

MOSFET - Power, N-Channel, Silicon Carbide 900 V, 53.1 mΩ, 67 A TO-247-4LD



ON Semiconductor®

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Product Preview NTH4L060N090SC1

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

Parameter	Symbol	Value	Unit	
Drain-to-Source Voltage	V _{DSS}	900	V	
Gate-to-Source Voltage	V _{GS}	+19/-8	V	
Continuous Drain Current R _{θJC}	I _D	66.9	A	
Power Dissipation R _{θJC}				320
Continuous Drain Current R _{θJC}	I _D	49.0	A	
Power Dissipation R _{θJC}				P _D
Continuous Drain Current R _{θJA}	I _D	TBD	A	
Power Dissipation R _{θJA}				P _D
Continuous Drain Current R _{θJA}	I _D	TBD	A	
Power Dissipation R _{θJA}				P _D
Pulsed Drain Current R _{θJC}	T _C = 25°C, t _p = 10 μs	I _{DM}	383	
Operating Junction and Storage Temperature	T _J , T _{stg}	-55 to +175	°C	
Source Current (Body Diode)	I _S	86.3	A	
Single Pulse Drain-to-Source Avalanche Energy (T _J = 25°C, V _{GS} = 15 V, I _{LPK} = 1 A, L = 0.1 mH, R _G = 25 Ω)	E _{AS}	TBD	mJ	
Maximum Lead Temperature for Soldering, (1/8" from Case for 5 seconds)	T _L	TBD	°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.

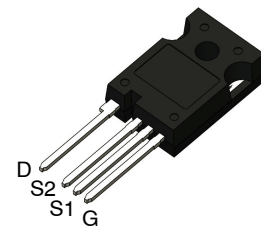
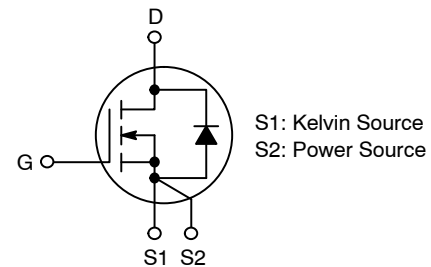
THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Case - Steady State	R _{θJC}	0.468	°C/W
Junction-to-Ambient - Steady State	R _{θJA}	TBD	

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

V _{(BR)DSS}	R _{DS(ON) MAX}	I _{D MAX}
900 V	53.1 mΩ @ 15 V	67 A

N-CHANNEL MOSFET



TO-247-4LD
CASE 340CJ

ORDERING INFORMATION

Device	Package	Shipping†
NTH4L060N090SC1	TO-247	TBD / 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.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 2.50e - 04A, T _C = 25°C	900			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J	V _{GS} = 0 V, I _D = 2.50e - 04A, T _{Jmax} = 175°C		-93.5		V/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 900 V	T _C = 25°C		10	μA
			T _C = 175°C		250	
Gate-to-Source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = +19/-8 V			250	nA

ON CHARACTERISTICS

Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 15 V, I _D = 21.3 A		53.1		mΩ
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 5.34e-03 A		2.09		V
Gate Threshold Voltage Temperature Coefficient	V _{GS(TH)} /T _J	V _{GS} = V _{DS} , I _D = 5.34e-03 A		-5.33		mV/°C
Forward Transconductance	g _{FS}	V _{DS} = 10 V, I _D = 21.3 A		11.2		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Gate-Resistance	R _G	V _{GS} = 0 V, V _{DS} = 450 V		4.93		Ω
Input Capacitance	C _{ISS}			1780		pF
Reverse Transfer Capacitance	C _{RSS}			9.94		
Output Capacitance	C _{OSS}			107		
Effective Output Capacitance	C _{OSSef}	V _{GS} = 0 V, V _{DS} = 0 to 450 V		204		μJ
Energy Related Output Capacitance	C _{OSSer}			140		
C _{OSS} Stored Energy	E _{OSS}			14.2		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 15 V, V _{DS} = 720 V, I _D = 10.7 A		61.8		nC
Gate-to-Source Charge	Q _{GS}			12.1		
Gate-to-Drain Charge	Q _{GD}			20.9		

