

NVD5865NL

Power MOSFET

60 V, 46 A, 16 mΩ, Single N-Channel

Features

- Low $R_{DS(on)}$ to Minimize Conduction Losses
- High Current Capability
- Avalanche Energy Specified
- AEC-Q101 Qualified
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

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

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	60	V
Gate-to-Source Voltage			V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JC}$ (Notes 1 & 3)	Steady State	$T_C = 25^{\circ}\text{C}$	I_D	46	A
		$T_C = 100^{\circ}\text{C}$		33	
Power Dissipation $R_{\theta JC}$ (Note 1)	Steady State	$T_C = 25^{\circ}\text{C}$	P_D	71	W
		$T_C = 100^{\circ}\text{C}$		36	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2 & 3)	Steady State	$T_A = 25^{\circ}\text{C}$	I_D	10	A
		$T_A = 100^{\circ}\text{C}$		7.0	
Power Dissipation $R_{\theta JA}$ (Notes 1 & 2)	Steady State	$T_A = 25^{\circ}\text{C}$	P_D	3.1	W
		$T_A = 100^{\circ}\text{C}$		1.5	
Pulsed Drain Current	$T_A = 25^{\circ}\text{C}$, $t_p = 10\text{ }\mu\text{s}$		I_{DM}	203	A
Current Limited by Package (Note 3)	$T_A = 25^{\circ}\text{C}$		$I_{Dmaxpkg}$	60	A
Operating Junction and Storage Temperature			T_J , T_{stg}	-55 to 175	$^{\circ}\text{C}$
Source Current (Body Diode)			I_S	46	A
Single Pulse Drain-to-Source Avalanche Energy ($L = 0.1\text{ mH}$)			E_{AS}	36	mJ
			I_{AS}	27	A
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			T_L	260	$^{\circ}\text{C}$

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 MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain) (Note 1)	$R_{\theta JC}$	2.1	$^\circ\text{C/W}$
Junction-to-Ambient - Steady State (Note 2)	$R_{\theta JA}$	49	

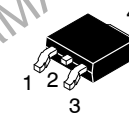
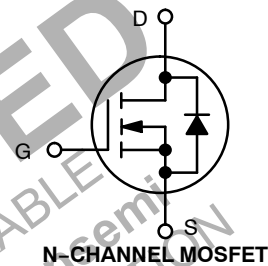
1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.



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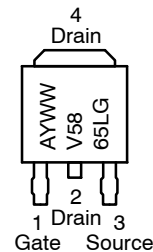
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$V_{(BR)DSS}$	$R_{DS(on)}$	I_D
60 V	16 mΩ @ 10 V	46 A
	19 mΩ @ 4.5 V	



DPACK
CASE 369AA
STYLE 2

MARKING DIAGRAM & PIN ASSIGNMENT



A = Assembly Location*
Y = Year
WW = Work Week
V5865L = Device Code
G = Pb-Free Package

* 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

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$			55		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 60\text{ V}$	$T_J = 25^\circ\text{C}$		1.0	μA
			$T_J = 125^\circ\text{C}$		100	
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA

ON CHARACTERISTICS (Note 4)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	1.0		2.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$			5.6		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 19\text{ A}$		13	16	m Ω
Drain-to-Source on Resistance	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 19\text{ A}$		16	19	m Ω
Forward Transconductance	gFS	$V_{DS} = 15\text{ V}, I_D = 19\text{ A}$		15		S

CHARGES, CAPACITANCES AND GATE RESISTANCES

Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = 25\text{ V}$		1400		pF
Output Capacitance	C_{oss}			137		
Reverse Transfer Capacitance	C_{rss}			95		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 48\text{ V}, I_D = 38\text{ A}$		29		nC
Threshold Gate Charge	$Q_{G(TH)}$			1.1		
Gate-to-Source Charge	Q_{GS}			4		
Gate-to-Drain Charge	Q_{GD}			8		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DS} = 48\text{ V}, I_D = 38\text{ A}$		15		nC
Gate Resistance	R_G			1.3		Ω

SWITCHING CHARACTERISTICS (Note 5)

Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DD} = 48\text{ V}, I_D = 38\text{ A}, R_G = 2.5\text{ }\Omega$		8.4		ns
Rise Time	t_r			12.4		
Turn-Off Delay Time	$t_{d(off)}$			26		
Fall Time	t_f			4.4		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 38\text{ A}$	$T_J = 25^\circ\text{C}$		0.95	1.2	V
			$T_J = 125^\circ\text{C}$		0.85		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, dI_S/dt = 100\text{ A}/\mu\text{s}, I_S = 38\text{ A}$			20		ns
Charge Time	t_a				13		
Discharge Time	t_b				7		
Reverse Recovery Charge	Q_{RR}				13		nC

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.

4. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

5. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

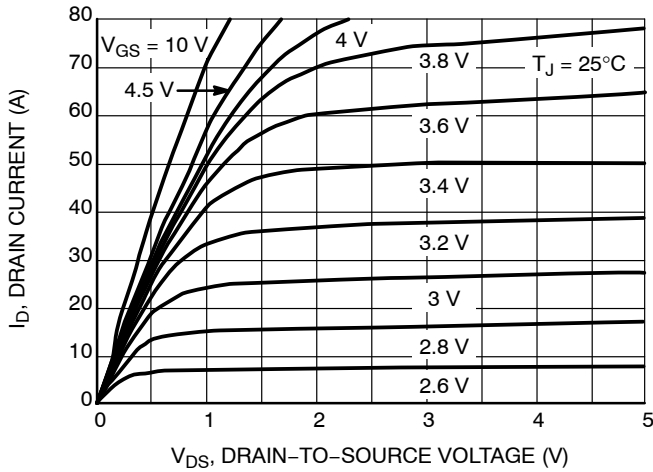


Figure 1. On-Region Characteristics

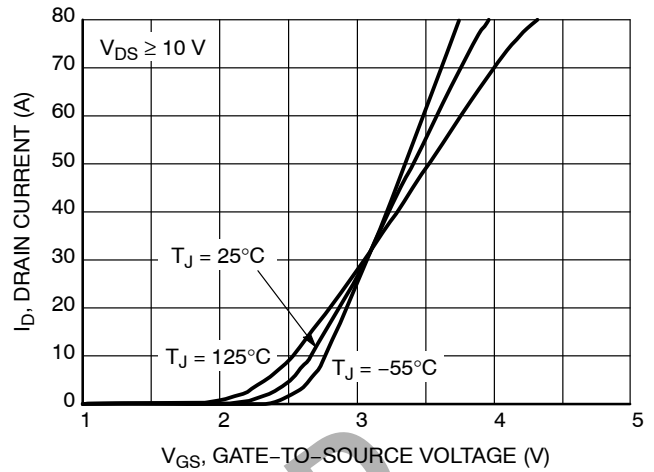


Figure 2. Transfer Characteristics

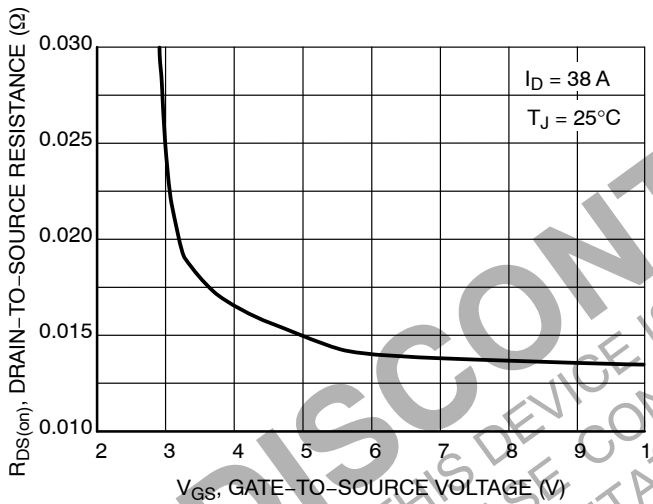


Figure 3. On-Resistance vs. Gate Voltage

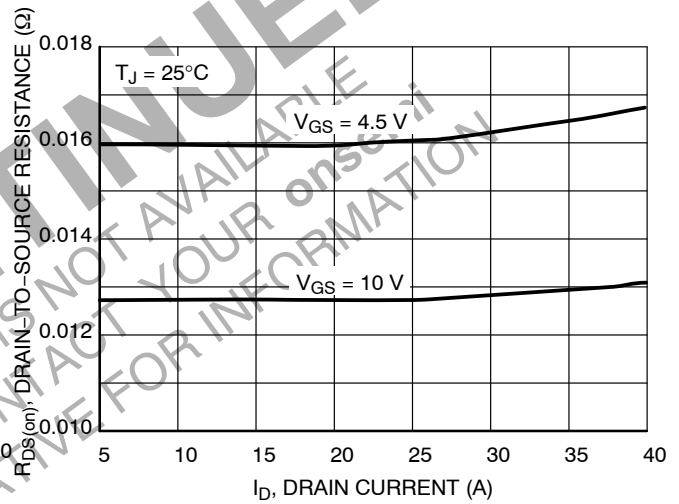


Figure 4. On-Resistance vs. Drain Current

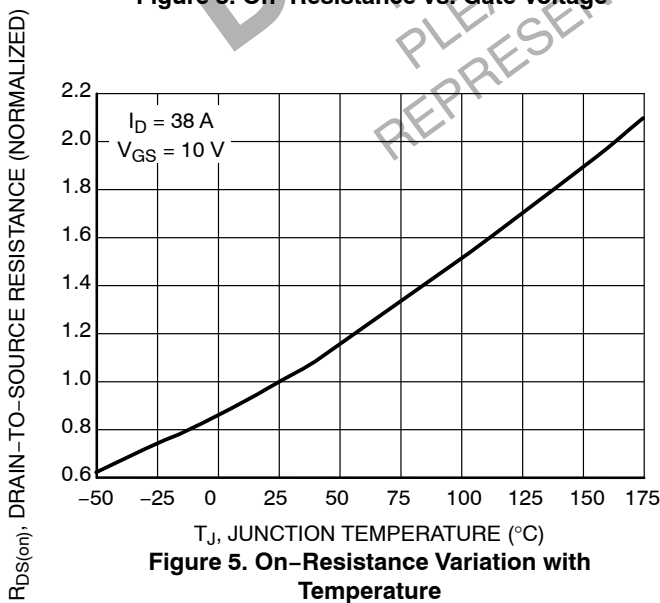


Figure 5. On-Resistance Variation with Temperature

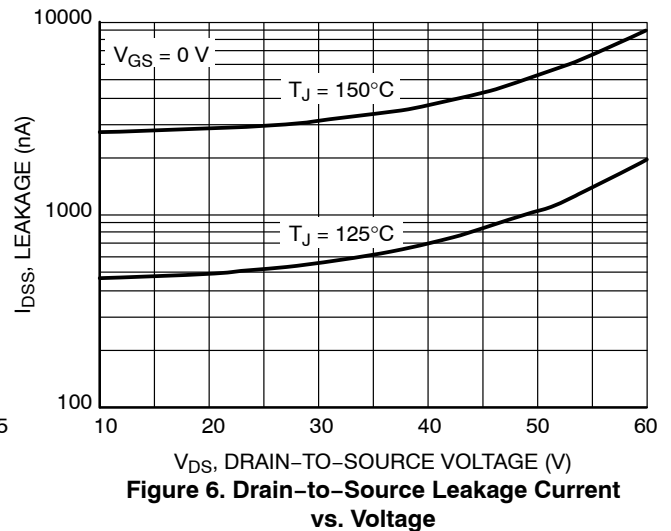


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

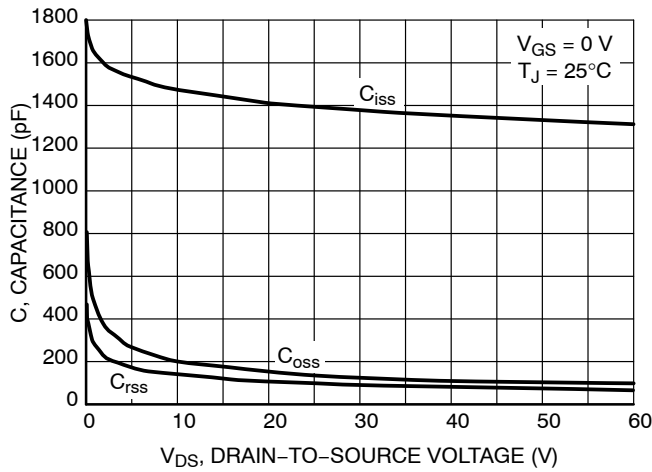


Figure 7. Capacitance Variation

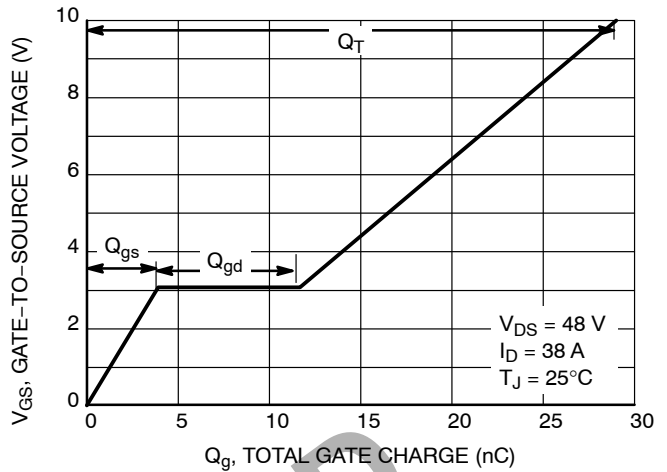


Figure 8. Gate-to-Source vs. Total Charge

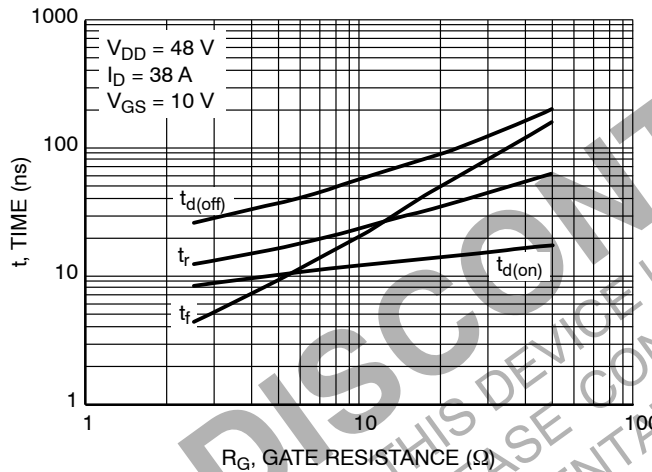


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

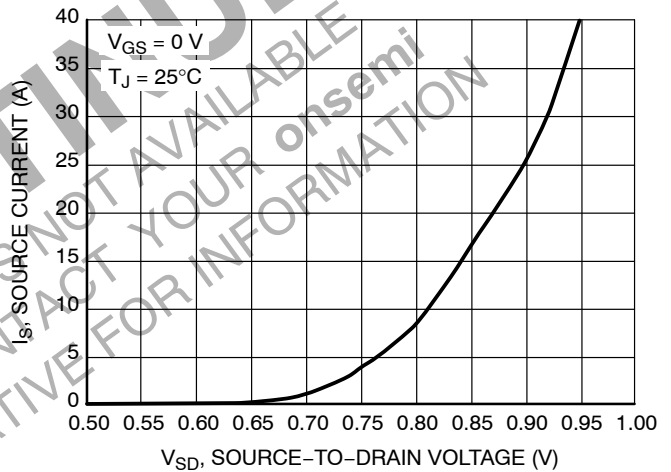


Figure 10. Diode Forward Voltage vs. Current

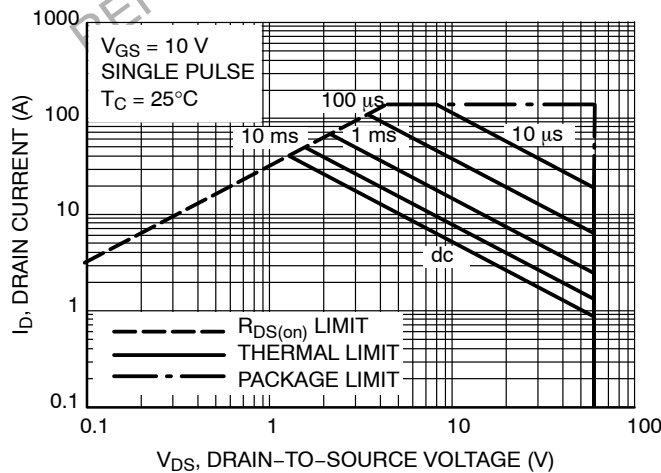


