

NTD5406N, STD5406N

Power MOSFET

40 V, 70 A, Single N-Channel, DPAK

Features

- Low $R_{DS(on)}$
- High Current Capability
- Low Gate Charge
- STD 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

Applications

- Electronic Brake Systems
- Electronic Power Steering
- Bridge Circuits

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	40	V
Gate-to-Source Voltage			V _{GS}	±20	V
Continuous Drain Current – R _{θJC}	Steady State	T _C = 25°C	I _D	70	A
		T _C = 125°C		40	
Power Dissipation – R _{θJC}	Steady State	T _C = 25°C	P _D	100	W
Continuous Drain Current – R _{θJA} (Note 1)	Steady State	T _A = 25°C	I _D	12.2	A
		T _A = 125°C		7.0	
Power Dissipation – R _{θJA} (Note 1)	Steady State	T _A = 25°C	P _D	3.0	W
Pulsed Drain Current	t _p = 10 μs		I _{DM}	150	A
Operating Junction and Storage Temperature			T _J , T _{STG}	–55 to 175	°C
Source Current (Body Diode) Pulsed			I _S	63.5	A
Single Pulse Drain-to Source Avalanche Energy – (V _{DD} = 50 V, V _{GS} = 10 V, I _{PK} = 30 A, L = 1 mH, R _G = 25 Ω)			EAS	450	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T _L	260	°C

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.

THERMAL RESISTANCE RATINGS (Note 1)

Parameter	Symbol	Max	Unit
Junction-to-Case (Drain)	$R_{\theta JC}$	1.5	$^\circ\text{C/W}$
Junction-to-Ambient (Note 1)	$R_{\theta JA}$	49	

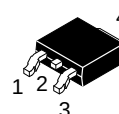
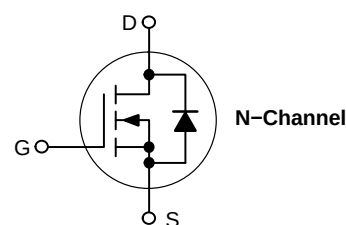
1. Surface mounted on FR4 board using 1 sq in pad size, (Cu Area 1.127 sq in [2 oz] including traces).



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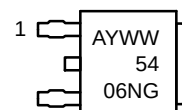
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$V_{(BR)DSS}$	$R_{DS(ON)}$ TYP	I_D MAX (Note 1)
40 V	8.7 m Ω @ 10 V	70 A



DPAK
CASE 369C
STYLE 2

MARKING DIAGRAM



A = Assembly Location*
Y = Year
WW = Work Week
5406N = Specific Device Code
G = Pb-Free Device

* The Assembly Location code (A) is front side optional. In cases where the Assembly Location is stamped in the package, the front side assembly code may be blank.

ORDERING INFORMATION

Device	Package	Shipping†
NTD5406NT4G	DPAK (Pb-Free)	2500 / Tape & Reel
STD5406NT4G*	DPAK (Pb-Free)	2500 / Tape & Reel
STD5406NT4G-VF01	DPAK (Pb-Free)	2500 / 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.

NTD5406N, STD5406N

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise stated)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	40			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J			42		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 40 V	T _J = 25°C		1.0	μA
			T _J = 100°C		10	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±30 V			±100	nA

ON CHARACTERISTICS (Note 2)

Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250 μA	1.5		3.5	V
Gate Threshold Temperature Coefficient	V _{GS(TH)} /T _J			-7.0		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A		8.7	10	mΩ
		V _{GS} = 5.0 V, I _D = 10 A		13.2	17	
Forward Transconductance	g _{FS}	V _{GS} = 10 V, I _D = 10 A		19		S

CHARGES AND CAPACITANCES

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 32 V		1375	2500	pF
Output Capacitance	C _{OSS}			370	700	
Reverse Transfer Capacitance	C _{RSS}			160	300	
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 32 V, I _D = 30 A		45		nC
Threshold Gate Charge	Q _{G(TH)}			2.0		
Gate-to-Source Charge	Q _{GS}			5.4		
Gate-to-Drain Charge	Q _{GD}			20		

SWITCHING CHARACTERISTICS, V_{GS} = 10 V (Note 3)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 10 V, V _{DD} = 32 V, I _D = 30 A, R _G = 2.5 Ω		7.2		ns
Rise Time	t _r			57		
Turn-Off Delay Time	t _{d(OFF)}			30		
Fall Time	t _f			67		

SWITCHING CHARACTERISTICS, V_{GS} = 5 V (Note 3)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 5.0 V, V _{DD} = 20 V, I _D = 30 A, R _G = 2.5 Ω		15		ns
Rise Time	t _r			147		
Turn-Off Delay Time	t _{d(OFF)}			20		
Fall Time	t _f			29		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 A	T _J = 25°C		0.82	1.1	V
			T _J = 125°C		0.67		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _{SD} /dt = 100 A/μs, I _S = 10 A			46		ns
Charge Time	t _a				24		
Discharge Time	t _b				22		
Reverse Recovery Charge	Q _{RR}					65	

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.