SWITCHING CHARACTERISTICS

Turn-On Delay Time	t _{d(ON)}	V _{GS} = -8/15 V, V _{DS} = 720 V, I _D = 10.7 A, R _G = 6 Ω		26.3		ns
Turn-Off Delay Time	t _{d(OFF)}			33.5		
Rise Time	t _r			8.95		
Fall Time	t _f			14.4		
Turn-On Switching Loss	E _{ON}			0.158		mJ
Turn-Off Switching Loss	E _{OFF}			0.031		
Total Switching Loss	E _{tot}			0.190		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	I _D = 10.7 A		2.97		V
Reverse Recovery Time	t _{RR}	V _{GS} = -8/15 V, V _{DS} = 720 V, di _s /dt = 1000 A/μs, I _D = 10.7 A		45.6		ns
Reverse Recovery Charge	Q _{RR}			149		nC
Reverse Recovery Energy	E _{REC}			33.2		μJ
Peak Reverse Recovery Current	I _{RRM}			7.48		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.

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TYPICAL CHARACTERISTICS

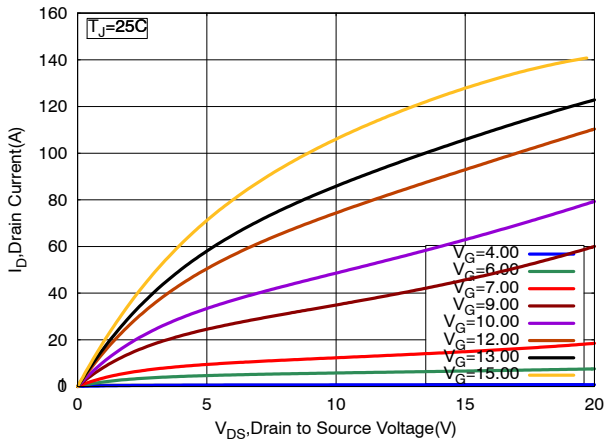


Figure 1. On-Region Characteristics

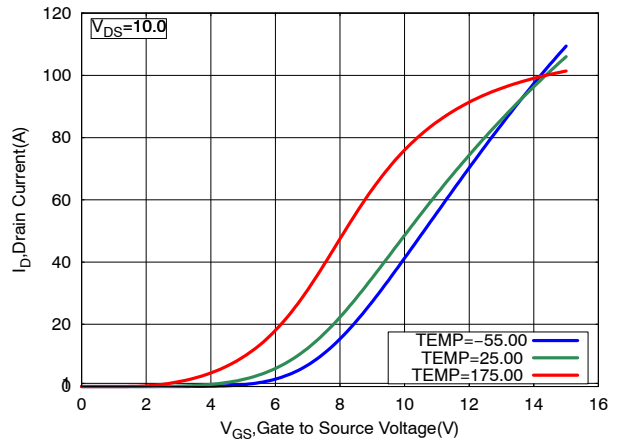


Figure 2. Transfer Characteristics

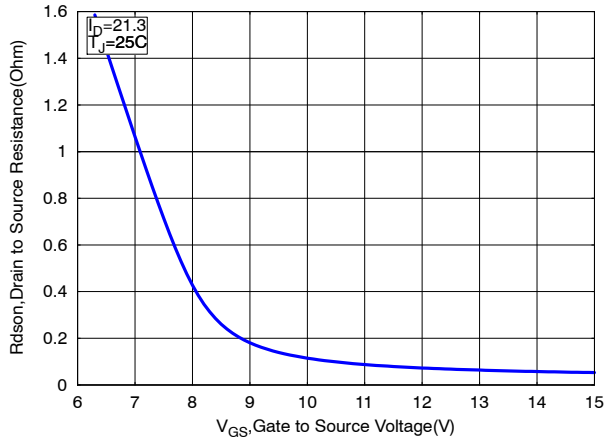


Figure 3. On-Resistance vs. VGS

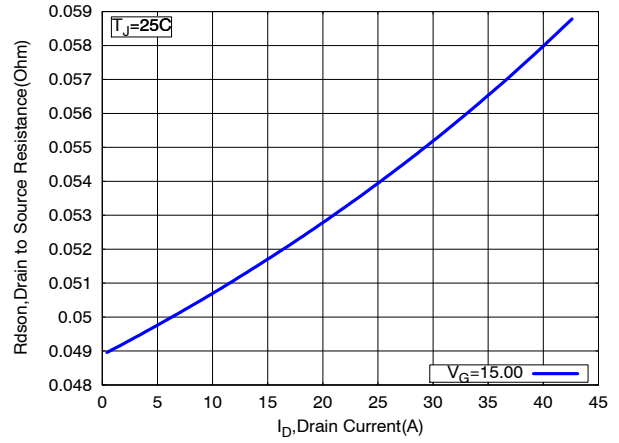


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

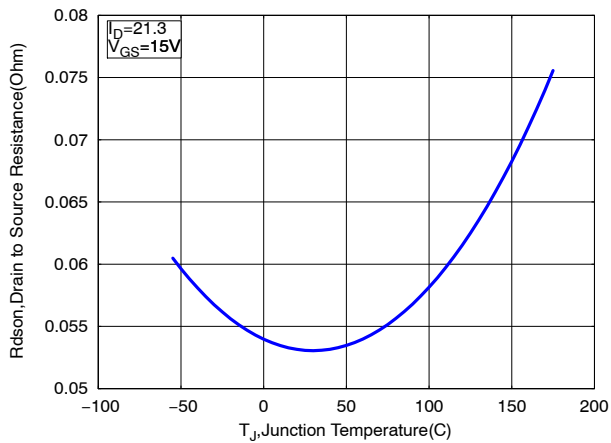


Figure 5. On-Resistance Variation with Temperature

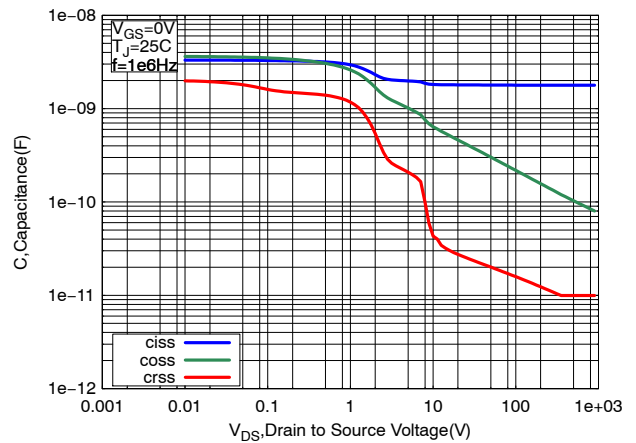


Figure 6. Capacitance Variation

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TYPICAL CHARACTERISTICS

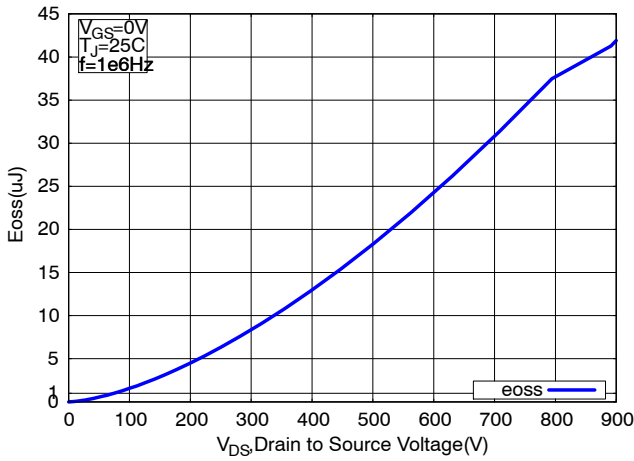


Figure 7. Eoss vs. Drain to Source Voltage

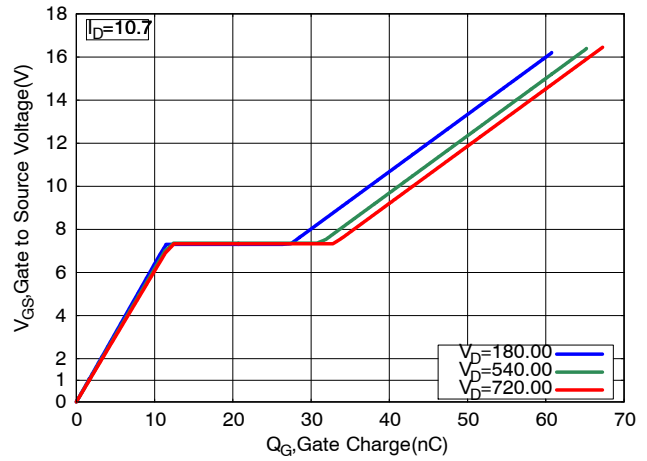


Figure 8. Gate-to-Source Voltage vs. Total Charge

