Enhancement Mode Gallium Nitride (GaN) HEMT

700 V, 132 mΩ, 12 A, PTFP-N9 (DFN)

NTMT170N70GN1

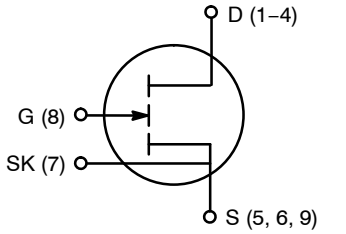
$V_{(BR)DSS}$	$R_{DS(ON)}$ TYP	I_{DS} MAX
700 V	132 mΩ	12 A

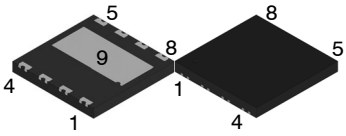
Features

- Low $R_{DS(ON)}$ to Minimize Conduction Losses
- Ultra Low Gate Charge for High Speed Switching
- FOM-Q_G = 280 nC*mW
- 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





PTFO-N9 8.00 x 8.00 x 0.90, 2.00P (DFN)
CASE 522AG

MARKING DIAGRAM

MT170N70GN1 = Specific Device Code
A = Assembly Location
YY = Year
WW = Work Week
ZZ = Assembly Lot

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

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} < 10 h)/ T_J = 125 °C (t_{TOTAL} < 1 h)	$V_{DS(PULSE)}$	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}	12	A
Pulsed Drain Current, t_P < 10 μs, T_C = 25 °C T_C = 125 °C	$I_{DS(PULSE)}$	24 13	A
Power Dissipation, V_{GS} = 6 V, T_{CASE} = 25 °C	P_{TOT}	69	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	$R_{\theta JC}$	1.81	°C/W
Junction-to-Ambient (Note 1)	$R_{\theta JA}$	67.3	°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†
NTMT170N70GN1TXG	PTFO-N9 (DFN)	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 specified)

Parameter	Test Conditions	Symbols	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	V_{GS} = 0 V	$V_{(BR)DSS}$	700			V
Drain-to-Source Leakage Current	V_{GS} = 0 V, V_{DS} = 700 V	I_{DSS}		0.5	28	μA
	V_{GS} = 0 V, V_{DS} = 700 V, T_J = 125 °C			5.3		
Gate-to-Source Leakage Current	V_{GS} = 6 V, V_{DS} = 0 V	I_{GSS}		26		μA
ON CHARACTERISTICS						
Drain-to-Source On Resistance	V_{GS} = 6 V, I_{DS} = 0.5 A	$R_{DS(ON)}$		132	170	mΩ
	V_{GS} = 6 V, I_{DS} = 4 A			132		
	V_{GS} = 6 V, I_{DS} = 4 A, T_J = 125 °C			254		
Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 10.7 mA, T_J = 25 °C	$V_{GS(TH)}$	1.2	1.6	2.5	V
	V_{DS} = V_{GS}, I_{DS} = 10.7 mA, T_J = 125 °C			1.5		
DYNAMIC CHARACTERISTICS						
Input Capacitance	V_{DS} = 400 V, V_{GS} = 0 V, f = 100 kHz	C_{ISS}		78		pF
Output Capacitance		C_{OSS}		27		
Reverse Transfer Capacitance		C_{RSS}		0.3		
Output Capacitance, Energy Related	V_{DS} = 0 V to 400 V, V_{GS} = 0 V	$C_{OSS(ER)}$		38.6		pF
Output Capacitance, Time Related		$C_{OSS(TR)}$		51.1		
Output Charge		Q_{OSS}		20.4		nC
Output Capacitance Stored Energy		E_{OSS}		3.1		μJ
Gate Resistance	f = 5 MHz	R_G		11		Ω
Gate Charge	V_{DS} = 400 V, I_{DS} = 4 A, V_{GS} = 0/6 V	Q_G		2.1		nC
Gate-to-Source Charge		Q_{GS}		0.2		
Gate-to-Drain Charge		Q_{GD}		0.8		
Gate Plateau Voltage		V_{PLAT}		2.1		V
REVERSE CONDUCTION CHARACTERISTICS						
Source-to-Drain Reverse Voltage	V_{GS} = 0 V, I_{SD} = 4 A	V_{SD}		2.4		V
Pulsed Reverse Current	V_{GS} = 6 V, t_{PULSE} = 10 μs	$I_{SD(PULSE)}$			24	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)