2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.

3. Switching characteristics are independent of operating junction temperatures.

TYPICAL PERFORMANCE CURVES

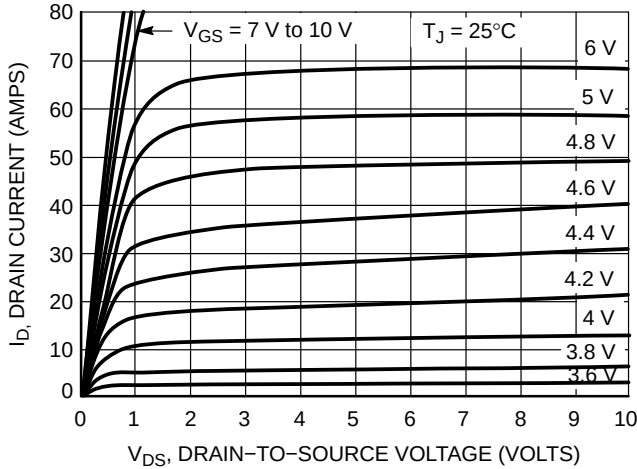


Figure 1. On-Region Characteristics

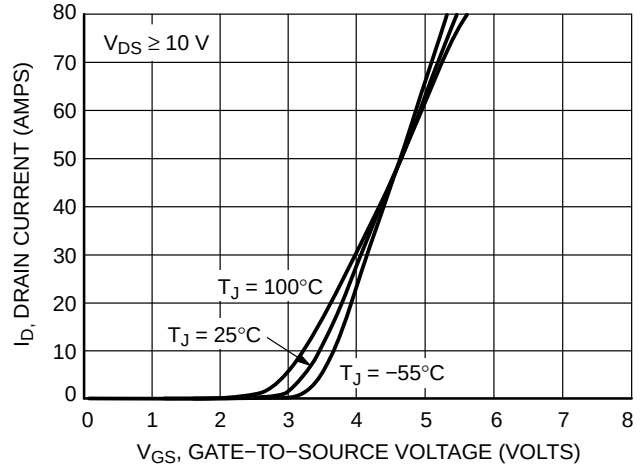


