Enhancement Mode Gallium Nitride (GaN) HEMT

700 V, 75 mΩ, 21 A, PDSO-E3 (DPAK)

NTD100N70GN1

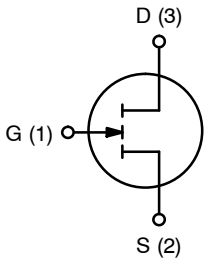
$V_{(BR)DSS}$	$R_{DS(ON)}$ TYP	I_D MAX
700 V	75 mΩ	21 A

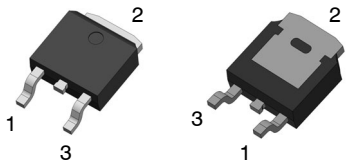
Features

- Low $R_{DS(ON)}$ to Minimize Conduction Losses
- Ultra Low Gate Charge for High Speed Switching
- FOM-Q_G = 280 nC*mΩ
- Small Footprint for High Density PCB Design
- This Device is Pb-Free, Halide Free and is RoHS Compliant

Typical Applications

- High Density Power Modules
- High Frequency AC-DC and DC-DC Converters
- High Performance PSU for Consumer and Industrial
- Resonant Conversion





PDSO-E3 6.10x6.60x2.30, 2.28P
(DPAK)
CASE 209AA

MARKING DIAGRAM

D100N70GN1 = Specific Device Code
A = Assembly Location
YY = Year
WW = Work Week
ZZ = Assembly Lot Code

MAXIMUM RATINGS (T_J = 25 °C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	700	V
Drain-to-Source Transient Voltage, t_P < 200 μs	$V_{DS(TRAN)}$	800	V
Pulsed Drain-to-Source Voltage, T_J = 25 °C (t_{TOTAL} < 10h) / T_J = 125 °C (t_{TOTAL} < 1h)	$V_{DS(PULSE)}$	750	V
Gate-to-Source Voltage	V_{GS}	−6 to 7	V
Gate-to-Source Transient Voltage, t_P = 50 ns, f_P = 100 kHz, Open Drain	$V_{GS(PULSE)}$	−20 to 10	V
Continuous Drain Current, T_{CASE} = 25 °C	I_{DS}	21	A
Pulsed Drain Current, t_P < 10 μs, T_C = 25 °C T_C = 125 °C	$I_{DS(PULSE)}$	 41 23	A
Power Dissipation, V_{GS} = 6 V, T_{CASE} = 25 °C	P_{TOT}	105	W
Operating Junction Temperature	T_J	−55 to 150	°C
Storage Temperature	T_{STG}	−55 to 150	°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 CHARACTERISTICS

Parameter	Symbol	Value	Unit
Junction-to-Case	$R_{\theta JC}$	1.19	°C/W
Junction-to-Ambient	$R_{\theta JA}$	54.8	°C/W
Maximum Soldering Temperature (MSL3)	T_{SLD}	260	°C

