DATA SHEET
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MOSFET - Power, Single N-Channel, SO8-FL

30 V, 0.52 mΩ, 464 A

NTMFS0D5N03C

Features

- Advanced Package (5x6mm) with Excellent Thermal Conduction
- Ultra Low $R_{DS(on)}$ to Improve System Efficiency
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- ORing
- Motor Drive
- Power Load Switch
- DC−DC Converters
- Battery Management and Protection

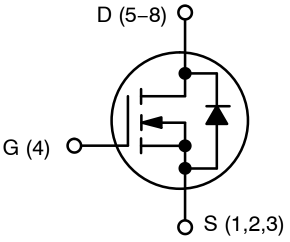
MAXIMUM RATINGS (T_J = 25°C unless otherwise stated)

Parameter			Symbol	Value	Unit
Drain−to−Source Voltage			V_{DSS}	30	V
Gate−to−Source Voltage			V_{GS}	±20	V
Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State	T_C = 25°C	I_D	464	A
		T_C =100°C		328	
Power Dissipation $R_{\theta JC}$ (Note 2)		T_C = 25°C	P_D	200	W
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2)	Steady State	T_A = 25°C	I_D	65	A
		T_A = 100°C		46	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		T_A = 25°C	P_D	3.9	W
Pulsed Drain Current	T_A = 25°C, t_p = 10 µs		I_{DM}	900	A
Source Current (Body Diode)			I_S	166	A
Single Pulse Drain−to−Source Avalanche Energy (I_L = 96 A_{pk})			E_{AS}	467	mJ
Operating Junction and Storage Temperature Range			T_J, T_{STG}	−55 to +175	°C
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.

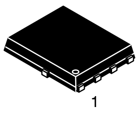
1. Surface−mounted on FR4 board using 1 in^2 pad, 2 oz Cu pad.
2. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
30 V	0.52 mΩ @ 10 V	464 A
	0.78 mΩ @ 4.5 V	

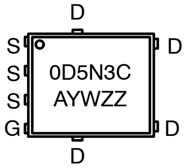


N−CHANNEL MOSFET

MARKING DIAGRAMS



DFN5 (SO−8FL)
CASE 506EZ



A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceabililty

ORDERING INFORMATION

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

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction−to−Case − Steady State (Note 1)	$R_{\theta JC}$	0.8	°C/W
Junction−to−Ambient * Steady State (Note 1)	$R_{\theta JA}$	38	

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

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$			30	–	–	V
Drain−to−Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	I_D = 250 μA. ref to 25°C		–	11	–	mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0 V, V_{DS} = 30 V	T_J = 25°C	–	–	1.0	μA
			T_J = 125°C	–	–	100	
Gate−to−Source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = 20 V		–	–	100	nA
ON CHARACTERISTICS (Note 3)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 330 μA		1.3	–	2.2	V
Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	I_D = 330 μA. ref to 25°C		–	−5.9	–	mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A		–	0.43	0.52	mΩ
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 30 A		–	0.62	0.78	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 3 V, I_D = 30 A		–	208	–	S
Gate Resistance	R_G	T_A = 25°C		–	0.4	–	Ω
CHARGES AND CAPACITANCES							
Input Capacitance	C_{ISS}	V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz		–	13000	–	pF
Output Capacitance	C_{OSS}			–	6540	–	
Reverse Transfer Capacitance	C_{RSS}			–	146	–	
Output Charge	Q_{OSS}			–	154	–	nC
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 15 V; I_D = 30 A		–	80	–	nC
Threshold Gate Charge	$Q_{G(TH)}$			–	20	–	
Gate−to−Drain Charge	Q_{GD}			–	13	–	
Gate−to−Source Charge	Q_{GS}			–	33	–	
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DS} = 15 V; I_D = 30 A		–	178	–	nC
SWITCHING CHARACTERISTICS (Note 4)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DS} = 15 V, I_D = 30 A, R_G = 3.0 Ω		–	29	–	ns
Rise Time	t_r			–	13	–	
Turn−Off Delay Time	$t_{d(OFF)}$			–	108	–	
Fall Time	t_f			–	20	–	
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 30 A	T_J = 25°C	–	0.75	1.2	V
			T_J = 125°C	–	0.58	–	
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dIS/dt = 100 A/μs, V_{DS} = 15 V, I_S = 30 A		–	103	–	ns
Reverse Recovery Charge	Q_{RR}			–	160	–	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.

3. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
4. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

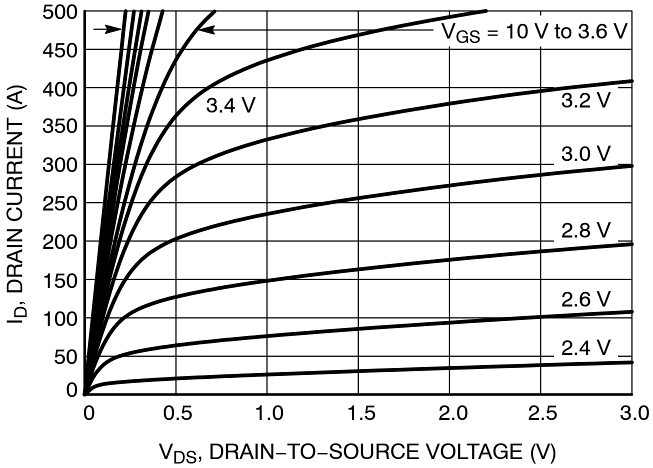


Figure 1. On−Region Characteristics

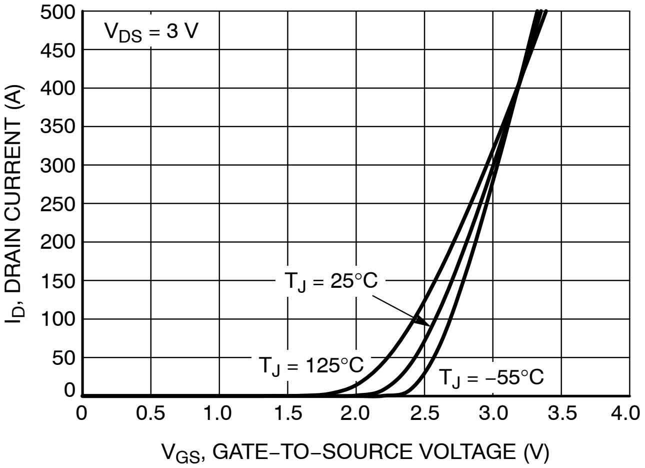


Figure 2. Transfer Characteristics

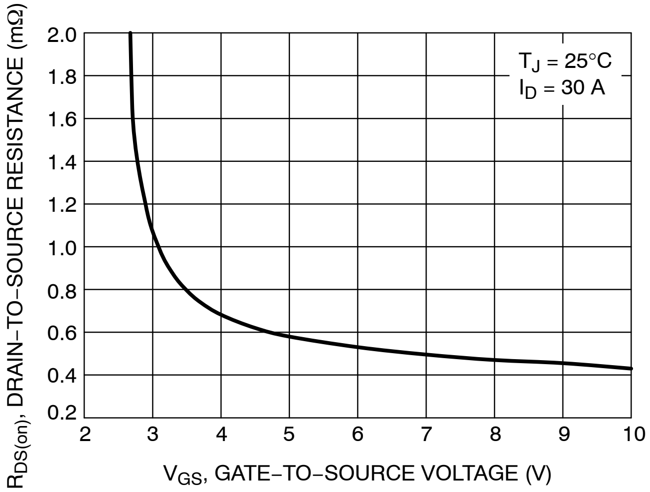


Figure 3. On−Resistance vs. Gate−to−Source Voltage

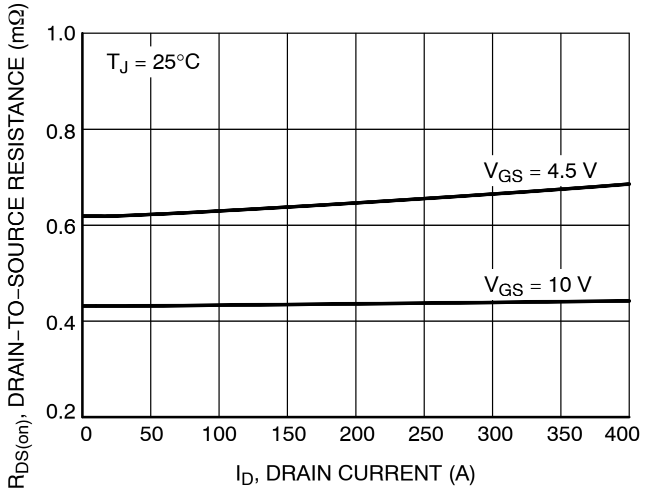


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

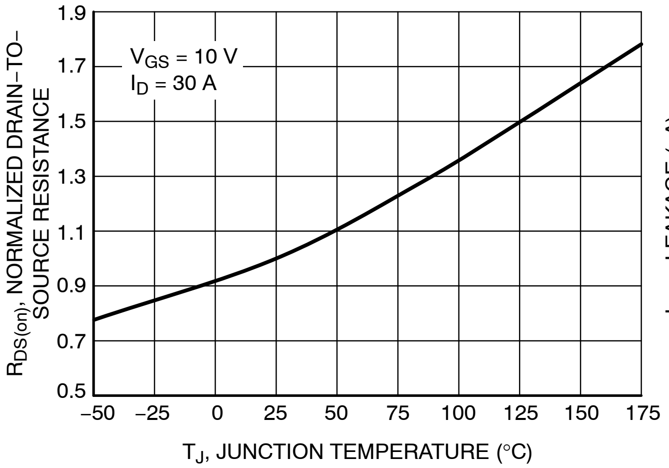


Figure 5. On−Resistance Variation with Temperature

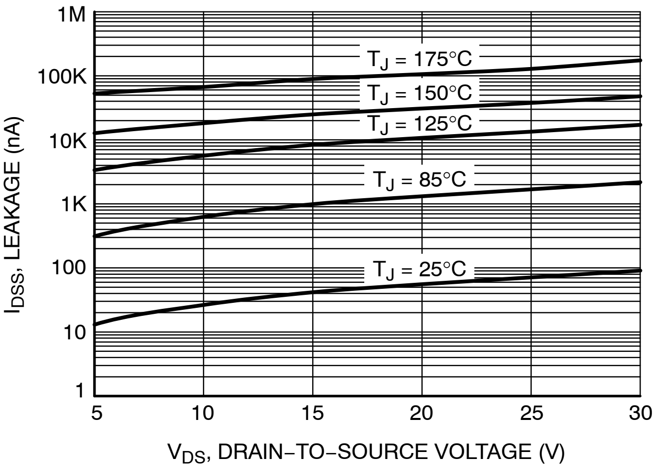