Figure 2. Transfer Characteristics

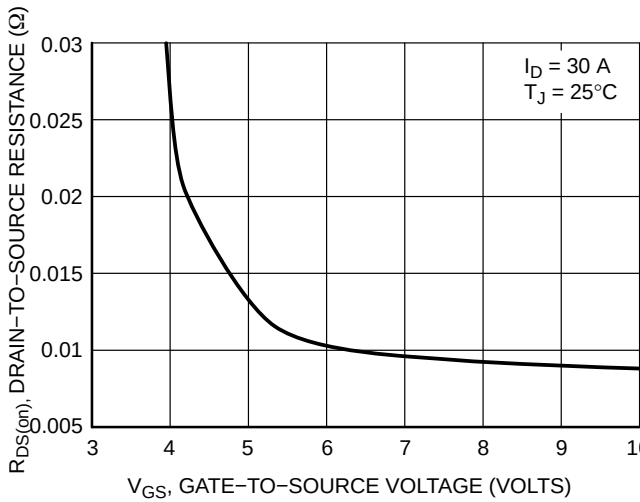


Figure 3. On-Resistance vs. Gate-to-Source Voltage

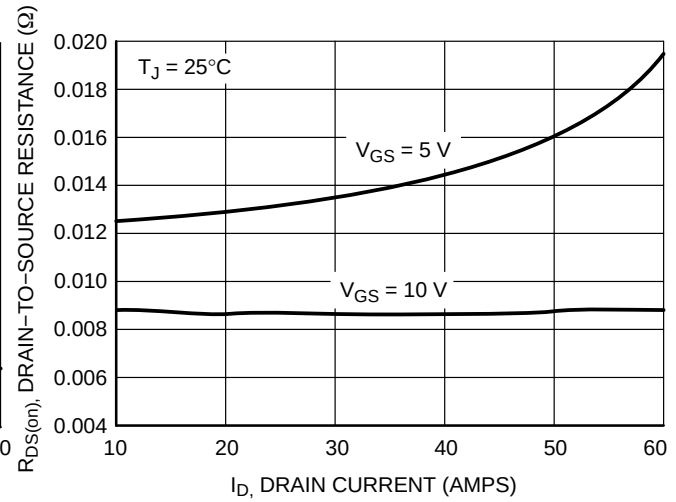


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

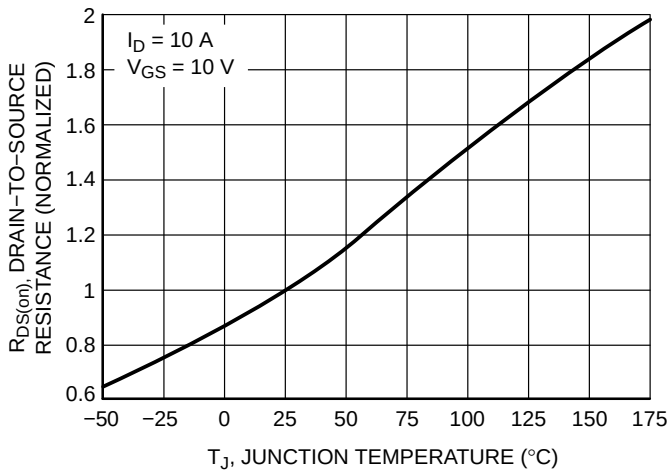