1. Device on 1 in^2, 2 oz copper pad on single layer FR-4 PCB

ORDERING INFORMATION

Device	Package	Shipping†
NTD100N70GN1TXG	PDSO-E3 (DPAK)	2500 / Tape & Reel

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

ELECTRICAL CHARACTERISTICS (T_J = 25 °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 V	700			V
Drain-to-Source Leakage Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 700 V		0.8	48	μA
		V_{GS} = 0 V, V_{DS} = 700 V, T_J = 125 °C		9		
Gate-to-Source Leakage Current	I_{GSS}	V_{GS} = 6 V, V_{DS} = 0 V		45		μA
ON CHARACTERISTICS						
Drain-to-Source On Resistance	$R_{DS(ON)}$	V_{GS} = 6 V, I_{DS} = 0.5 A		75	100	mΩ
		V_{GS} = 6 V, I_{DS} = 6 A		75		
		V_{GS} = 6 V, I_{DS} = 6 A, T_J = 125 °C		151		
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = V_{GS}, I_{DS} = 19.5 mA, T_J = 25 °C	1.2	1.6	2.5	V
		V_{DS} = V_{GS}, I_{DS} = 19.5 mA, T_J = 125 °C		1.5		
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS} = 400 V, V_{GS} = 0 V, f = 100 kHz		139		pF
Output Capacitance	C_{OSS}			47		
Reverse Transfer Capacitance	C_{RSS}			0.52		
Output Capacitance, Energy Related	$C_{OSS(ER)}$	V_{DS} = 0 V to 400 V, V_{GS} = 0 V		68.7		pF
Output Capacitance, Time Related	$C_{OSS(TR)}$			90.9		
Output Charge	Q_{OSS}			36.3		nC
Output Capacitance Stored Energy	E_{OSS}			5.5		μJ
Gate Resistance	R_G	f = 5 MHz		7		Ω
Gate Charge	Q_G	V_{DS} = 400 V, I_{DS} = 6 A, V_{GS} = 0/6 V		3.8		nC
Gate-to-Source Charge	Q_{GS}			0.3		
Gate-to-Drain Charge	Q_{GD}			1.4		
Gate Plateau Voltage	V_{PLAT}			2.1		V
REVERSE CONDUCTION CHARACTERISTICS						
Source-to-Drain Reverse Voltage	V_{SD}	V_{GS} = 0 V, I_{SD} = 6 A		2.4		V
Pulsed Reverse Current	$I_{SD(PULSE)}$	V_{GS} = 6 V, t_{PULSE} = 10 μs			41	A

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.

TYPICAL CHARACTERISTICS (T_J = 25 °C UNLESS OTHERWISE SPECIFIED)

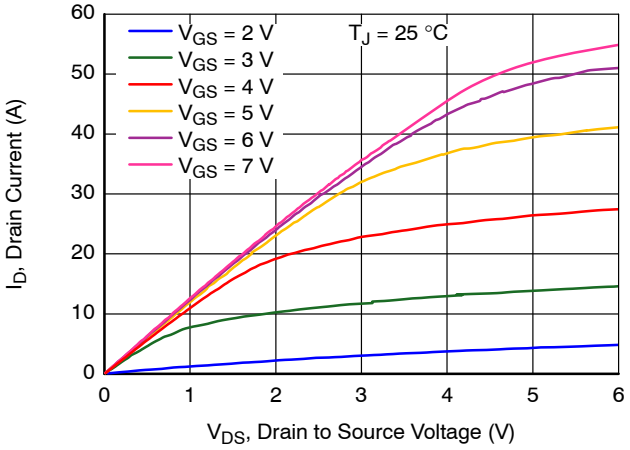


Figure 1. Output Characteristics at T_J = 25 °C

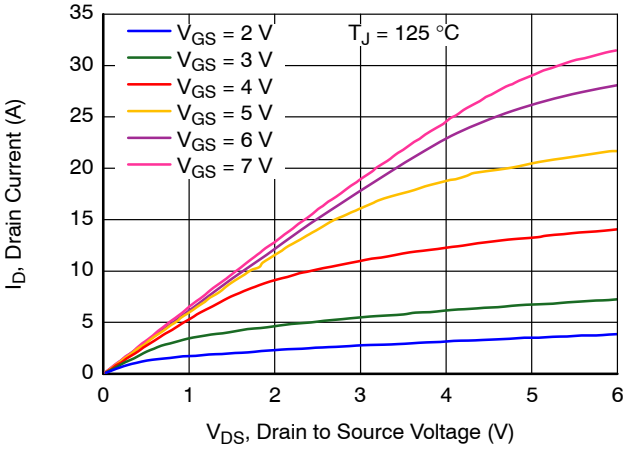


Figure 2. Output Characteristics at T_J = 125 °C

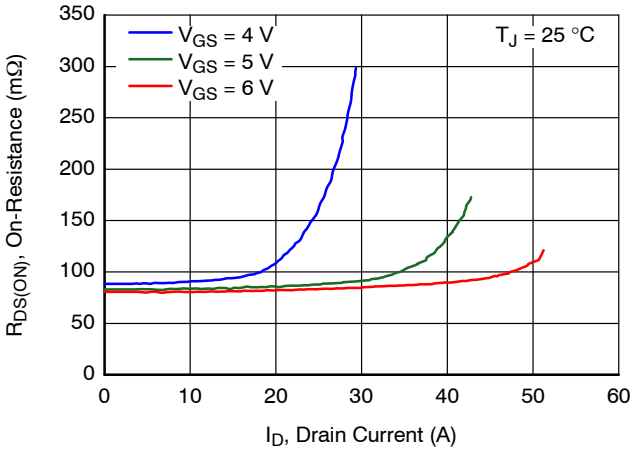


Figure 3. On-Resistance vs. Drain Current at T_J = 25 °C

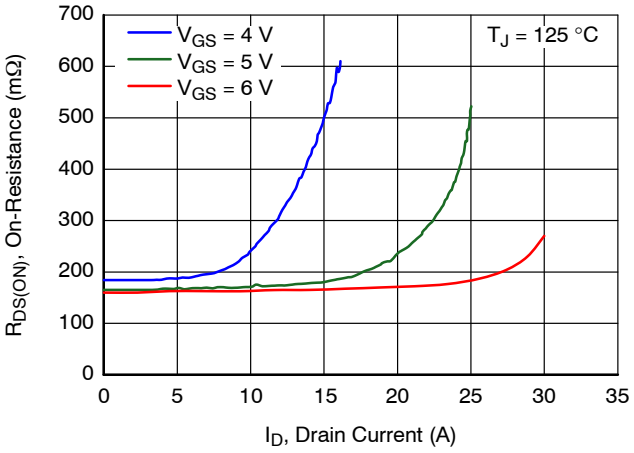


Figure 4. On-Resistance vs. Drain Current at T_J = 125 °C

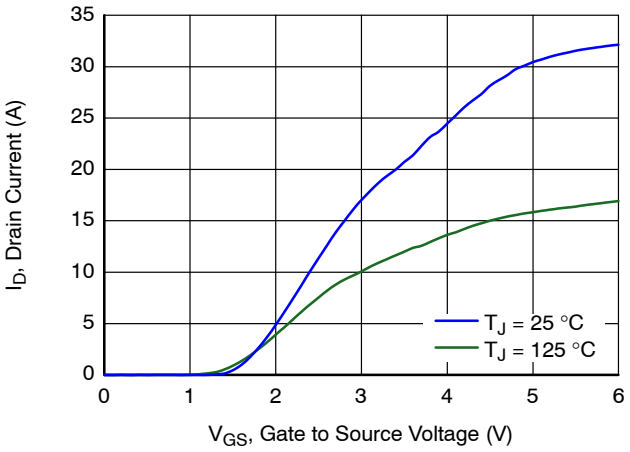


Figure 5. Transfer Characteristics at V_{DS} = 3 V

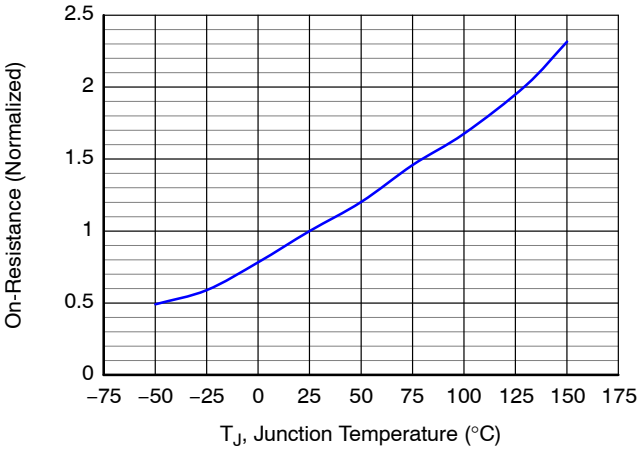


Figure 6. Normalized On-Resistance vs. Temperature at V_{GS} = 6 V

TYPICAL CHARACTERISTICS (T_J = 25 °C UNLESS OTHERWISE SPECIFIED) (CONTINUED)

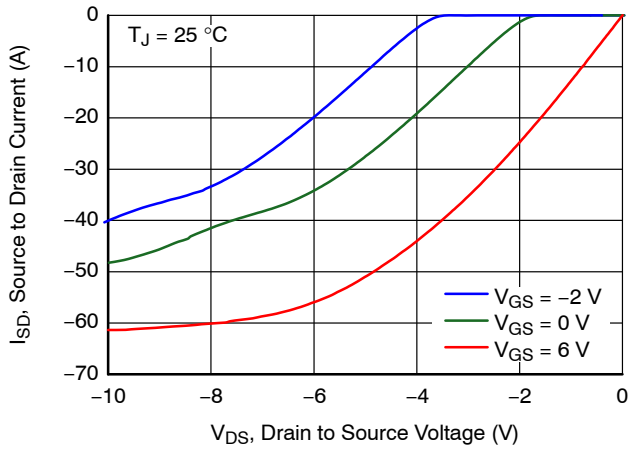


Figure 7. Reverse Conduction Characteristics at T_J = 25 °C

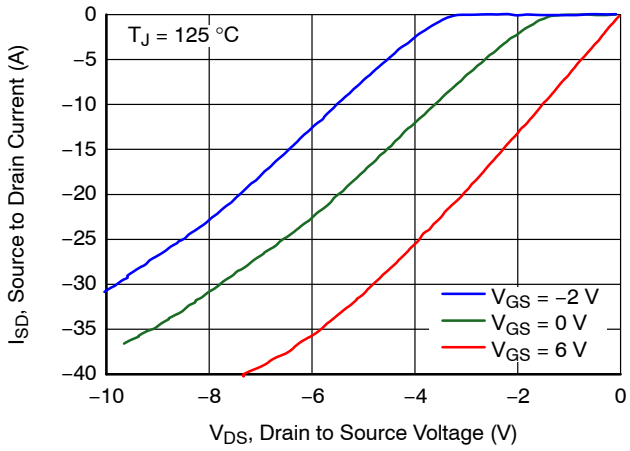


Figure 8. Reverse Conduction Characteristics at T_J = 125 °C

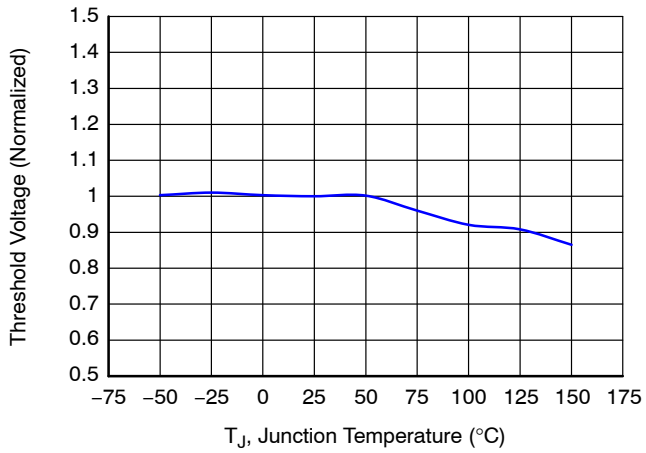


Figure 9. Normalized Threshold Voltage vs. Temperature