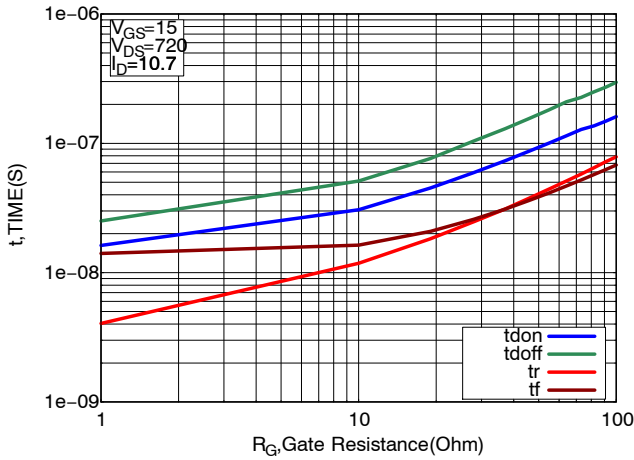


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

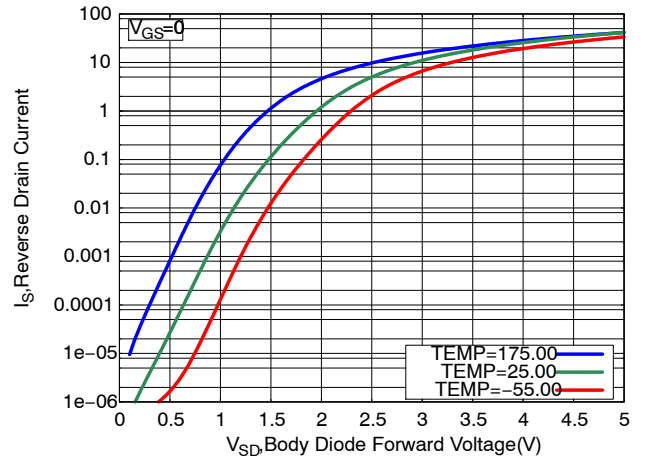


Figure 10. Diode Forward Voltage vs. Current

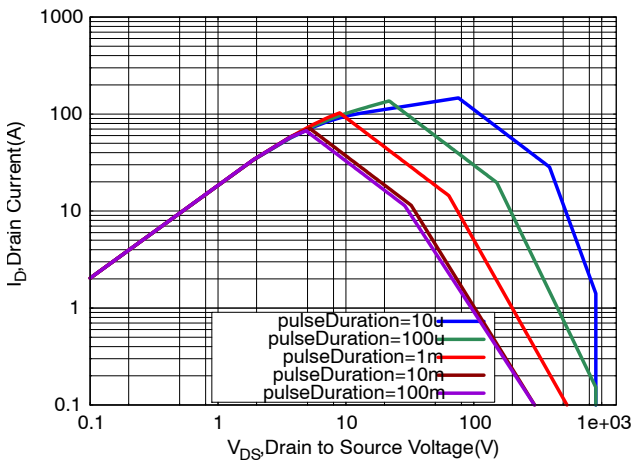


Figure 11. Maximum Rated Forward Biased Safe Operating Area

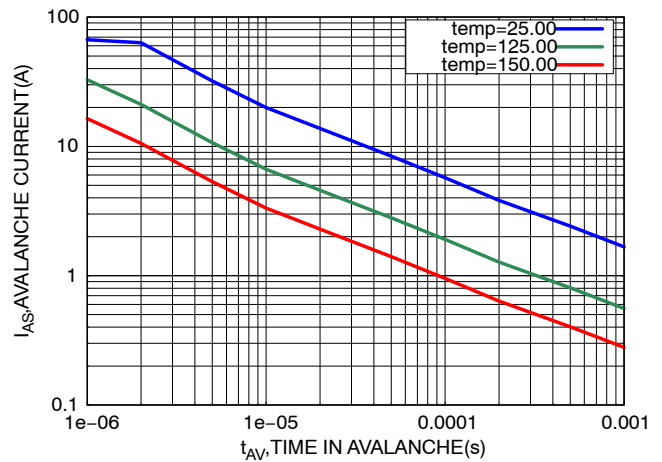


Figure 12. Ipeak vs. Time in Avalanche

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TYPICAL CHARACTERISTICS

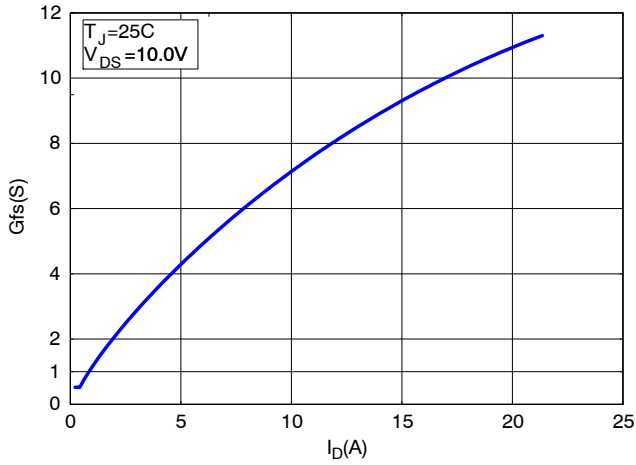


Figure 13. GFS vs. ID

