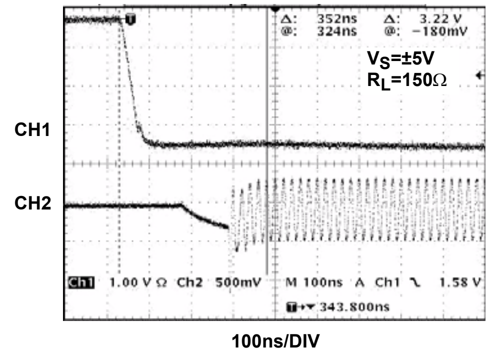


FIGURE 14. TURN-ON TIME

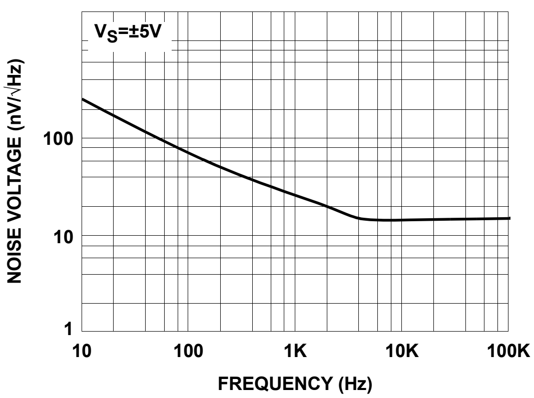


FIGURE 15. EQUIVALENT NOISE VOLTAGE vs FREQUENCY

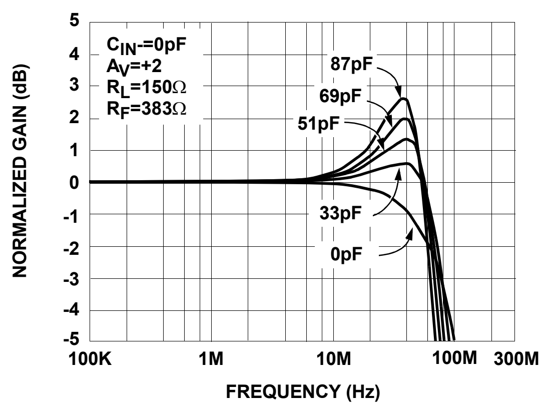


FIGURE 16. FREQUENCY vs GAIN FOR VARIOUS C_L

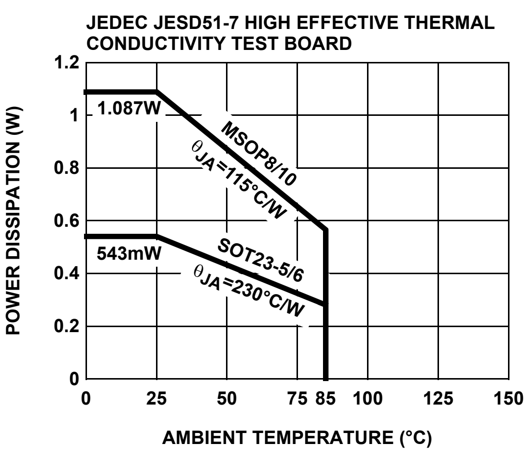


FIGURE 17. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

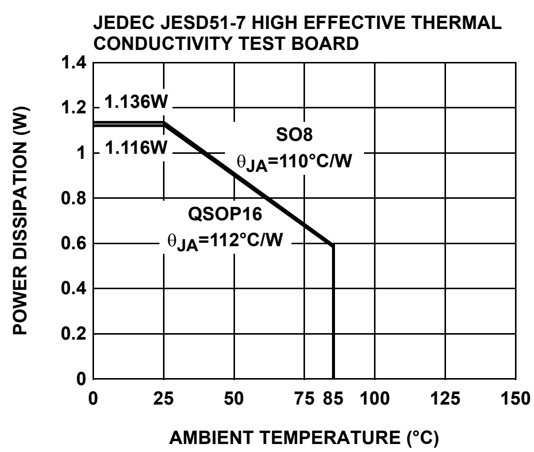


FIGURE 18. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

Typical Performance Curves (Continued)

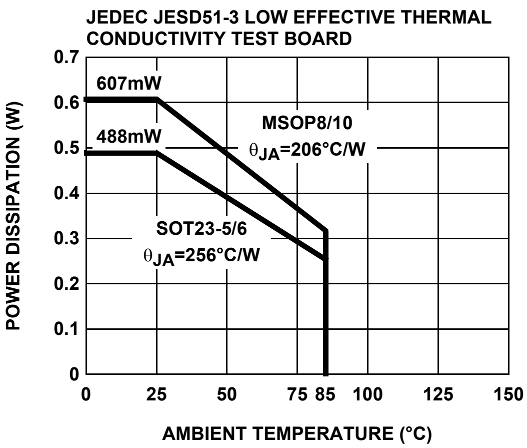


FIGURE 19. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

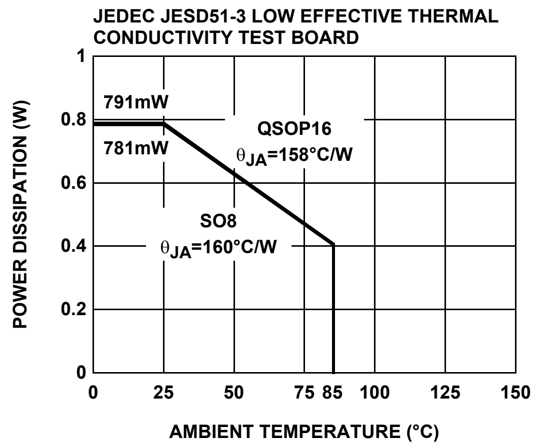


FIGURE 20. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE