

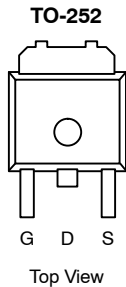
AP9T16H-VB Datasheet

N-Channel 20-V (D-S)175 °C MOSFET

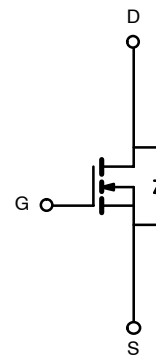
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a</sup>
20	0.0045 @ V <sub>GS</sub> = 4.5 V	100
	0.006 @ V <sub>GS</sub> = 2.5 V	90

FEATURES

- TrenchFET® Power MOSFET
- 175°C Maximum Junction Temperature
- 100% R<sub>g</sub> Tested



Drain Connected to Tab



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V <sub>DS</sub>	20	V
Gate-Source Voltage		V <sub>GS</sub>	± 15	
Continuous Drain Current <sup>a</sup>	T <sub>C</sub> = 25 °C	I <sub>D</sub>	100	A
	T <sub>C</sub> = 100 °C		80	
Pulsed Drain Current		I <sub>DM</sub>	200	
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	65	
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	P <sub>D</sub>	71	W
	T <sub>A</sub> = 25 °C		8.3 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	t ≤ 10 sec.	R <sub>thJA</sub>	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R <sub>thJC</sub>	1.75	2.1	

Notes

- a. Package Limited
- b. Surface Mounted on 1" x 1" FR4 Board
- c. t ≤ 10 sec

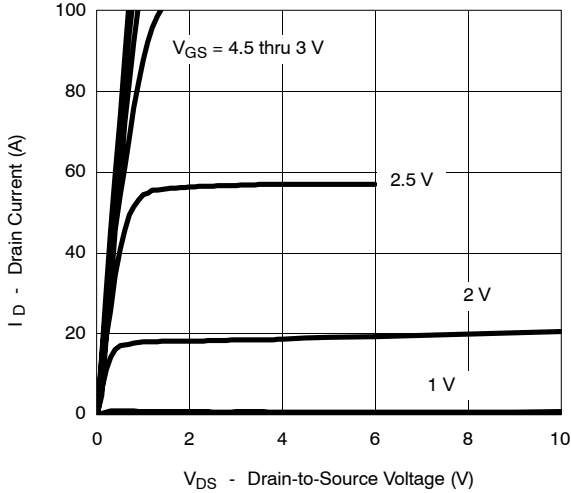
SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	20			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	0.5		1.5	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±12 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 4.5 V	100			A
Drain-Source On-State Resistance <sup>b</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A		0.0045		Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C		0.0055		
		V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 20 A		0.006		
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 40 A	20			S
<b>Dynamic<sup>a</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 20 V, f = 1 MHz		3660		pF
Output Capacitance	C <sub>oss</sub>			730		
Reverse Transfer Capacitance	C <sub>rss</sub>			375		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 40 A		26	35	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			5		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			7		
Gate Resistance	R <sub>g</sub>		1		3.7	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 10 V, R <sub>L</sub> = 0.25 Ω I <sub>D</sub> ≅ 40 A, V <sub>GEN</sub> = 4.5 V, R <sub>G</sub> = 2.5 Ω		20	35	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			120	190	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			45	70	
Fall Time <sup>c</sup>	t <sub>f</sub>			20	35	
<b>Source-Drain Diode Ratings and Characteristic (T<sub>C</sub> = 25 °C)</b>						
Pulsed Current	I <sub>SM</sub>				100	A
Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>F</sub> = 100 A, V <sub>GS</sub> = 0 V		1.2	1.5	V
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 40 A, di/dt = 100 A/μs		35	70	ns

## Notes

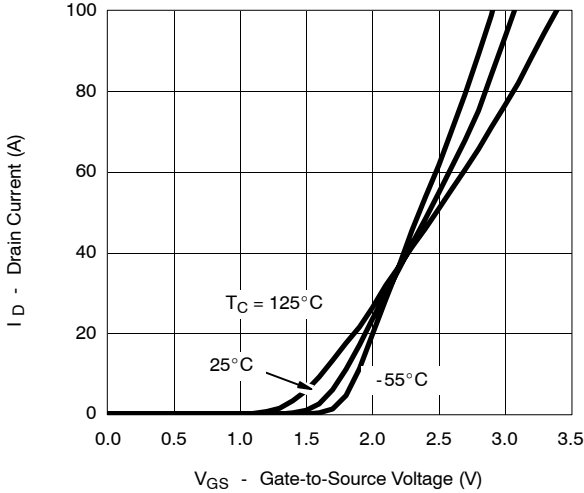
- a. Guaranteed by design, not subject to production testing.  
 b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
 c. Independent of operating temperature.

