

Complementary Plastic Power Transistors

MJD200 (NPN), MJD210 (PNP)

NPN/PNP Silicon DPAK For Surface Mount Applications

Designed for Low Voltage, Low-power, High-Gain Audio amplifier applications.

Features

- High DC Current Gain
- Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)
- Low Collector-Emitter Saturation Voltage
- High Current-Gain-Bandwidth Product
- Annular Construction for Low Leakage
- Epoxy Meets UL 94 V-0 @ 0.125 in
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

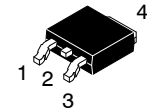
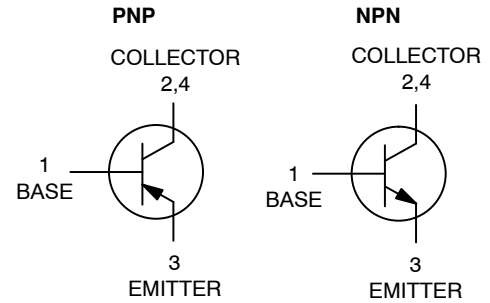
MAXIMUM RATINGS

Rating	Symbol	Max	Unit
Collector-Base Voltage	V_{CB}	40	Vdc
Collector-Emitter Voltage	V_{CEO}	25	Vdc
Emitter-Base Voltage	V_{EB}	8.0	Vdc
Collector Current-Continuous	I_C	5.0	Adc
Collector Current-Peak	I_{CM}	10	Adc
Base Current	I_B	1.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	12.5 0.1	W W/ $^\circ\text{C}$
Total Power Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.4 0.011	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150	$^\circ\text{C}$
ESD-Human Body Model	HBM	3B	V
ESD-Machine Model	MM	C	V

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

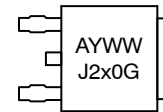
1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

SILICON POWER TRANSISTORS 5 AMPERES 25 VOLTS, 12.5 WATTS



**DPAK
CASE 369C
STYLE 1**

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
x = 1 or 0
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

MJD200 (NPN), MJD210 (PNP)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	10	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	89.3	$^{\circ}\text{C/W}$

2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

ELECTRICAL CHARACTERISTICS ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage (Note 3) ($I_C = 10 \text{ mAdc}$, $I_B = 0$)	$V_{CEO(sus)}$	25	–	Vdc
Collector Cutoff Current ($V_{CB} = 40 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 40 \text{ Vdc}$, $I_E = 0$, $T_J = 125^{\circ}\text{C}$)	I_{CBO}	– –	100 100	nAdc μAdc
Emitter Cutoff Current ($V_{BE} = 8 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	–	100	nAdc

ON CHARACTERISTICS

C Current Gain (Note 3), ($I_C = 500 \text{ mAdc}$, $V_{CE} = 1 \text{ Vdc}$) ($I_C = 2 \text{ Adc}$, $V_{CE} = 1 \text{ Vdc}$) ($I_C = 5 \text{ Adc}$, $V_{CE} = 2 \text{ Vdc}$)	h_{FE}	70 45 10	– 180 –	–
Collector-Emitter Saturation Voltage (Note 3) ($I_C = 500 \text{ mAdc}$, $I_B = 50 \text{ mAdc}$) ($I_C = 2 \text{ Adc}$, $I_B = 200 \text{ mAdc}$) ($I_C = 5 \text{ Adc}$, $I_B = 1 \text{ Adc}$)	$V_{CE(sat)}$	– – –	0.3 0.75 1.8	Vdc
Base-Emitter Saturation Voltage (Note 3) ($I_C = 5 \text{ Adc}$, $I_B = 1 \text{ Adc}$)	$V_{BE(sat)}$	–	2.5	Vdc
Base-Emitter On Voltage (Note 3) ($I_C = 2 \text{ Adc}$, $V_{CE} = 1 \text{ Vdc}$)	$V_{BE(on)}$	–	1.6	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain – Bandwidth Product (Note 4) ($I_C = 100 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f_{test} = 10 \text{ MHz}$)	f_T	65	–	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 0.1 \text{ MHz}$) MJD200 MJD210, NJVMJD210T4G	C_{ob}	– –	80 120	pF

3. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\approx 2\%$.