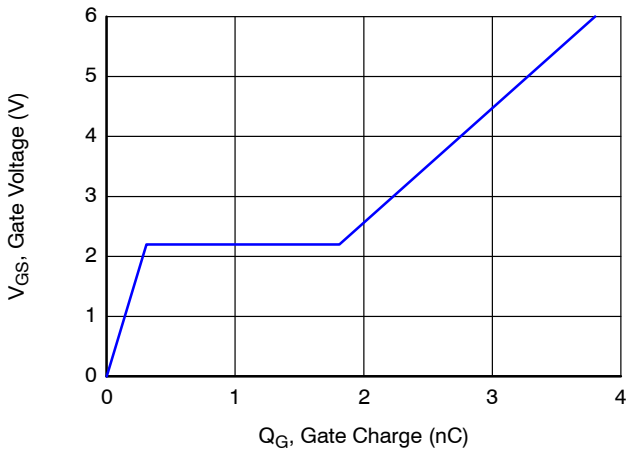


Figure 10. Gate Charge Characteristics at I_{DS} = 20 A

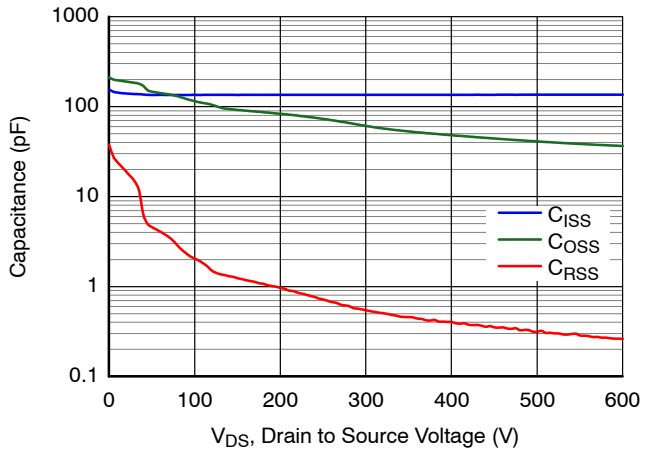


Figure 11. Capacitance Characteristics

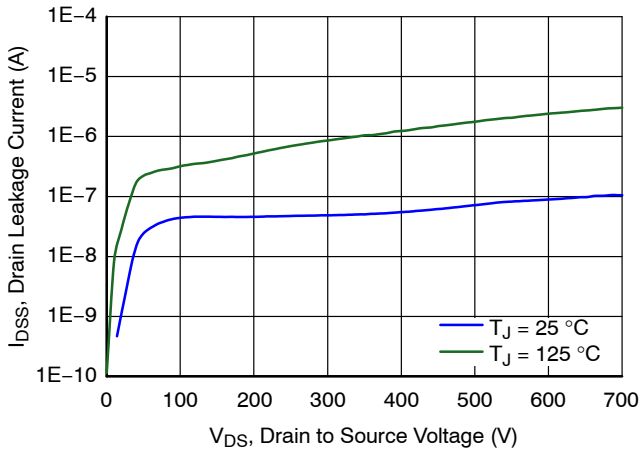


Figure 12. Drain Leakage Characteristics

TYPICAL CHARACTERISTICS (T_J = 25 °C UNLESS OTHERWISE SPECIFIED) (CONTINUED)

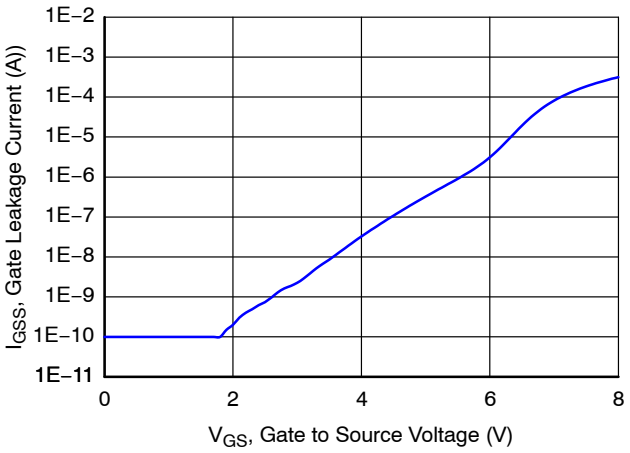


Figure 13. Gate Leakage Characteristics

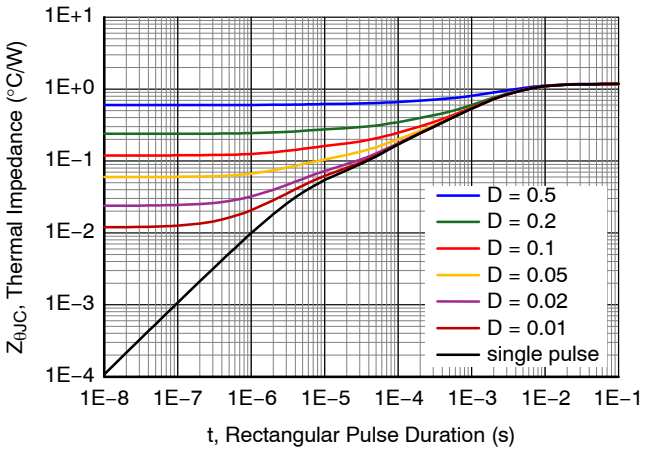


Figure 14. Transient Thermal Impedance

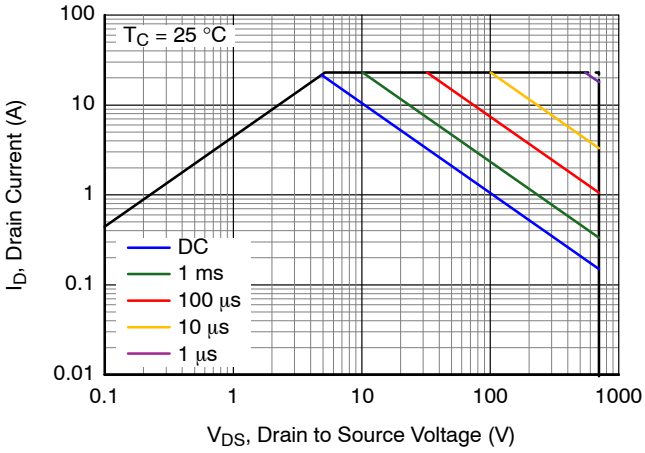


Figure 15. Safe Operating Area at T_C = 25 °C

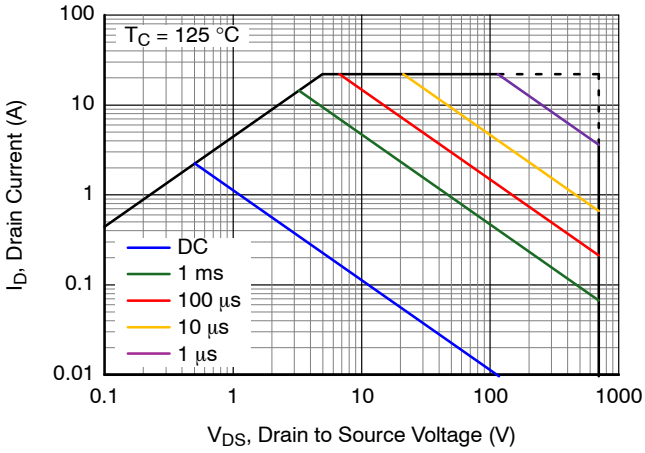
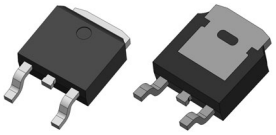


Figure 16. Safe Operating Area at T_C = 125 °C

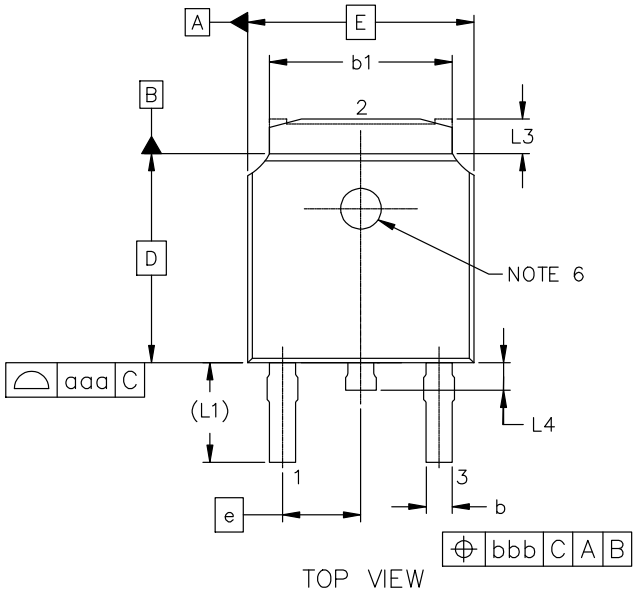
REVISION HISTORY

Revision	Description of Changes	Date
0	Initial production document release.	6/17/2026

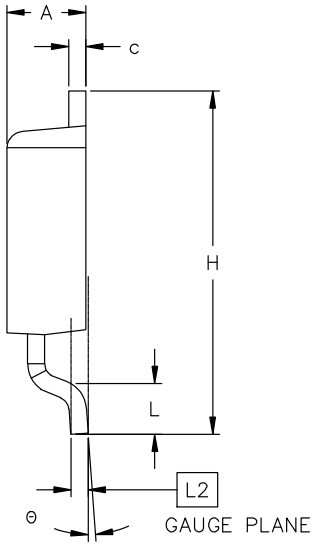


PDSO−E3 6.10x6.60x2.30, 2.28P
CASE 209AA
ISSUE O

DATE 04 MAY 2026

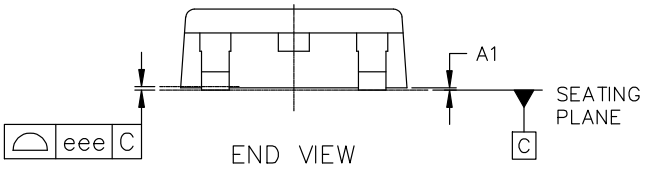


TOP VIEW

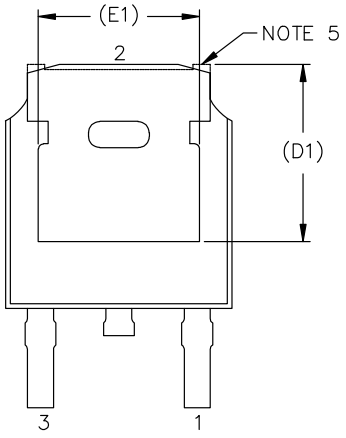


SIDE VIEW

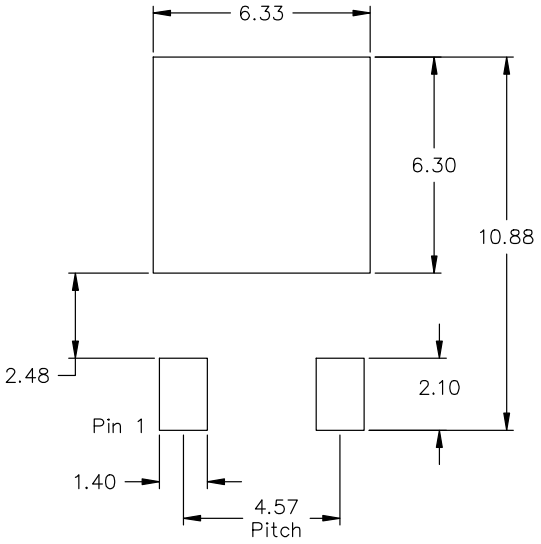
MILLIMETERS			
DIM	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	0.07	0.13
b	0.63	0.76	0.90
b1	5.10	5.33	5.46
c	0.43	0.53	0.61
D	6.10 BSC		
D1	5.30 REF		
E	6.60 BSC		
E1	4.83 REF		
e	2.286 BSC		
H	9.40	9.95	10.50
L	1.38	1.50	1.75
L1	2.90 REF		
L2	0.50 BSC		
L3	0.88	1.08	1.28
L4	0.50	0.75	1.00
θ	0°	5°	10°
TOLERANCE FORM & POSITION			
aaa	0.15		
bbb	0.20		
eee	0.10		



END VIEW



BOTTOM VIEW



RECOMMENDED MOUNTING FOOTPRINT

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

NOTES:
1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS DO NOT INCLUDE MOLD PROTRUSION.
4. PACKAGE OUTLINE EXCLUSIVE OF METAL BURR DIMENSIONS.
5. SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.
6. MOLD EJECTION PIN MARK IS OPTIONAL.

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CASE 209AA
ISSUE O

DATE 04 MAY 2026

GENERIC
MARKING DIAGRAM*

XXXX = Specific Device Code
A = Assembly Location
YY = Year
WW = Work Week
ZZ = Assembly Lot Code

*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.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales