TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

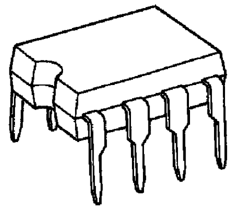
TA75458P, TA75458F

DUAL OPERATIONAL AMPLIFIER

FEATURES

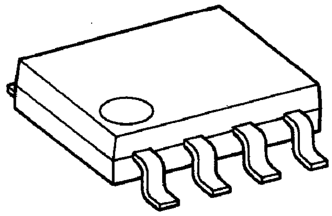
- Pair of Internally Compensated High Performance Amplifier
- No Frequency Compensation Required
- No Latch-up
- Short Circuit Protection
- Side Common Mode and Differential Voltage Range
- Low Power Consumption

TA75458P



DIP8-P-300-2.54A

TA75458F

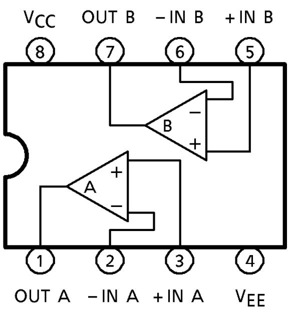


SOP8-P-225-1.27

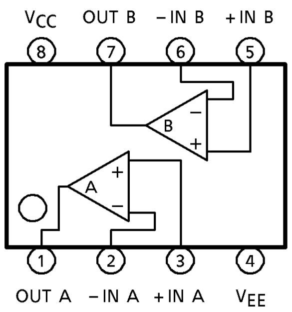
Weight
DIP8-P-300-2.54A : 0.5g (Typ.)
SOP8-P-225-1.27 : 0.1g (Typ.)

PIN CONNECTION (TOP VIEW)

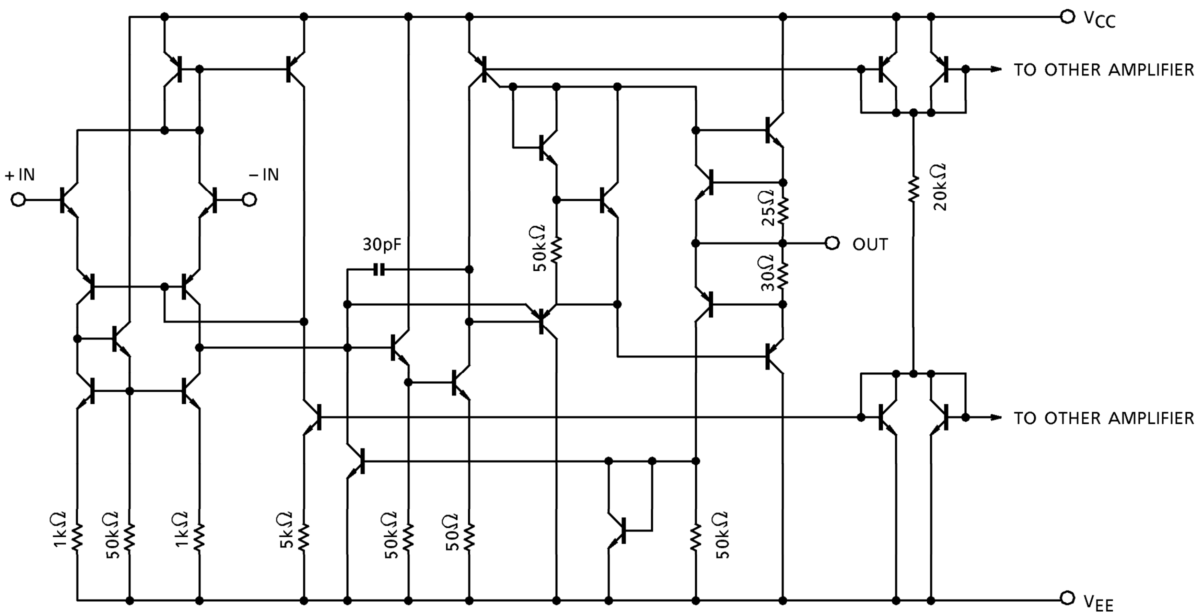
TA75458P



TA75458F



EQUIVALENT CIRCUIT



MAXIMUM RATINGS ($Ta = 25°C$)