4. $f_T = |h_{fe}| \cdot f_{test}$.

MJD200 (NPN), MJD210 (PNP)

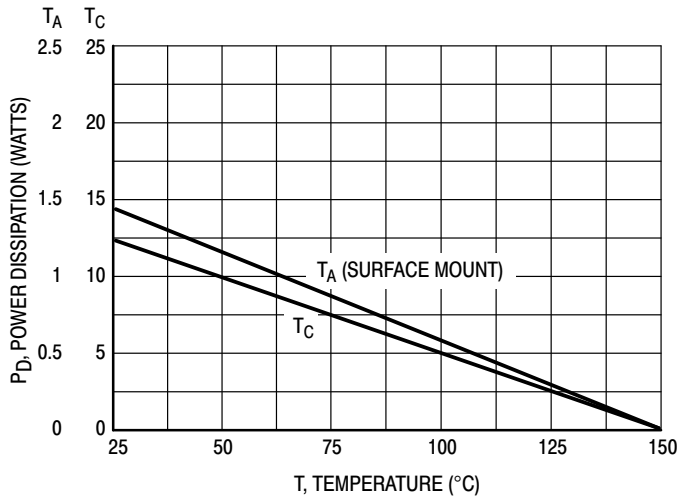


Figure 1. Power Derating

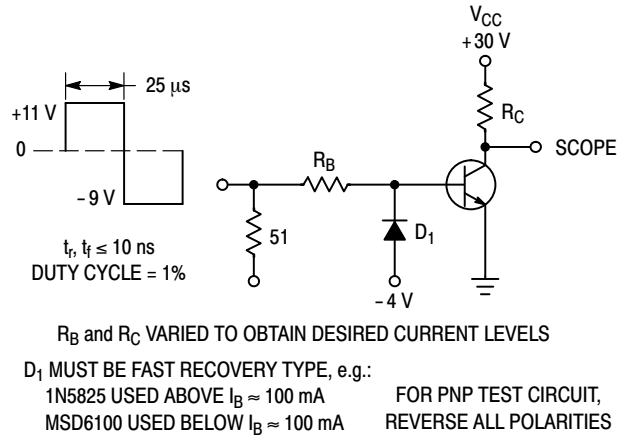


Figure 2. Switching Time Test Circuit

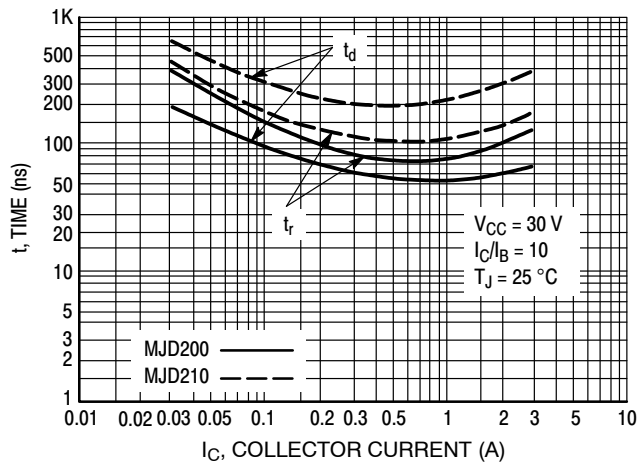


Figure 3. Turn-On Time

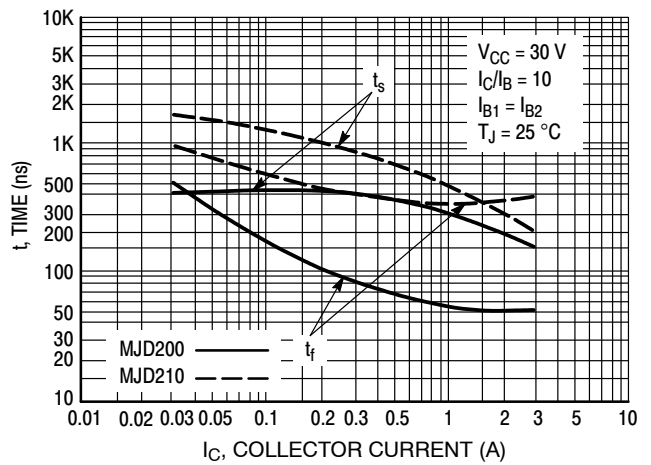


Figure 4. Turn-Off Time

MJD200 (NPN), MJD210 (PNP)

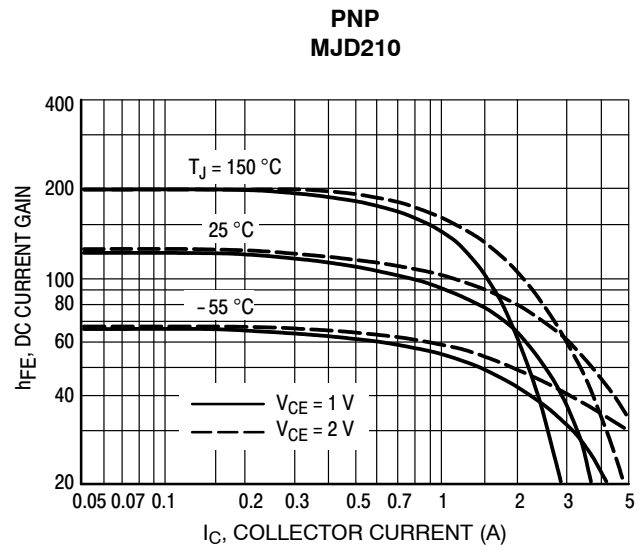
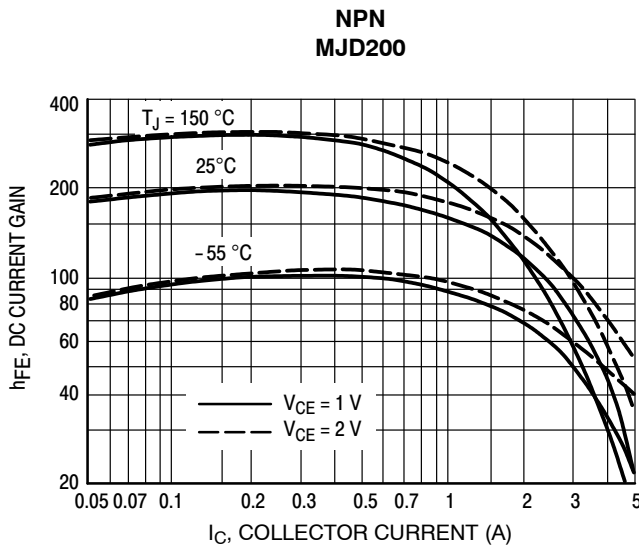


Figure 5. DC Current Gain

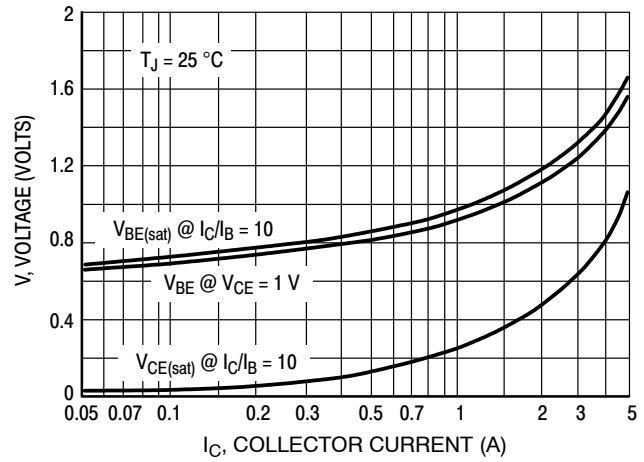
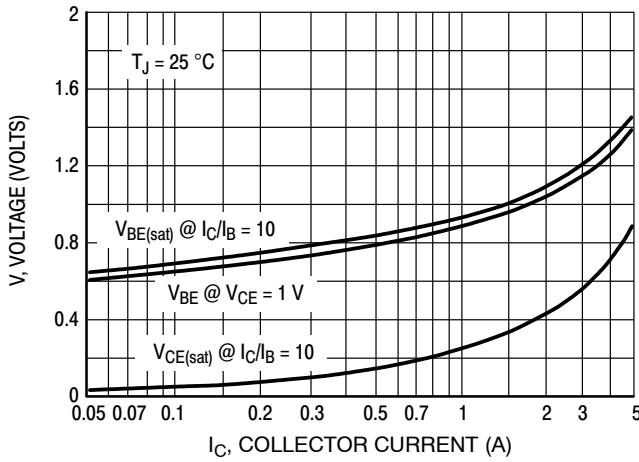


Figure 6. "On" Voltage

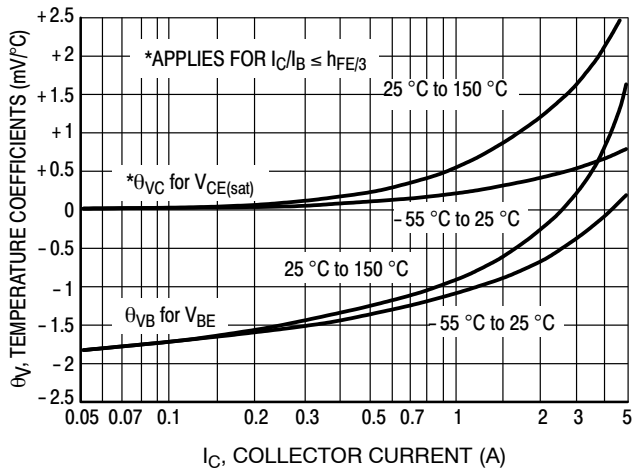
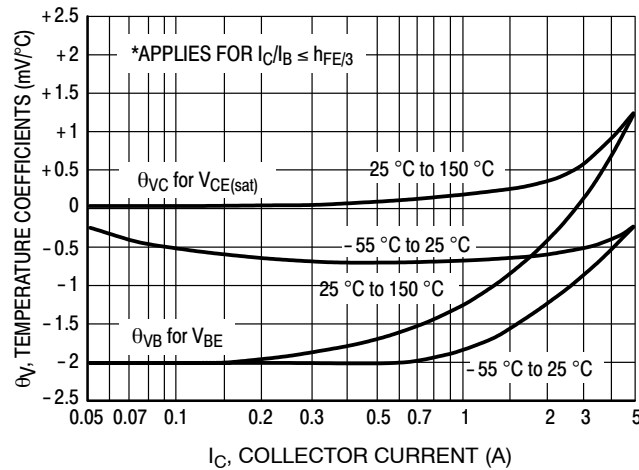


Figure 7. Temperature Coefficients

MJD200 (NPN), MJD210 (PNP)

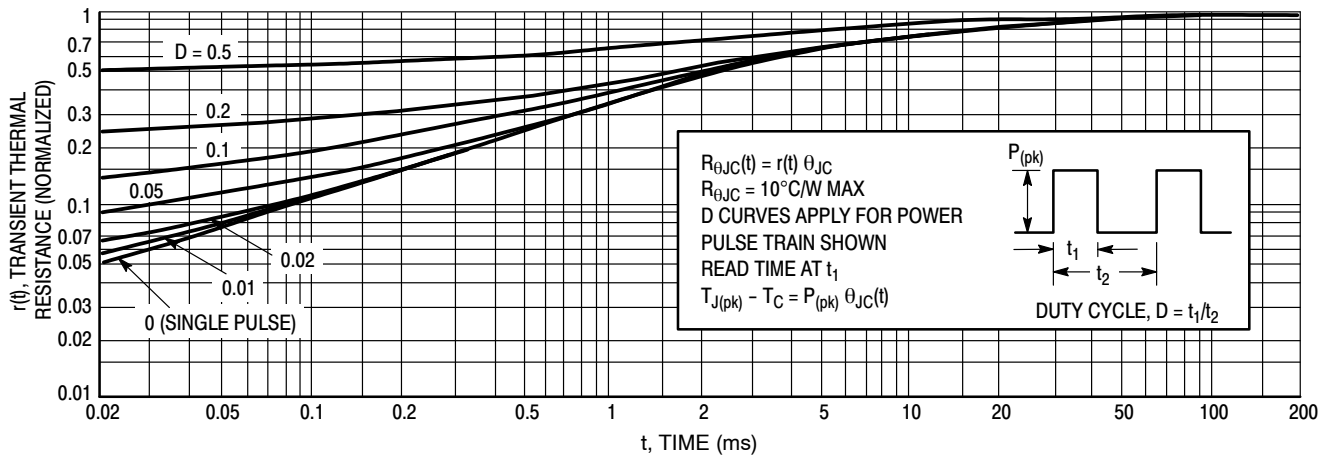


Figure 8. Thermal Response

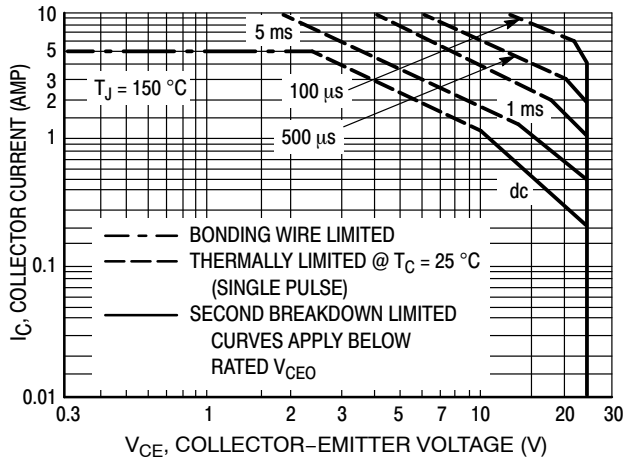


Figure 9. Active Region Safe Operating Area

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 9 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 8. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

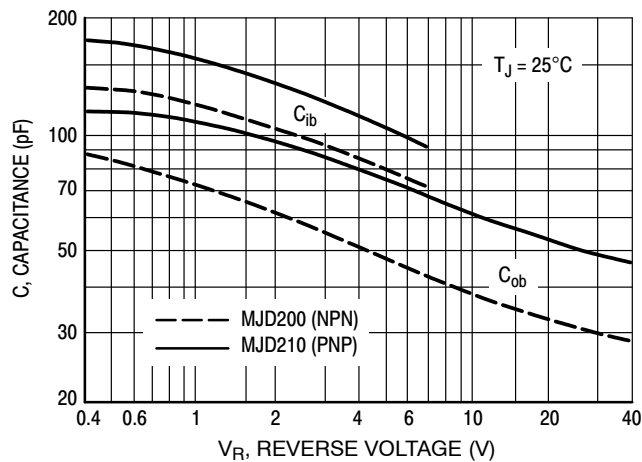


Figure 10. Capacitance

MJD200 (NPN), MJD210 (PNP)

ORDERING INFORMATION

Device	Package Type	Shipping†
MJD200G	DPAK (Pb-Free)	75 Units / Rail
MJD200RLG	DPAK (Pb-Free)	1,800 / Tape & Reel
MJD200T4G	DPAK (Pb-Free)	2,500 / Tape & Reel
MJD210G	DPAK (Pb-Free)	75 Units / Rail
MJD210RLG	DPAK (Pb-Free)	1,800 / Tape & Reel
MJD210T4G	DPAK (Pb-Free)	2,500 / Tape & Reel
NJVMJD210T4G*	DPAK (Pb-Free)	2,500 / Tape & Reel

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#)

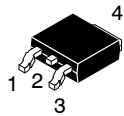
* NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable

MJD200 (NPN), MJD210 (PNP)

REVISION HISTORY

Revision	Description of Changes	Date
15	Rebranded the Data Sheet to onsemi format	10/8/2025

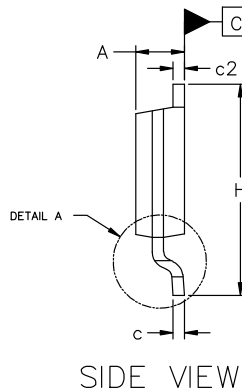
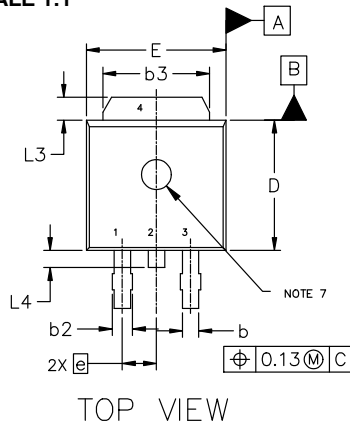
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



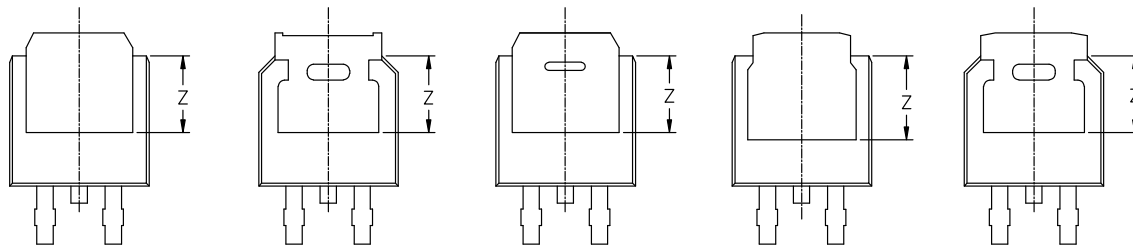
DPAK3 6.10x6.54x2.28, 2.29P
CASE 369C
ISSUE J

DATE 12 AUG 2025

SCALE 1:1

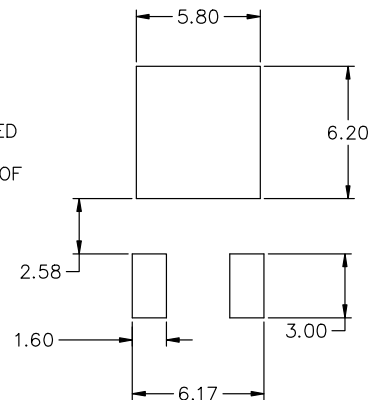
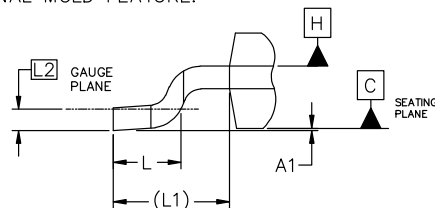


MILLIMETERS			
DIM	MIN	NOM	MAX
A	2.18	2.28	2.38
A1	0.00	---	0.13
b	0.63	0.76	0.89
b2	0.72	0.93	1.14
b3	4.57	5.02	5.46
c	0.46	0.54	0.61
c2	0.46	0.54	0.61
D	5.97	6.10	6.22
E	6.35	6.54	6.73
e	2.29 BSC		
H	9.40	9.91	10.41
L	1.40	1.59	1.78
L1	2.90 REF		
L2	0.51 BSC		
L3	0.89	---	1.27
L4	---	---	1.01
Z	3.93	---	---



NOTES:

1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15mm PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.



RECOMMENDED MOUNTING FOOTPRINT*

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

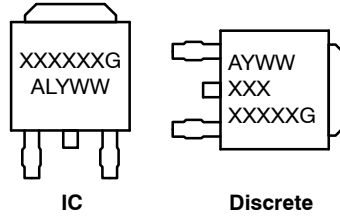
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DPAK3 6.10x6.54x2.28, 2.29P
CASE 369C
ISSUE J

DATE 12 AUG 2025

GENERIC
MARKING DIAGRAM*



XXXXXX = Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
WW = Work Week
G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLE 1: PIN 1. BASE 2. COLLECTOR 3. EMITTER 4. COLLECTOR	STYLE 2: PIN 1. GATE 2. DRAIN 3. SOURCE 4. DRAIN	STYLE 3: PIN 1. ANODE 2. CATHODE 3. ANODE 4. CATHODE	STYLE 4: PIN 1. CATHODE 2. ANODE 3. GATE 4. ANODE	STYLE 5: PIN 1. GATE 2. ANODE 3. CATHODE 4. ANODE
STYLE 6: PIN 1. MT1 2. MT2 3. GATE 4. MT2	STYLE 7: PIN 1. GATE 2. COLLECTOR 3. EMITTER 4. COLLECTOR	STYLE 8: PIN 1. N/C 2. CATHODE 3. ANODE 4. CATHODE	STYLE 9: PIN 1. ANODE 2. CATHODE 3. RESISTOR ADJUST 4. CATHODE	STYLE 10: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. ANODE

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