Figure 5. On-Resistance Variation with Temperature

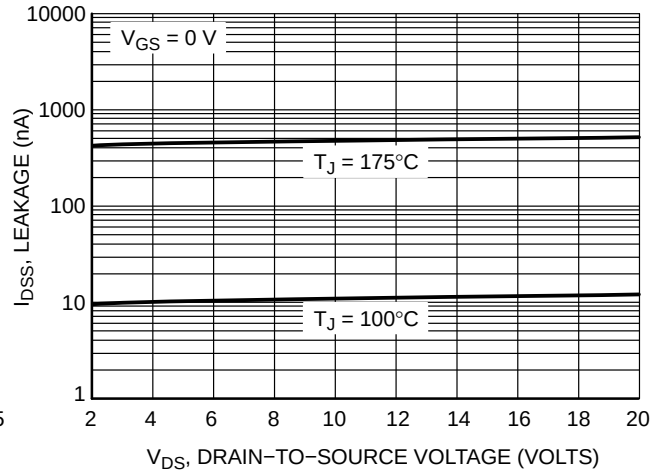
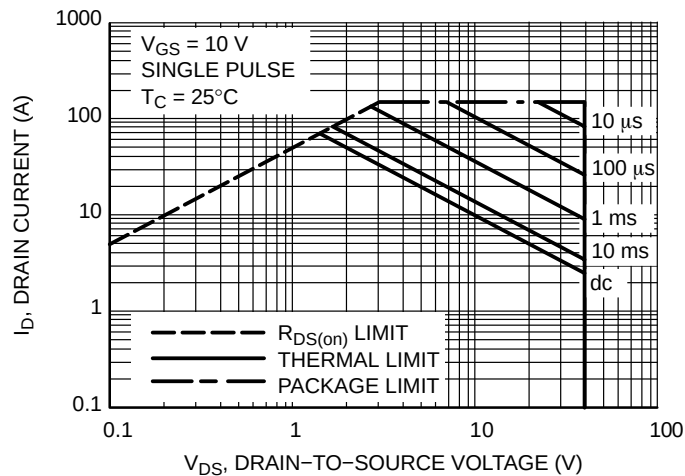
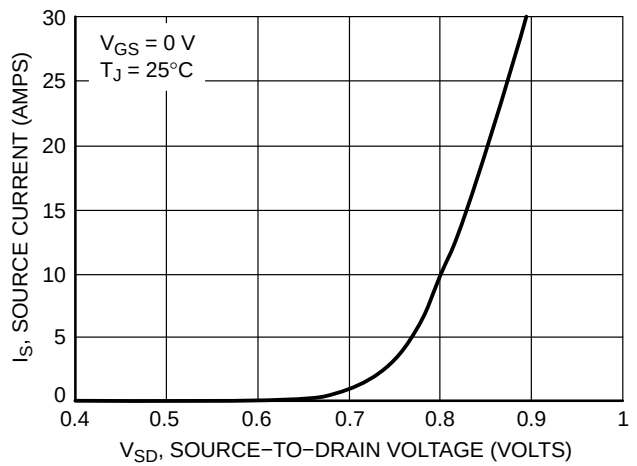
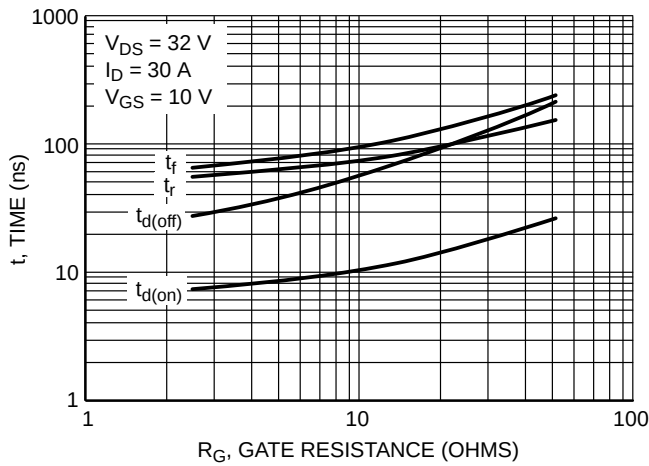
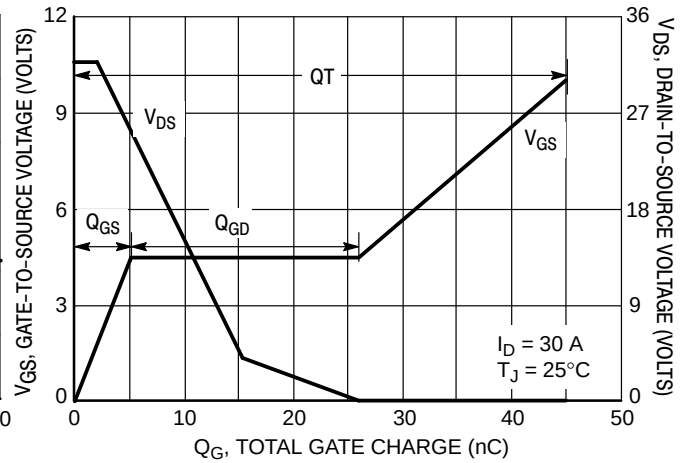
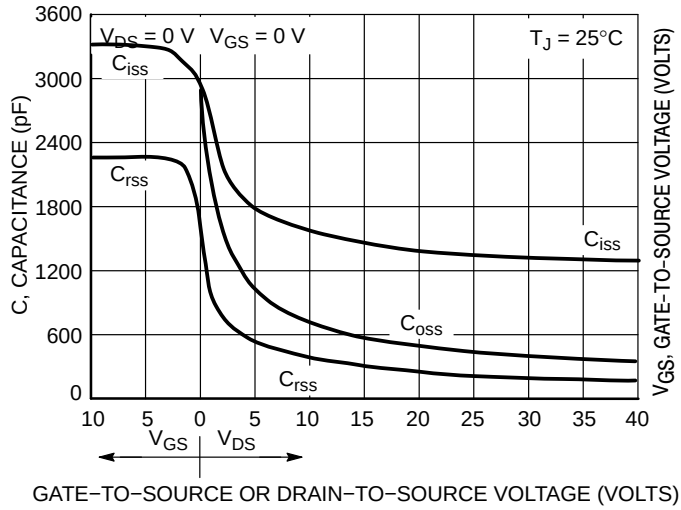


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL PERFORMANCE CURVES



NTD5406N, STD5406N

TYPICAL PERFORMANCE CURVES

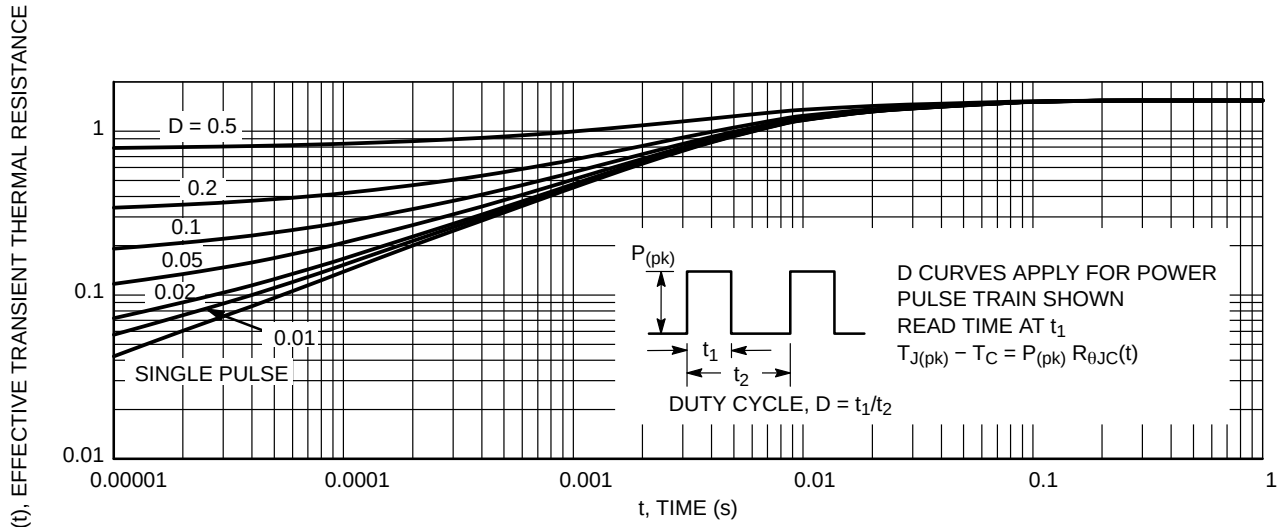
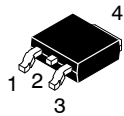


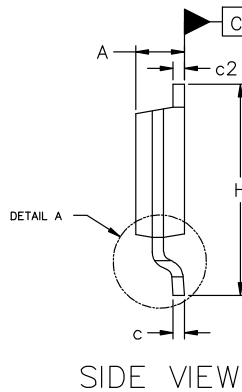
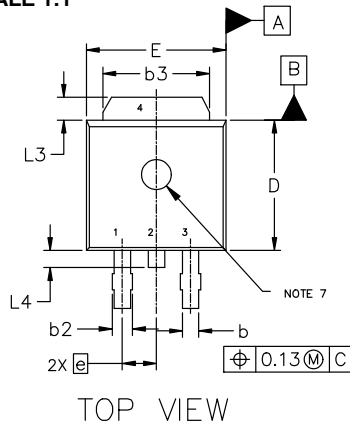
Figure 12. Thermal Response



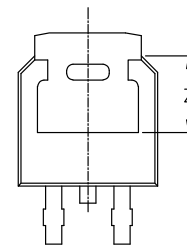
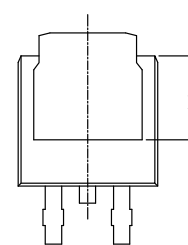
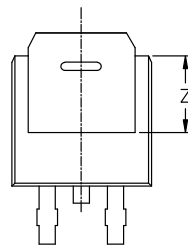
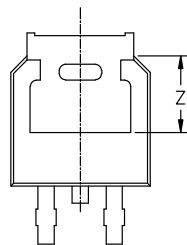
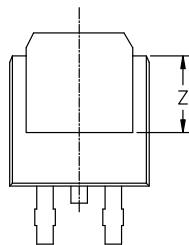
DPAK3 6.10x6.54x2.28, 2.29P
CASE 369C
ISSUE J

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	---	---

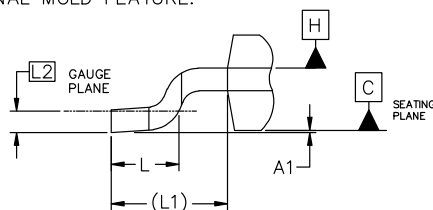


BOTTOM VIEW

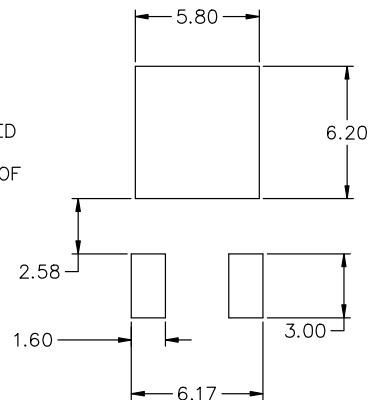
ALTERNATE CONSTRUCTIONS

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.



DETAIL A
ROTATED 90° CW



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.

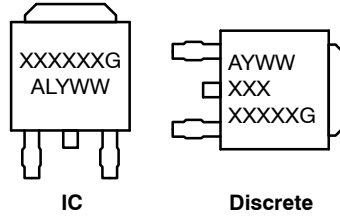
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DPAK3 6.10x6.54x2.28, 2.29P
CASE 369C
ISSUE J

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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