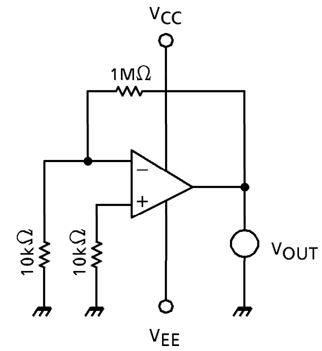
CHARACTERISTIC	SYMBOL	TA75458P	TA75458F	UNIT
Supply Voltage	V_{CC}, V_{EE}	+18, −18	+18, −18	V
Differential Input Voltage	DV_{IN}	±30	±30	V
Input Voltage	V_{IN}	V_{CC}~V_{EE}	V_{CC}~V_{EE}	V
Power Dissipation	P_D	500	240	mW
Operating Temperature	T_{opr}	−40~85	−30~75	°C
Ambient Temperature	T_{stg}	−55~125	−55~125	°C

ELECTRICAL CHARACTERISTICS ($V_{CC} = 15V$, $V_{EE} = -15V$, $Ta = 25°C$)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Offset Voltage		V_{IO}	1	$R_g \leqq 10k\Omega$	—	1	5	mV
Input Offset Current		I_{IO}	2		—	20	200	nA
Input Bias Current		I_I	2		—	80	500	nA
Common Mode Input Voltage		CMV_{IN}	3		±12	±13	—	V
Maximum Output Voltage		V_{OM}	4	$R_L = 10k\Omega$	±12	±14	—	V
		V_{OMR}	4	$R_L = 2k\Omega$	±10	±13	—	
Source Current		I_{source}	4		—	20	—	mA
Sink Current		I_{sink}	4		—	20	—	mA
Differential Input Impedance	Parallel Input Resistance	Z_{Di}	—	f = 20Hz Open Loop	0.3	1.0	—	MΩ
	Parallel Input Capacitance	C_i	—		—	6.0	—	pF
Output Impedance		Z_o	—	f = 20Hz	—	75	—	Ω
Voltage Gain (Open Loop)		G_V	7	$V_{OUT} = \pm 10V$, $R_L = 2k\Omega$	86	100	—	dB
Common Mode Input Signal Rejection Ratio		CMRR	3	f = 100Hz	70	90	—	dB
Supply Voltage Rejection Ratio		SVRR	1	$R_g \leqq 10k\Omega$	—	30	150	μV / V
Power Bandwidth		f_W	—	$G_V = 1$, $R_L = 2k\Omega$ $V_{OUT} = 20V_{p-p}$	—	14	—	kHz
Slew Rate		SR	6	$G_V = 1$, $R_L = 2k\Omega$	—	0.8	—	V / μs
Unity Gain Cross Frequency		f_T	7	Open Loop	—	1.1	—	MHz
Power Dissipation		P_D	5	$V_O = 0V$	—	70	170	mW
Input Offset Voltage Drift		$\Delta V_{IO} / \Delta T$	1	$R_g \leqq 10k\Omega$, $Ta = -30$~$75°C$	—	—	50	μV / °C
Supply Current		I_{CC}, I_{EE}	5		—	2.3	5.6	mA

TEST CIRCUIT

(1) V_{IO}, $\Delta V_{IO} / \Delta T$, SVRR



$V_{IO} = V_{OUT} / 100$ (V)

$\Delta V_{IO} / \Delta T = \{V_{IO}\ (25°C) - V_{IO}\ (-30°C)\} / 55$ (V / °C)

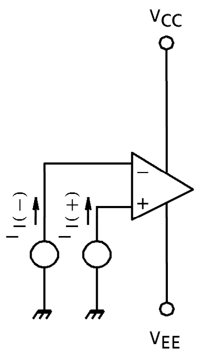
$\Delta V_{IO} / \Delta T = \{V_{IO}\ (75°C) - V_{IO}\ (25°C)\} / 50$ (V / °C)

SVRR = $(V_{IO1} - V_{IO2}) / 5$ (μV / V)

V_{IO1} : V_{CC}, AT $V_{EE} = \pm 17.5$V

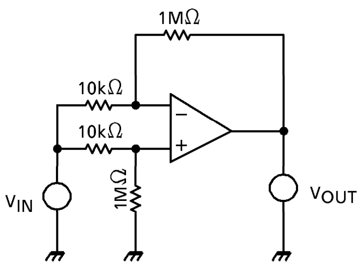
V_{IO2} : V_{CC}, At $V_{EE} = \pm 12.5$V

(2) I_I, I_{IO}



$I_{IO} = |I_{I(+)} - I_{I(-)}|$

(3) CMV_{IN}, CMRR

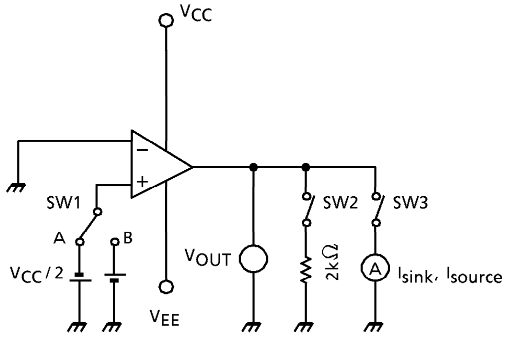


CMV_{IN} : $V_{OUT} = \pm 1$V (DC)
V_{IN} = MEASURE

CMRR : RATIO OF G_{diff} vs G_{CM}

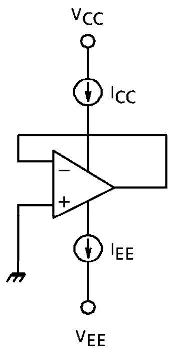
$$CMRR = 20\ell og \frac{G_{diff}}{G_{CM}} \text{ (dB)}$$

(4) V_{OM}, V_{OMR}, I_{sink}, I_{source}



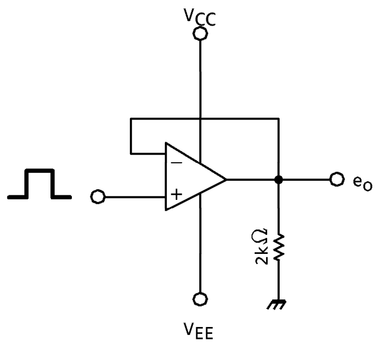
$V_{OM}(+)$	:	SW1 IS SIDE B, SW2 OFF, SW3 OFF
$V_{OM}(-)$	:	SW1 IS SIDE A, SW2 OFF, SW3 OFF
$V_{OMR}(+)$	:	SW1 IS SIDE B, SW2 ON, SW3 OFF
$V_{OMR}(-)$	:	SW1 IS SIDE A, SW2 ON, SW3 OFF
I_{sink}	:	SW1 IS SIDE A, SW2 OFF, SW3 ON
I_{source}	:	SW1 IS SIDE B, SW2 OFF, SW3 ON

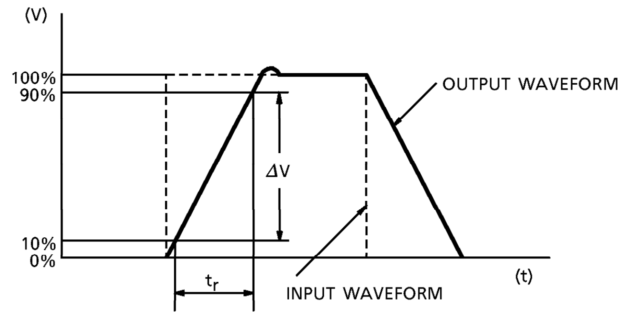
(5) I_{CC}, I_{EE}, P_D



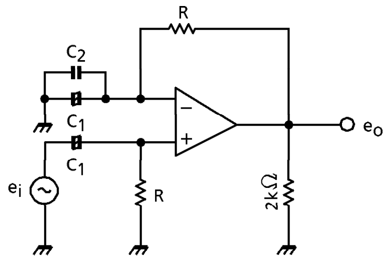
$$P_D = V_{CC} \cdot I_{CC} + V_{EE} \cdot I_{EE}\ (W)$$

(6) SR





(7) G_V, f_T



G_V

$R \gg 1 / WC_1$

C_1 : COUPLING CONDENSER

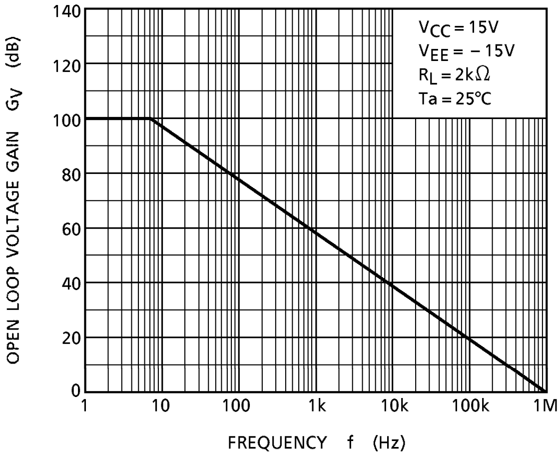
C_2 : HIGH FREQUENCY BYPASS CONDENSER 0.1μF

$G_V = 20\ell og\ e_o / e_i$ (dB)

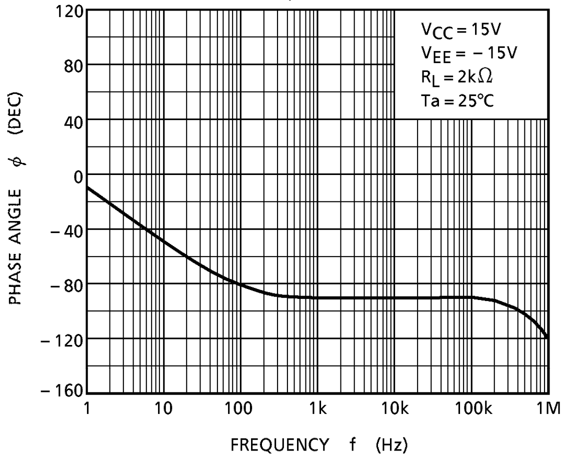
f_T INPUT FREQUENCY AT $e_i = e_o$

CHARACTERISTICS

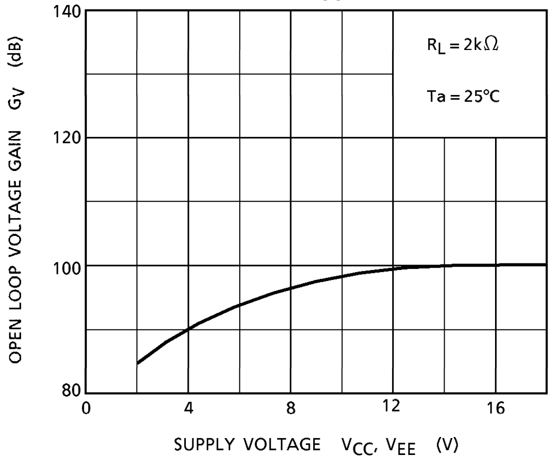
G_V – f