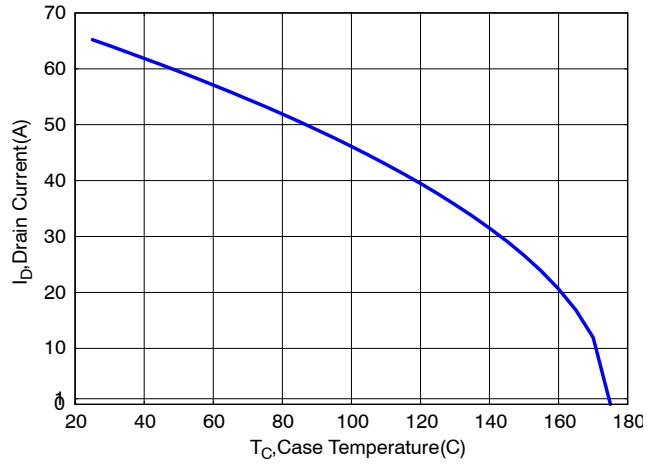


Figure 14. Maximum Current vs. Case Temperature

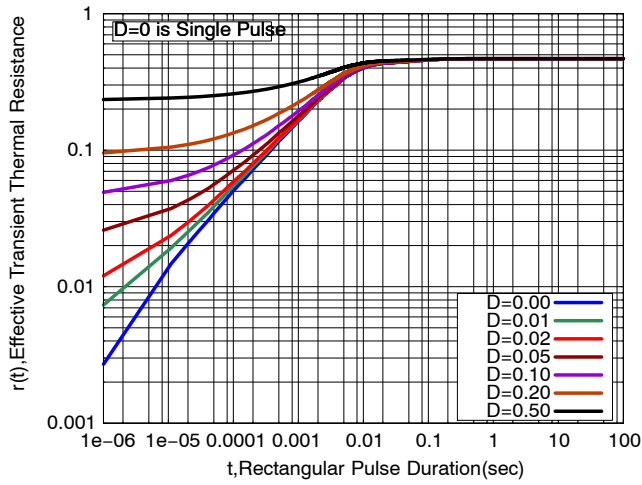
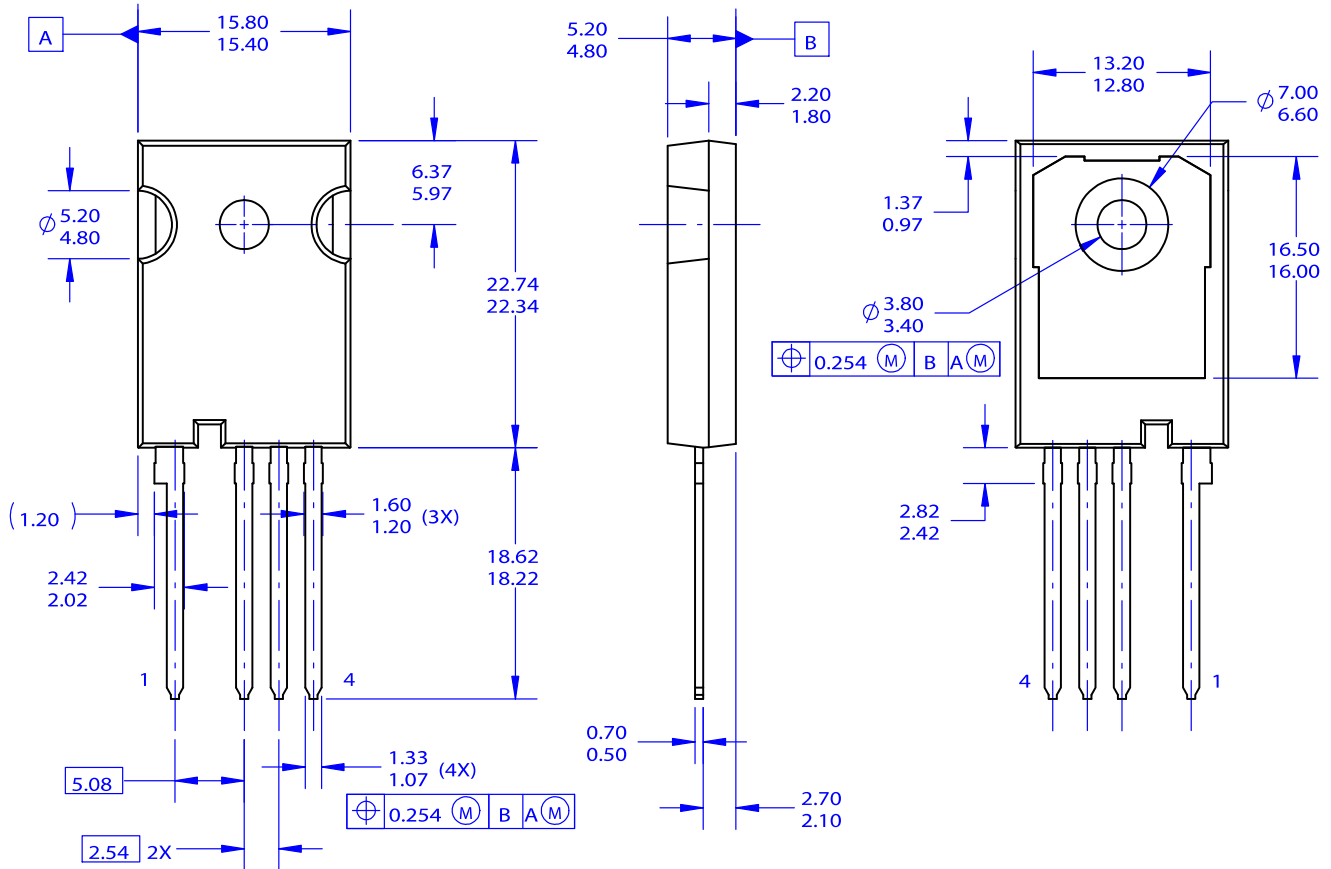


Figure 15. Thermal Response

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PACKAGE DIMENSIONS

TO-247-4LD
CASE 340CJ
ISSUE O



NOTES:

- A. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE.
- B. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DRAWING CONFORMS TO ASME Y14.5-2009.

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