Onsemi

Complementary Silicon Power Transistors

2N3055(NPN), MJ2955(PNP)

Complementary silicon power transistors are designed for general-purpose switching and amplifier applications.

Features

- DC Current Gain $h_{FE} = 20-70$ @ $I_C = 4$ Adc
- Collector-Emitter Saturation Voltage - $V_{CE(sat)} = 1.1 \text{ Vdc} (Max) @ I_C = 4 \text{ Adc}$
- Excellent Safe Operating Area
- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	60	Vdc
Collector-Emitter Voltage	V _{CER}	70	Vdc
Collector-Base Voltage	V _{CB}	100	Vdc
Emitter-Base Voltage	V _{EB}	7	Vdc
Collector Current – Continuous	Ι _C	15	Adc
Base Current	Ι _Β	7	Adc
Total Power Dissipation @ T _C = 25°C Derate Above 25°C	P _D	115 0.657	W W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-65 to +200	°C

Stresses exceeding those listed in the Maximum Rati device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



= Device Code xxxx55 G = =

	0.657	W/°C	A
T _J , T _{stg}	-65 to +200	°C	YY WW MEX
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ORDERING INFORMATION

Year

= Work Week

Device	Package	Shipping
2N3055	TO-204AA	100 Units / Tray
2N3055G	TO-204AA (Pb-Free)	100 Units / Tray
MJ2955	TO-204AA	100 Units / Tray
MJ2955G	TO-204AA (Pb-Free)	100 Units / Tray

Preferred devices are recommended choices for future use and best overall value.

*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



MARKING DIAGRAM

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xxxx55G AYYWW MEX Œ.

xxxx = 2N30 or MJ20

Pb-Free Package

Location Code

= Country of Orgin

TO-204AA (TO-3)

CASE 1-07 STYLE 1

2N3055(NPN), MJ2955(PNP)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{ extsf{ heta}JC}$	1.52	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS*				
Collector-Emitter Sustaining Voltage (Note 1) (I_C = 200 mAdc, I_B = 0)	V _{CEO(sus)}	60	-	Vdc
Collector–Emitter Sustaining Voltage (Note 1) (I _C = 200 mAdc, R _{BE} = 100 Ω)	V _{CER(sus)}	70	-	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc, I_B = 0)	I _{CEO}	-	0.7	mAdc
$ Collector Cutoff Current \\ (V_{CE} = 100 Vdc, V_{BE(off)} = 1.5 Vdc) \\ (V_{CE} = 100 Vdc, V_{BE(off)} = 1.5 Vdc, T_C = 150^{\circ}C) $	I _{CEX}		1.0 5.0	mAdc
Emitter Cutoff Current (V_{BE} = 7.0 Vdc, I_C = 0)	I _{EBO}	-	5.0	mAdc
ON CHARACTERISTICS* (Note 1)				
DC Current Gain ($I_C = 4.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$) ($I_C = 10 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$)	h _{FE}	20 5.0	70 -	-
Collector-Emitter Saturation Voltage ($I_C = 4.0 \text{ Adc}, I_B = 400 \text{ mAdc}$) ($I_C = 10 \text{ Adc}, I_B = 3.3 \text{ Adc}$)	V _{CE(sat)}	-	1.1 3.0	Vdc
Base-Emitter On Voltage (I _C = 4.0 Adc, V _{CE} = 4.0 Vdc)	V _{BE(on)}	-	1.5	Vdc
SECOND BREAKDOWN				
Second Breakdown Collector Current with Base Forward Biased (V _{CE} = 40 Vdc, t = 1.0 s, Nonrepetitive)	I _{s/b}	2.87	-	Adc
DYNAMIC CHARACTERISTICS				

Current Gain – Bandwidth Product (I _C = 0.5 Adc, V_{CE} = 10 Vdc, f = 1.0 MHz)	f _T	2.5	_	MHz
*Small–Signal Current Gain (I_C = 1.0 Adc, V_{CE} = 4.0 Vdc, f = 1.0 kHz)	h _{fe}	15	120	-
*Small–Signal Current Gain Cutoff Frequency (V _{CE} = 4.0 Vdc, I_C = 1.0 Adc, f = 1.0 kHz)	f _{hfe}	10	-	kHz

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

*Indicates Within JEDEC Registration. (2N3055) 1. Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2.0%.



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 2 is based on $T_C = 25^{\circ}C$; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% but must be derated for temperature according to Figure 1.

2N3055(NPN), MJ2955(PNP)



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TO-204 (TO-3) CASE 1-07 ISSUE Z DATE 10 MAR 2000 SCALE 1:1 NOTES: Δ 1. DIMENSIONING AND TOLERANCING PER ANSI ٠N Y14.5M. 1982. ¥ 2. CONTROLLING DIMENSION: INCH. 3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO-204AA OUTLINE SHALL APPLY. С E -T- SEATING PLANE MILLIMETERS Łκ INCHES → 🖛 D 2 PL MIN MAX MIN MAX DIM Α 1.550 REF 39.37 REF $| \oplus | \oslash 0.13 (0.005)$ \square T Q \square Y \square B
 -- 1.050
 -- 26.67

 0.250
 0.335
 6.35
 8.51

 D
 0.038
 0.043
 0.97

 E
 0.055
 0.070
 1.40
1.09 1.40 1.77 -Y-1-> v G 0.430 BSC 10.92 BSC
 H
 0.215 BSC
 5.46 BSC

 K
 0.440
 0.480
 11.18
 12.19
2**⊕** G ന് в 0.665 BSC 16.89 BSC L Ĥ
 N
 -- 0.830
 -- 21.08

 Q
 0.151
 0.165
 3.84
 4.19
 \oplus Å
 U
 1.187 BSC
 30.15 BSC

 V
 0.131
 0.188
 3.33
 4.77
-Q-⊕ Ø 0.13 (0.005) M T Y M STYLE 3: PIN 1. GATE 2. SOURCE STYLE 5: PIN 1. CATHODE 2. EXTERNAL TRIP/DELAY STYLE 1: PIN 1. BASE STYLE 4: PIN 1. GROUND STYLE 2: PIN 1. BASE 2. COLLECTOR 2 FMITTER 2 INPUT CASE: COLLECTOR CASE: EMITTER CASE: DRAIN CASE: OUTPUT CASE: ANODE STYLE 6: STYLE 7: STYLE 8: STYLE 9: PIN 1. GATE 2. EMITTER PIN 1. ANODE 2. OPEN PIN 1. CATHODE #1 2. CATHODE #2 PIN 1. ANODE #1 2. ANODE #2

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DESCRIPTION:	TO-204 (TO-3)		PAGE 1 OF 1

CASE: ANODE

CASE: CATHODE

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CASE: COLLECTOR

CASE: CATHODE

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