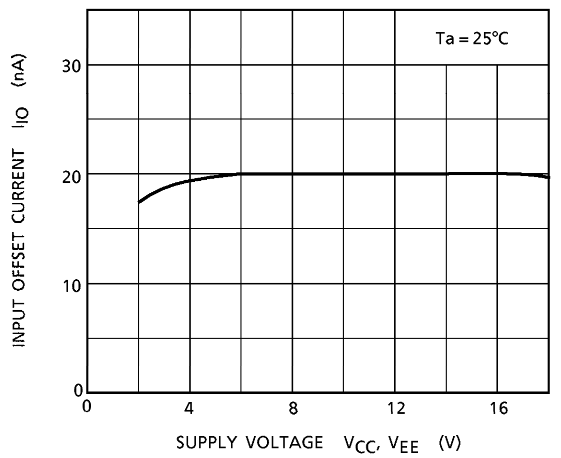
φ – f



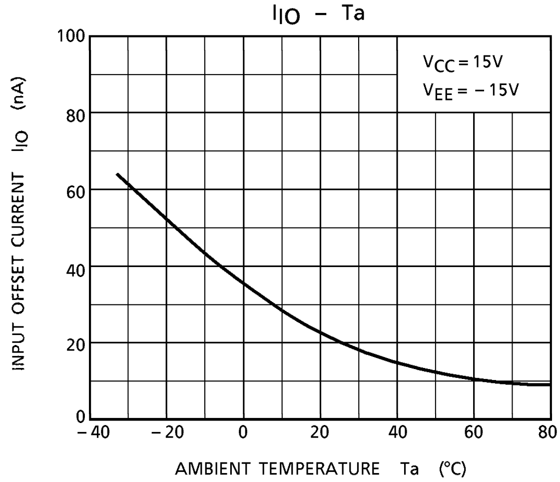
G_V – V_{CC}, V_{EE}



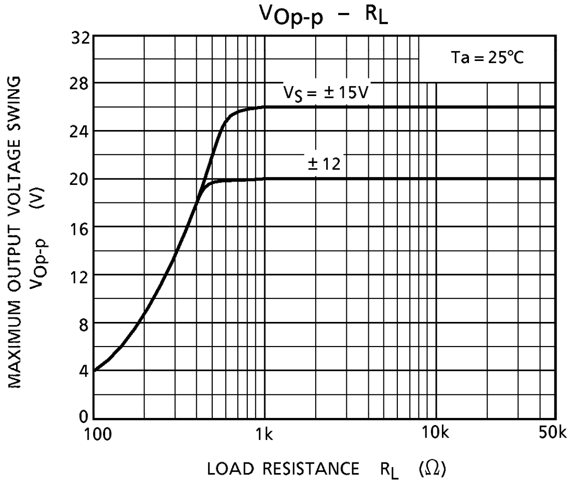
I_{IO} – V_{CC}, V_{EE}

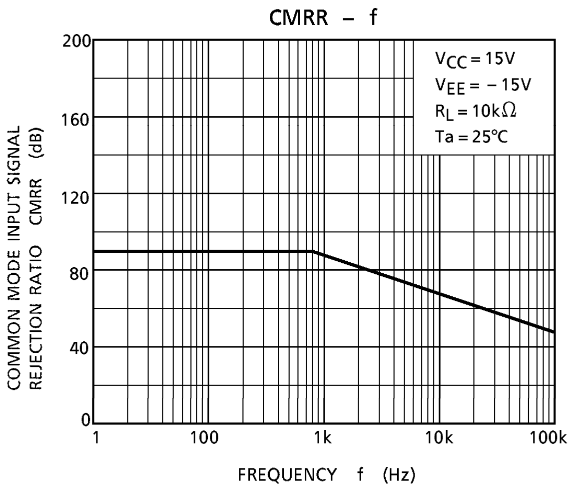


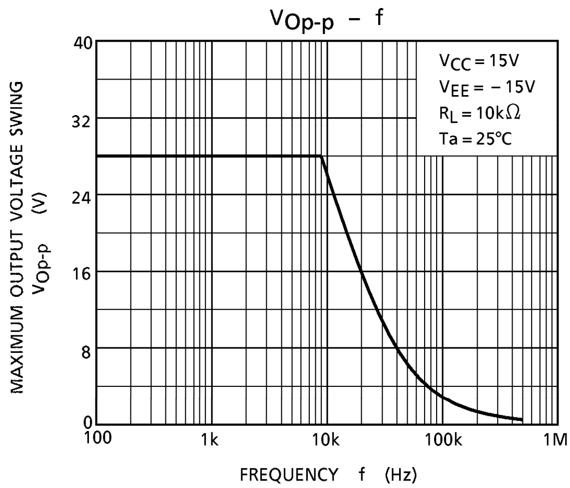
I_{IO} – Ta

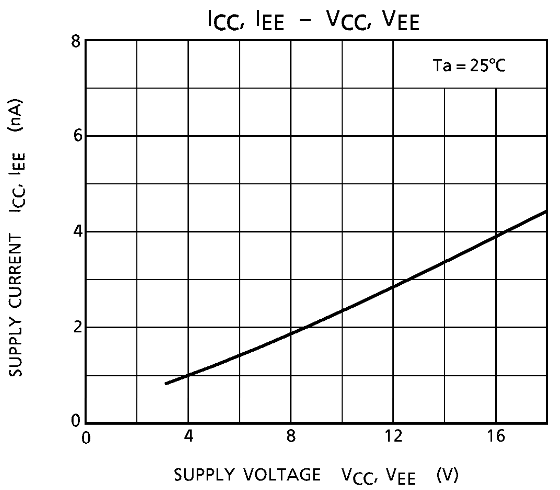


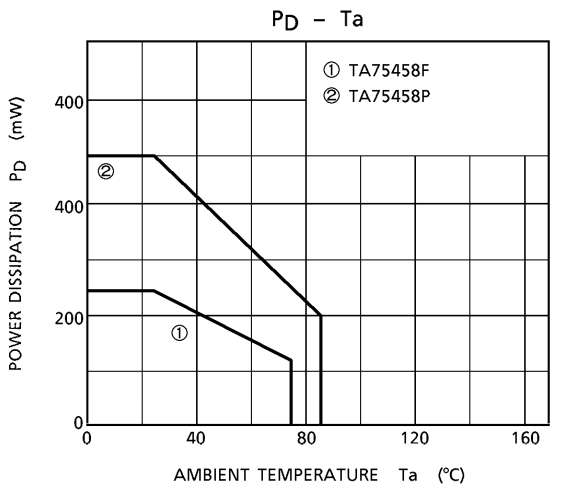
$V_{Op\text{-}p}$ – R_L



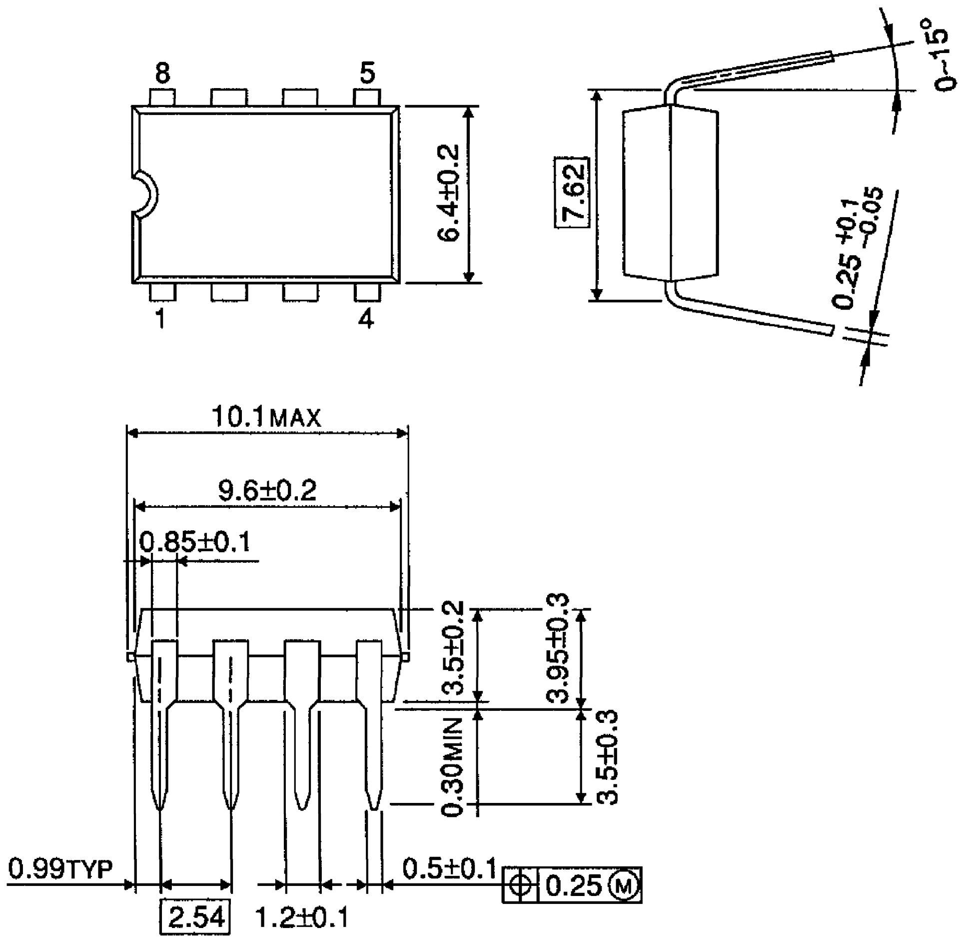

CMRR – f
VCC = 15V
VEE = – 15V
RL = 10kΩ
Ta = 25°C
COMMON MODE INPUT SIGNAL REJECTION RATIO CMRR (dB)
FREQUENCY f (Hz)
200
160
120
80
40
0
1
100
1k
10k
100k


VOp-p – f
VCC = 15V
VEE = – 15V
RL = 10kΩ
Ta = 25°C
MAXIMUM OUTPUT VOLTAGE SWING VOp-p (V)
FREQUENCY f (Hz)
40
32
24
16
8
0
100
1k
10k
100k
1M