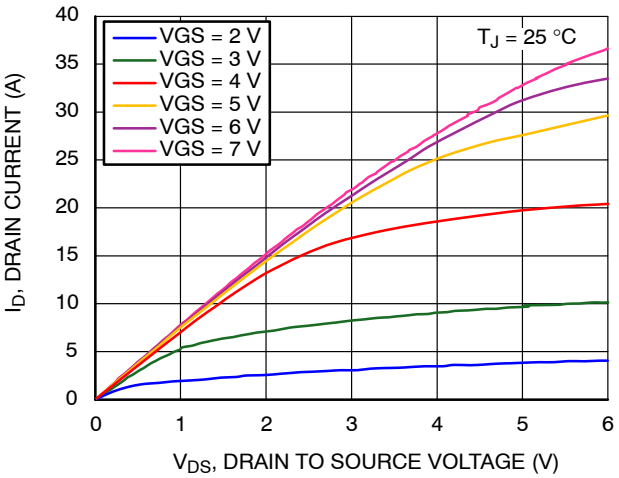


Figure 1. Output Characteristics at T_J = 25 °C

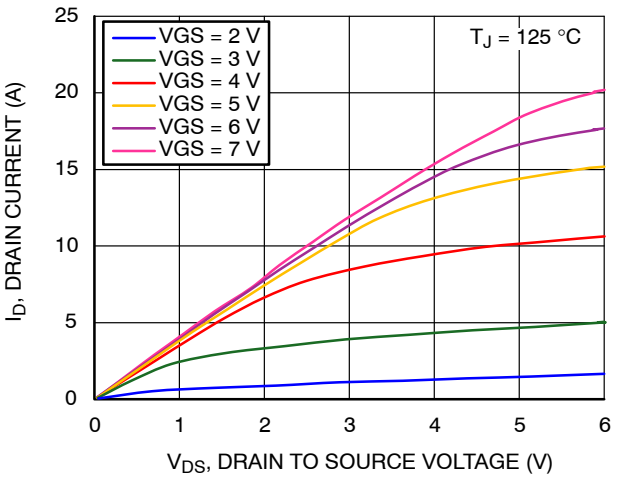


Figure 2. Output Characteristics at T_J = 125 °C

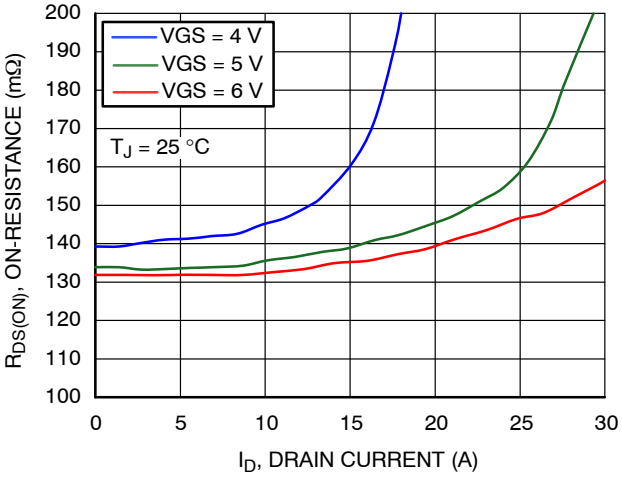


Figure 3. On-Resistance vs. Drain Current at T_J = 25 °C

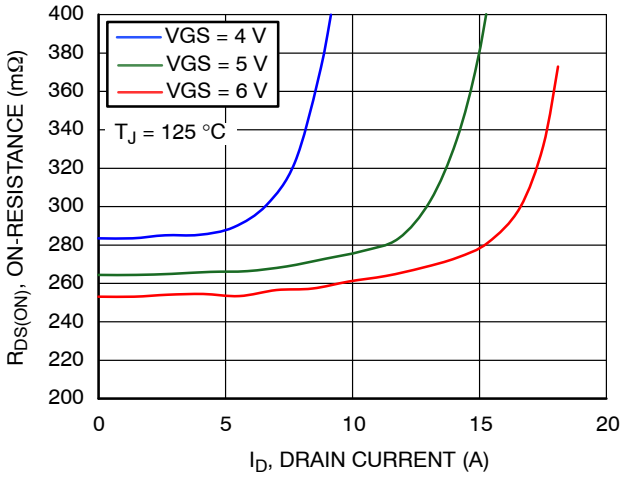


Figure 4. On-Resistance vs. Drain Current at T_J = 125 °C

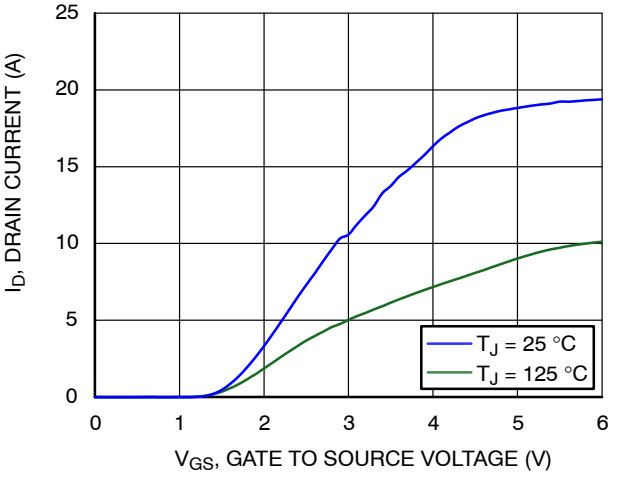


Figure 5. Transfer Characteristics at V_{DS} = 3 V

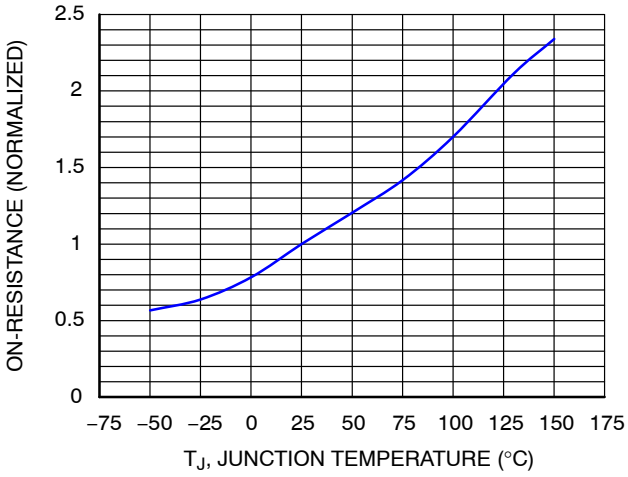


Figure 6. Normalized On-Resistance vs. Temperature at V_{GS} = 6 V

TYPICAL CHARACTERISTICS (T_J = 25 °C unless otherwise specified) (continued)

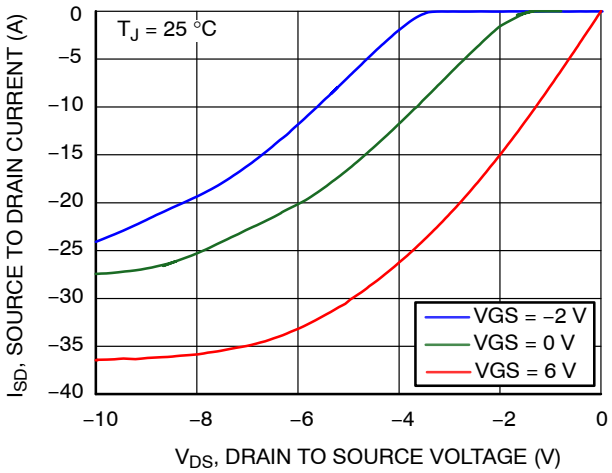


Figure 7. Reverse Conduction Characteristics at T_J = 25 °C

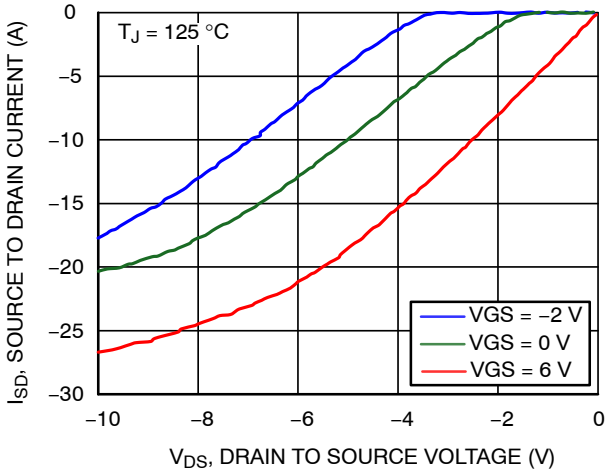


Figure 8. Reverse Conduction Characteristics at T_J = 125 °C

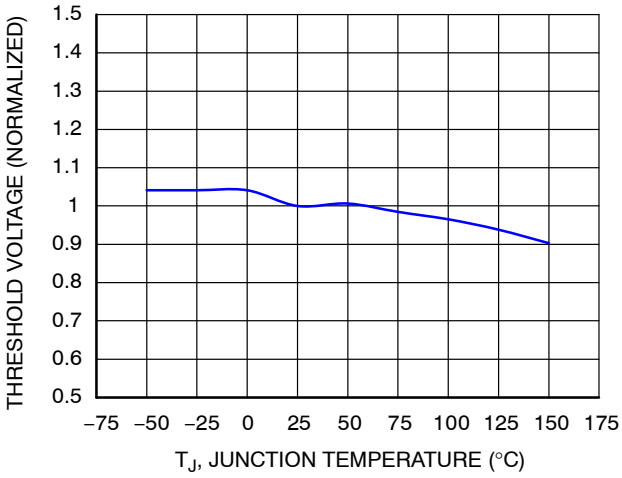


Figure 9. Normalized Threshold Voltage vs. Temperature

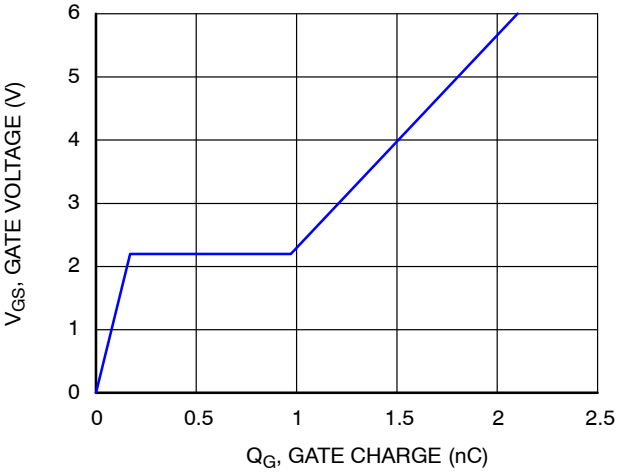


Figure 10. Gate Charge Characteristics at I_{DS} = 20 A

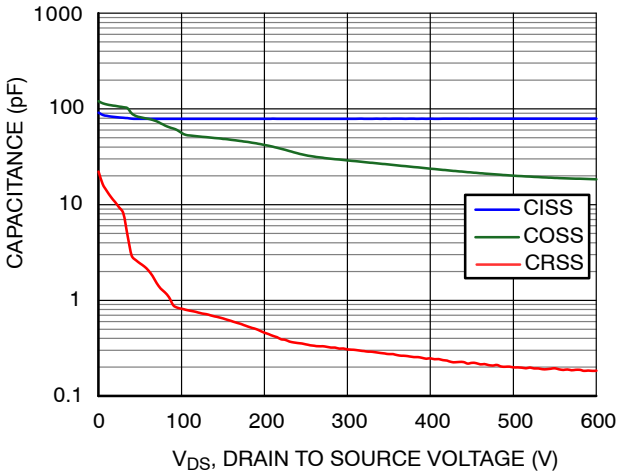


Figure 11. Capacitance Characteristics

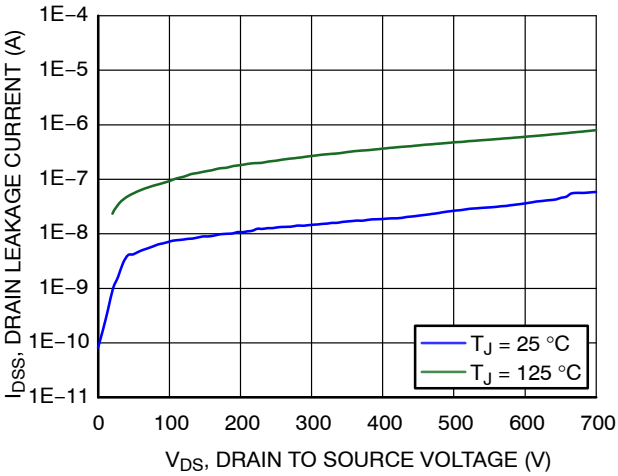


Figure 12. Drain Leakage Characteristics

TYPICAL CHARACTERISTICS (T_J = 25 °C unless otherwise specified) (continued)

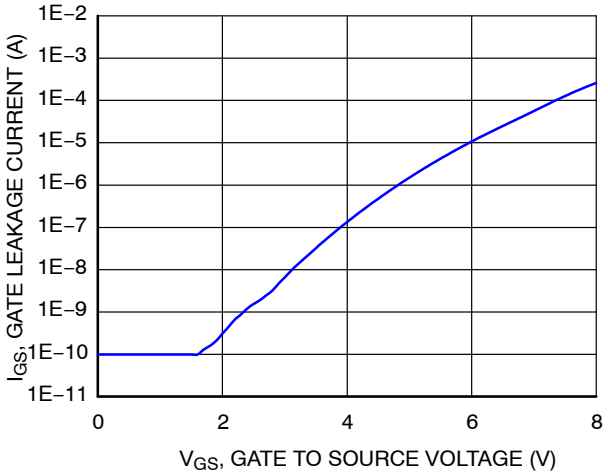


Figure 13. Gate Leakage Characteristics

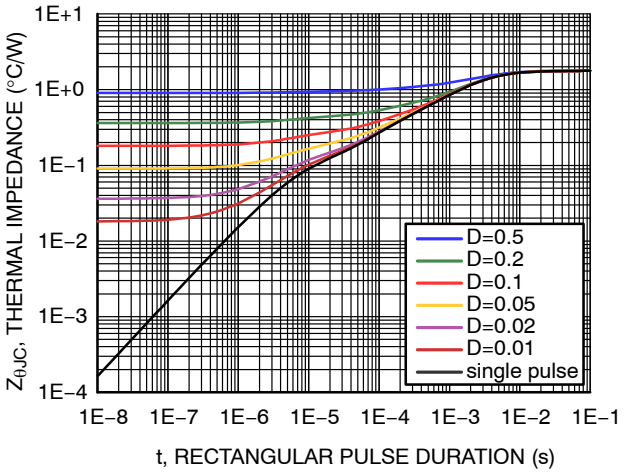


Figure 14. Transient Thermal Impedance

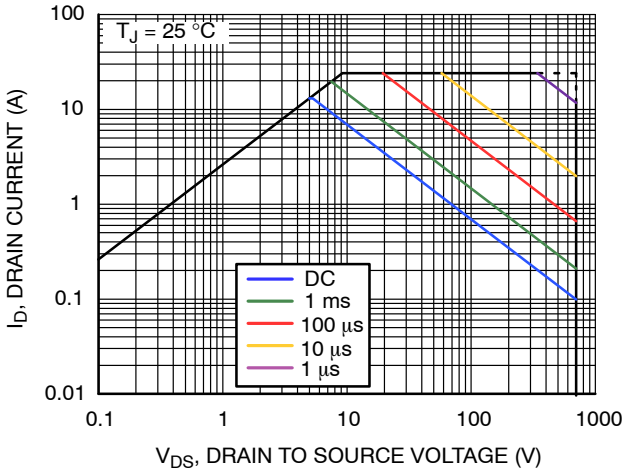


Figure 15. Safe Operating Area at T_C = 25 °C

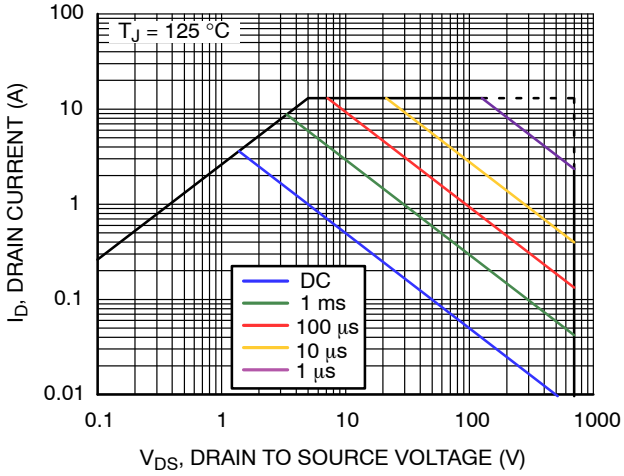