Figure 11. Maximum Rated Forward Biased Safe Operating Area

TYPICAL CHARACTERISTICS

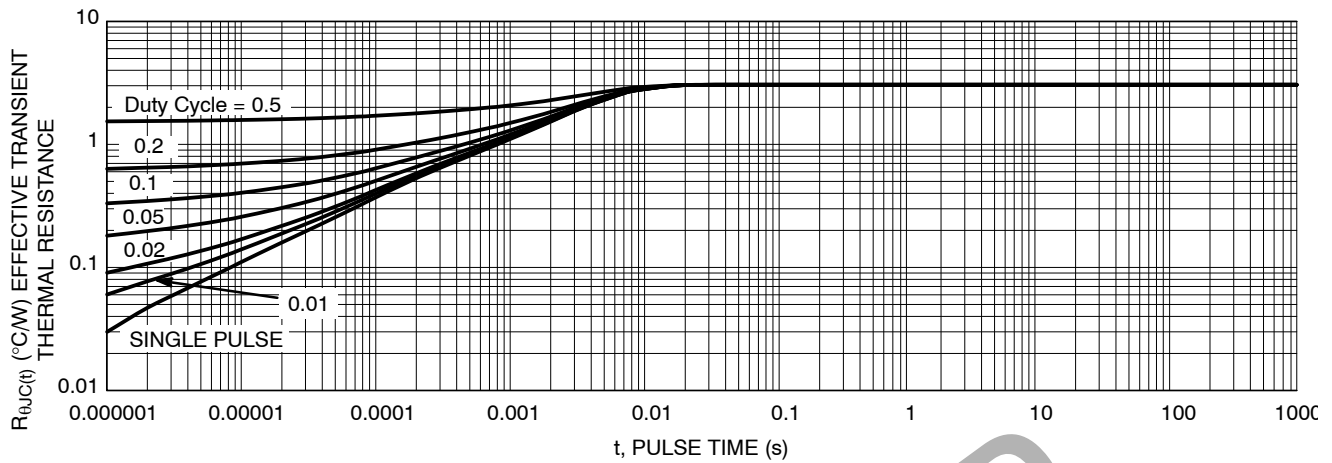


Figure 12. Thermal Response

ORDERING INFORMATION

Order Number	Package	Shipping [†]
NVD5865NLT4G	DPAK (Pb-Free)	2500 / Tape & Reel
SVD5865NLT4G	DPAK (Pb-Free)	2500 / Tape & Reel

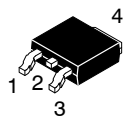
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

REVISION HISTORY

Revision	Description of Changes	Date
5	Document Discontinued.	4/13/2026

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.

DISCONTINUED
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 REPRESENTATIVE FOR INFORMATION



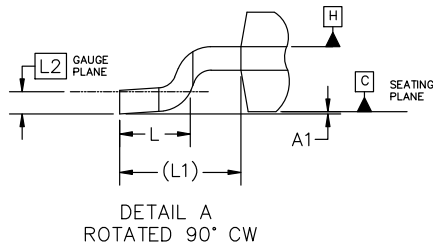
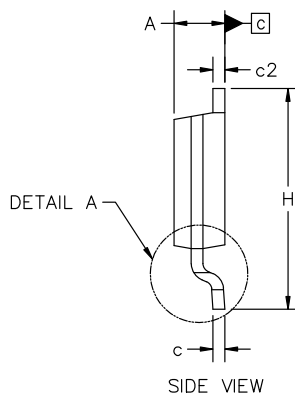
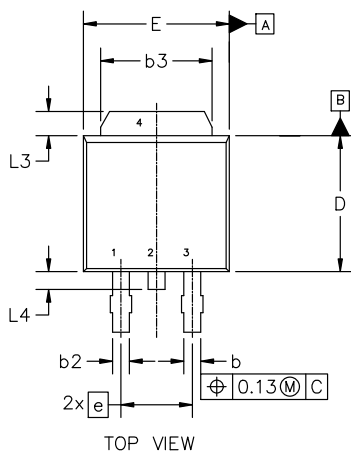
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DPAK-3 6.10x6.54x2.28, 2.29P
CASE 369AA
ISSUE C

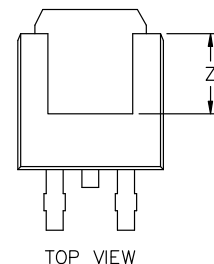
DATE 14 MAY 2026

NOTES

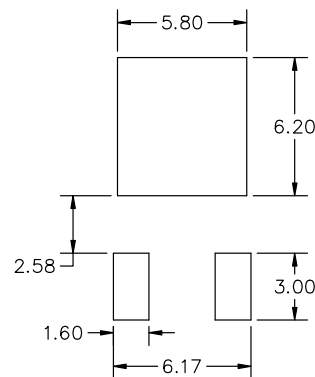
1. DIMENSION AND TOLERANCING PER ASME Y14.5 2018
2. CONTROLLING DIMENSION: MILLIMETERS
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSION b3, L3, AND Z
4. DIMENSION D AND E DO NOT INCLUDED MOLD FLASH, PROTRUSION, OR BURRS.
5. DIMENSION D AND E ARE DETERMINED AT OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H



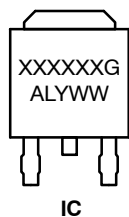
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	2.18	2.28	2.38
A1	0.00	---	0.13
b	0.63	0.76	0.89
b2	0.76	0.95	1.14
b3	4.57	5.02	5.46
c	0.46	0.54	0.61
c2	0.46	0.54	0.61
D	5.97	6.10	6.22
E	6.35	6.54	6.73
e	2.29 BSC		
H	9.40	9.91	10.41
L	1.40	1.59	1.78
L1	2.74 REF		
L2	0.51 BSC		
L3	0.89	---	1.27
L4	---	---	1.01
Z	3.93	---	---



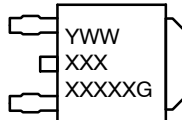
RECOMMENDED
MOUNTING FOOTPRINT



GENERIC
MARKING DIAGRAM*



IC



Discrete

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.

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DESCRIPTION:	DPAK-3 6.10x6.54x2.28, 2.29P	PAGE 1 OF 1

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