ICC, IEE – VCC, VEE
Ta = 25°C
SUPPLY CURRENT ICC, IEE (nA)
SUPPLY VOLTAGE VCC, VEE (V)
8
6
4
2
0
0
4
8
12
16


PD – Ta
① TA75458F
② TA75458P
②
①
POWER DISSIPATION PD (mW)
AMBIENT TEMPERATURE Ta (°C)
400
400
200
0
0
40
80
120
160

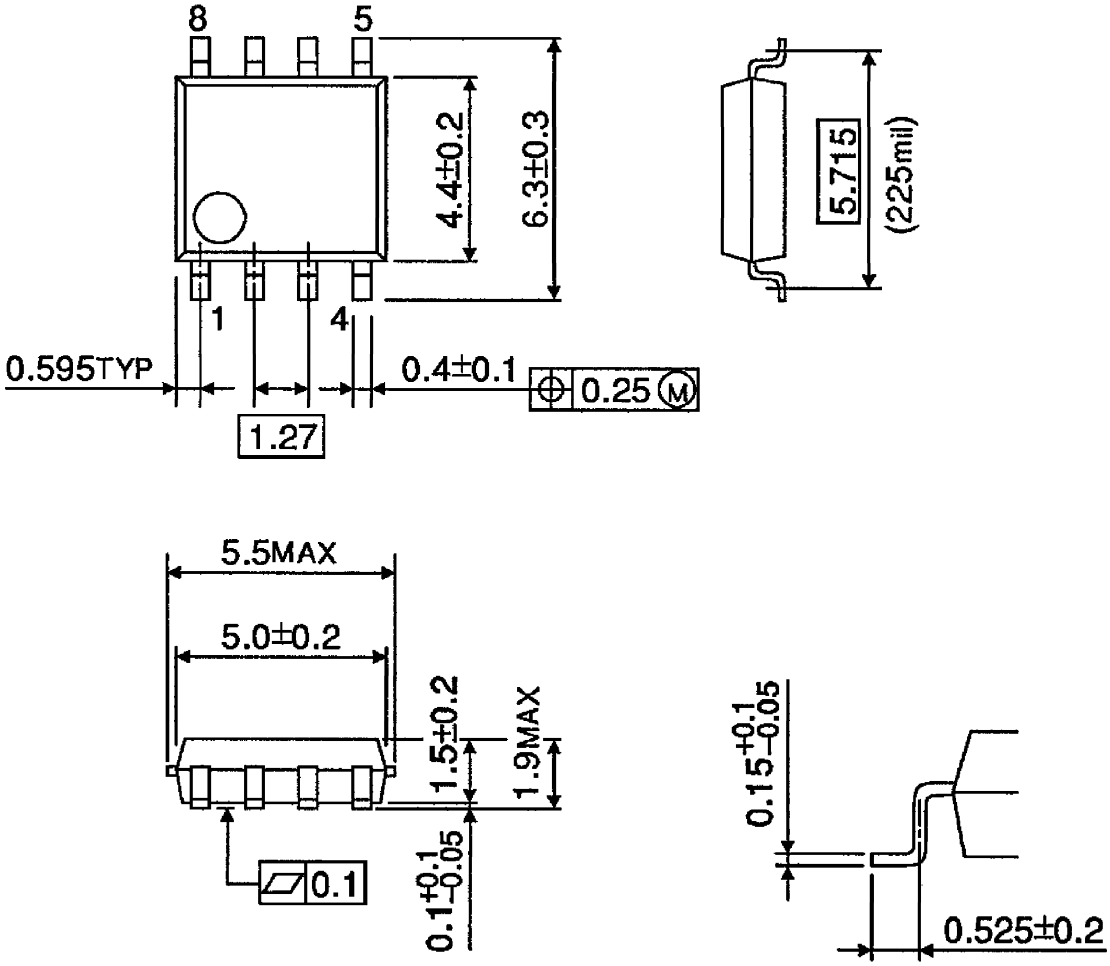
PACKAGE DIMENSIONS
DIP8-P-300-2.54A Unit : mm



Weight : 0.5g (Typ.)

PACKAGE DIMENSIONS

SOP8-P-225-1.27 Unit : mm



Weight : 0.1g (Typ.)

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