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

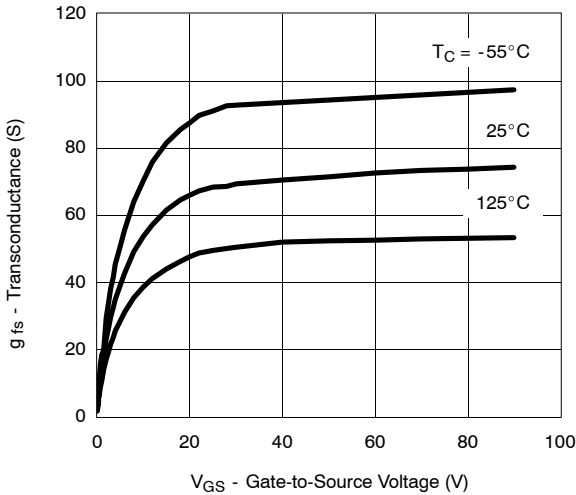
**Output Characteristics**



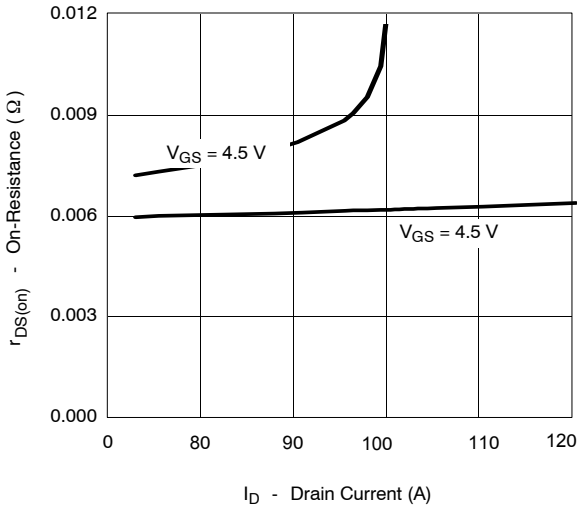
**Transfer Characteristics**



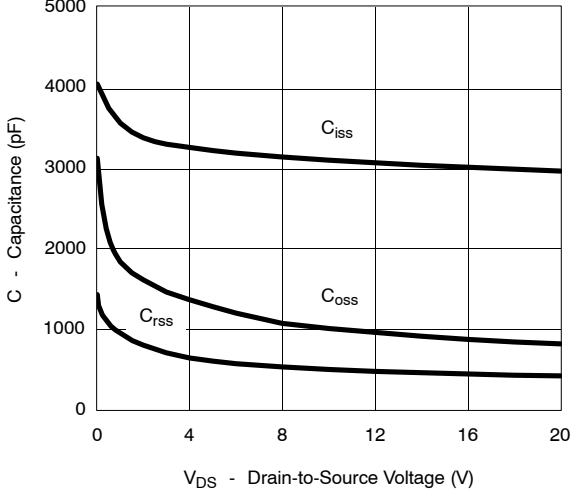