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

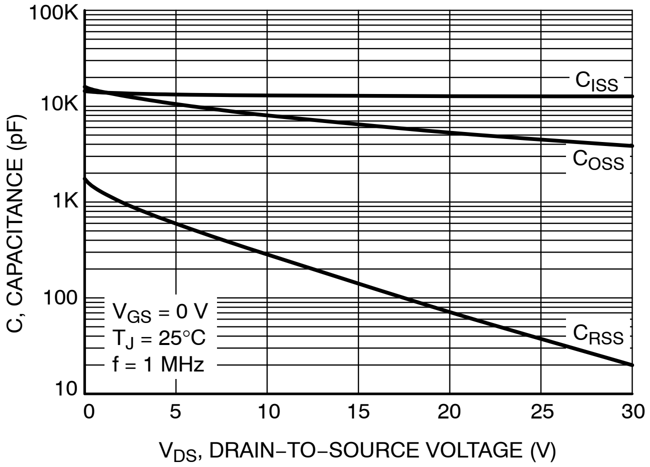


Figure 7. Capacitance Variation

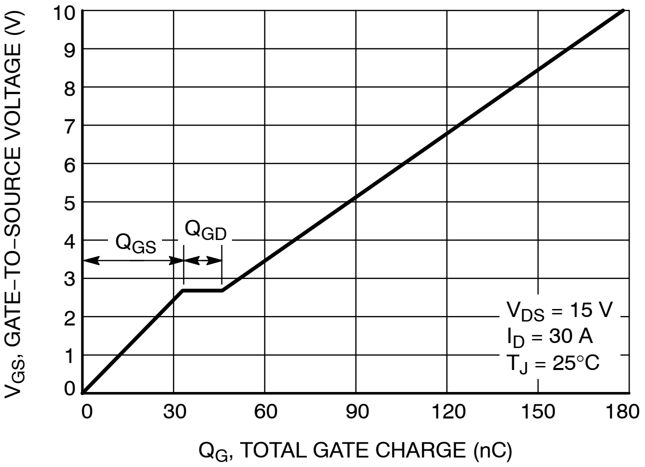


Figure 8. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

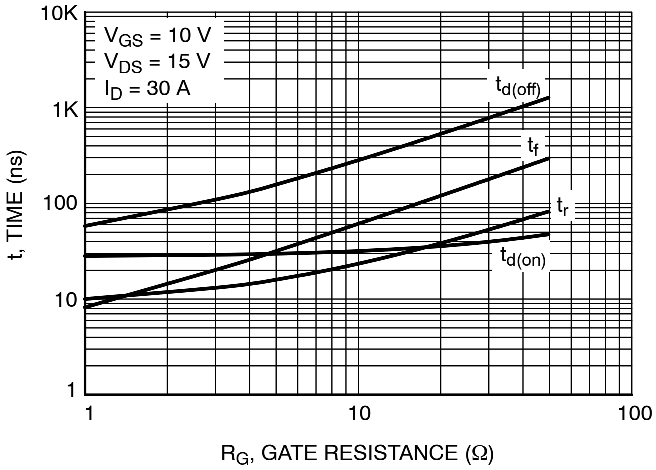


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

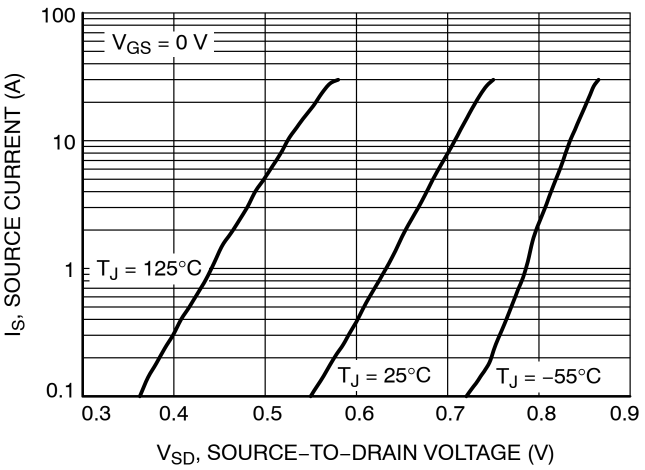


Figure 10. Diode Forward Voltage vs. Current

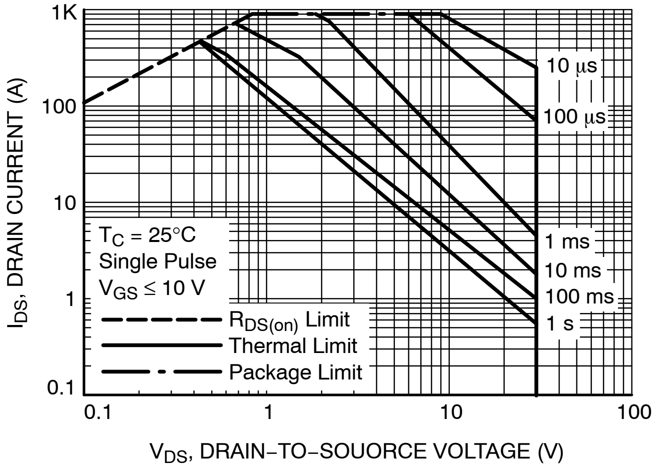


Figure 11. Safe Operating Area

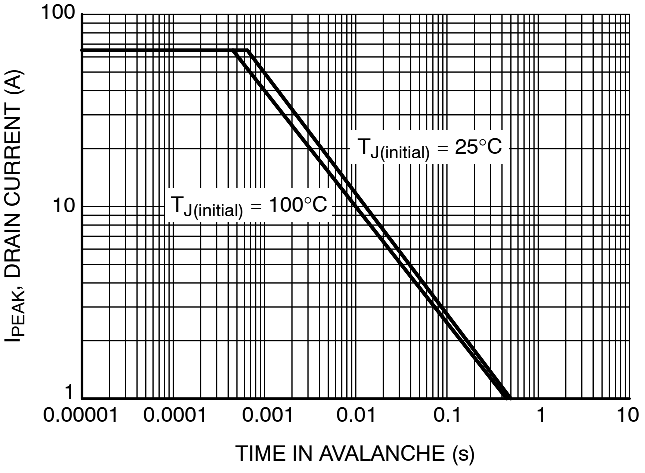


Figure 12. I_{PEAK} vs. Time in Avalanche

TYPICAL CHARACTERISTICS

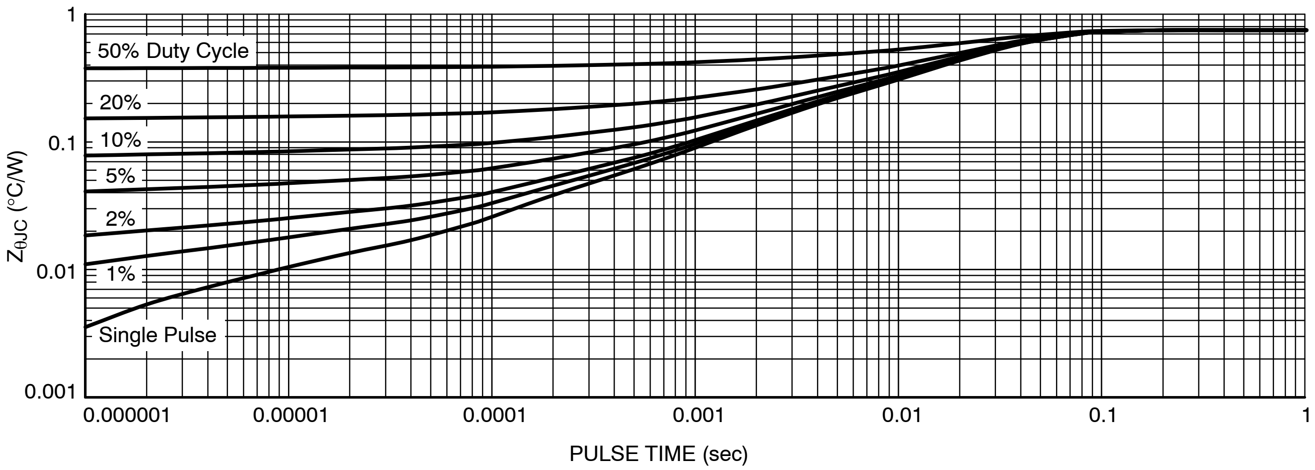
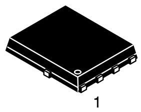


Figure 13. Thermal Characteristics

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NTMFS0D5N03CT1G	0D5N3C	DFN5 (Pb−Free)	1500 / 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.



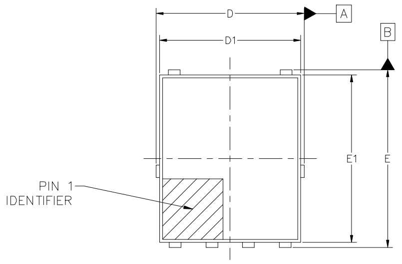
SCALE 2:1

DFN5, 4.90 x 5.90 x 1.00, 1.27P
CASE 506EZ
ISSUE B

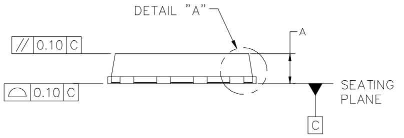
DATE 16 SEP 2024

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

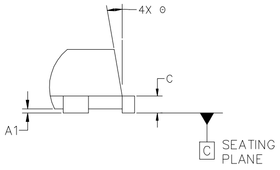
MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.80	3.85
e	1.27 BSC		
G	0.51	0.575	0.71
k	1.10	1.20	1.40
L	0.51	0.575	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ	0°	---	12°



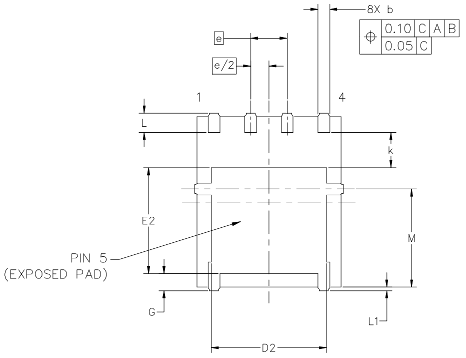
TOP VIEW



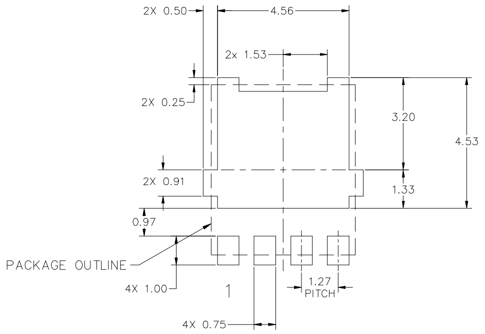
SIDE VIEW



DETAIL "A"
SCALED 2:1



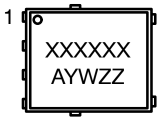
BOTTOM VIEW



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.

GENERIC MARKING DIAGRAM*



XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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:	**DFN5, 4.90 x 5.90 x 1.00, 1.27P**	**PAGE 1 OF 1**

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