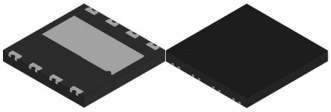


Figure 16. Safe Operating Area at T_C = 125 °C

REVISION HISTORY

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



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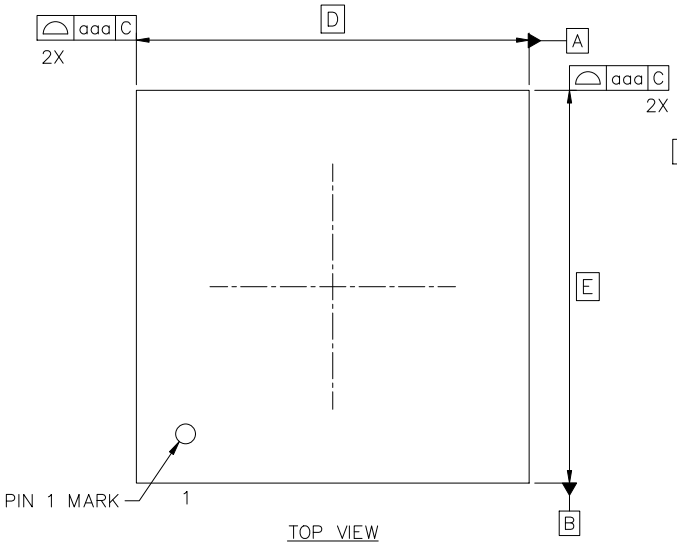
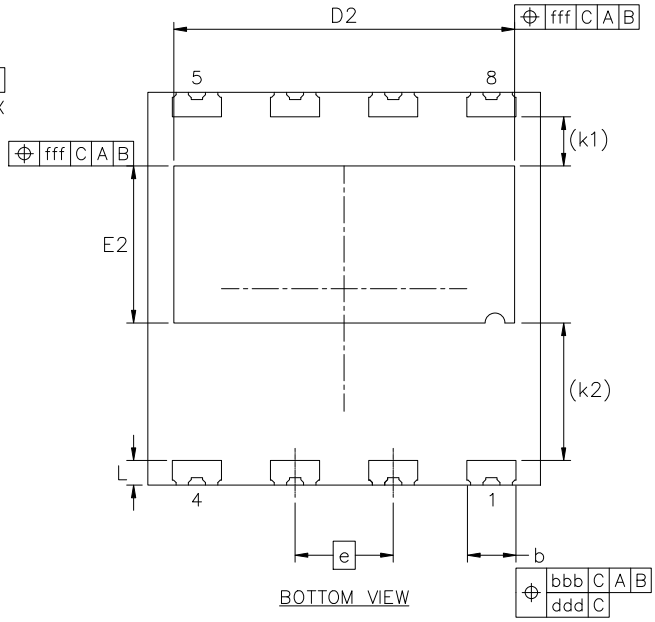
ISSUE O

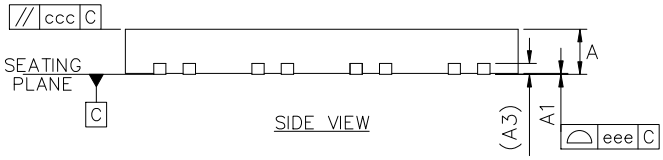
DATE 04 MAY 2026



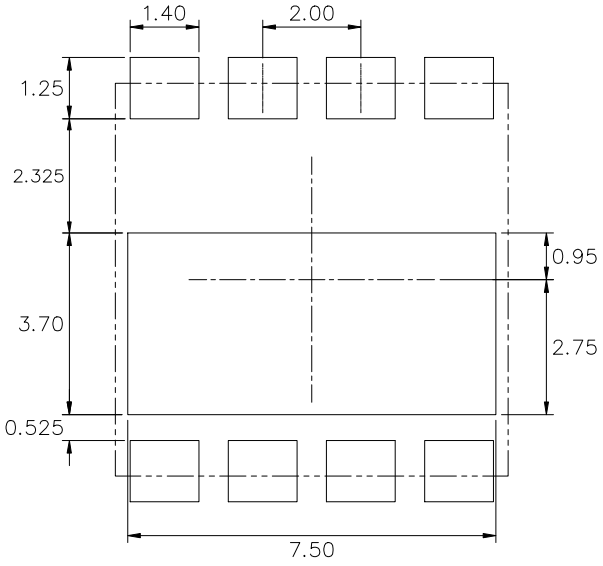
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED MOUNTING FOOTPRINT

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

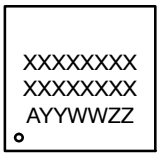
NOTES:
1. ALL DIMENSION AND TOLERANCE CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS
3. DRAWING NOT TO SCALE.
4. DIMENSION DO NOT INCLUDE MOLD PROTRUSION.
5. PACKAGE OUTLINE EXCLUSIVE OF METAL BURR DIMENSIONS.

MILLIMETER			
SYMBOL	MIN.	NOM.	MAX.
A	0.80	0.90	1.00
A1	0.00	0.02	0.05
A3		0.203 REF.	
b	0.95	1.00	1.05
D		8.00 BSC	
D2	6.84	6.94	7.04
E		8.00 BSC	
E2	3.10	3.20	3.30
e		2.00 BSC	
k1		1.00 REF.	
k2		2.80 REF.	
L	0.40	0.50	0.60
TOLERANCE FORM & POSITION			
aaa		0.10	
bbb		0.10	
ccc		0.10	
ddd		0.05	
eee		0.10	
fff		0.10	

PTFP−N9 8.00x8.00x0.90, 2.00P
CASE 522AG
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