**Transconductance**



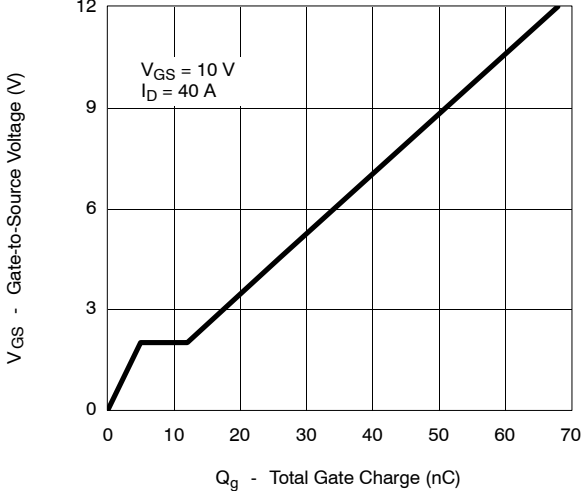
**On-Resistance vs. Drain Current**



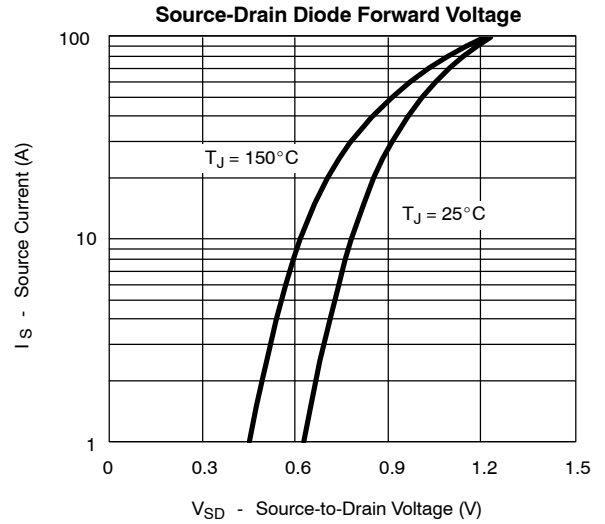
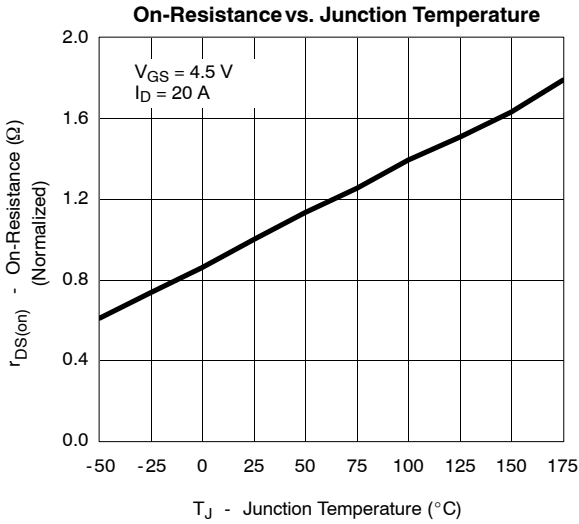
**Capacitance**



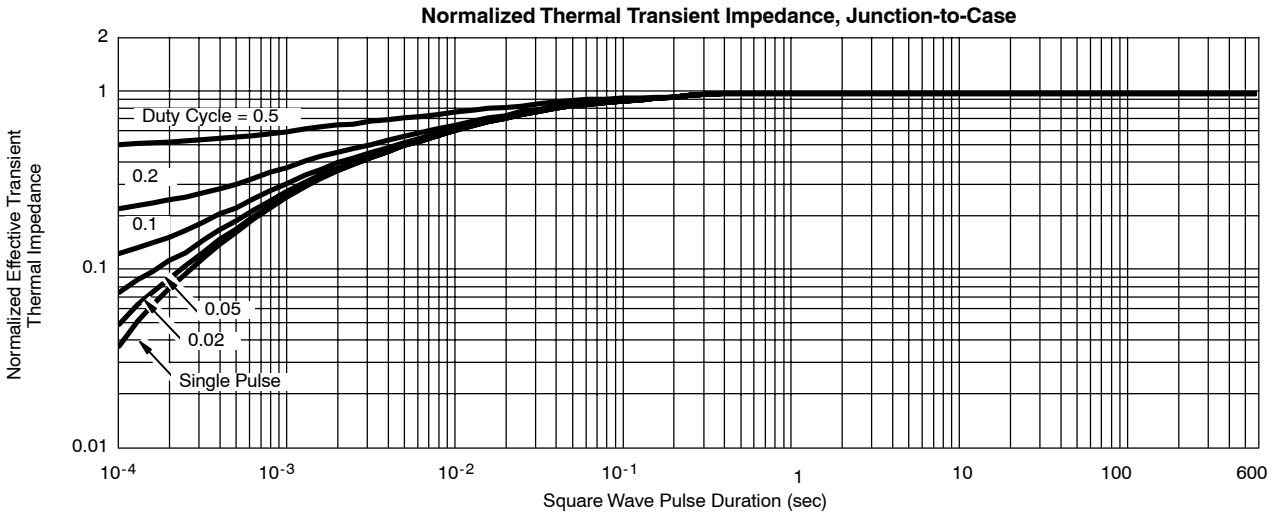
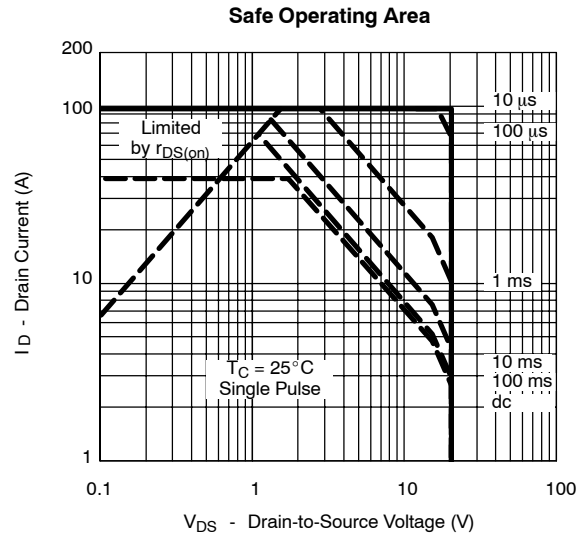
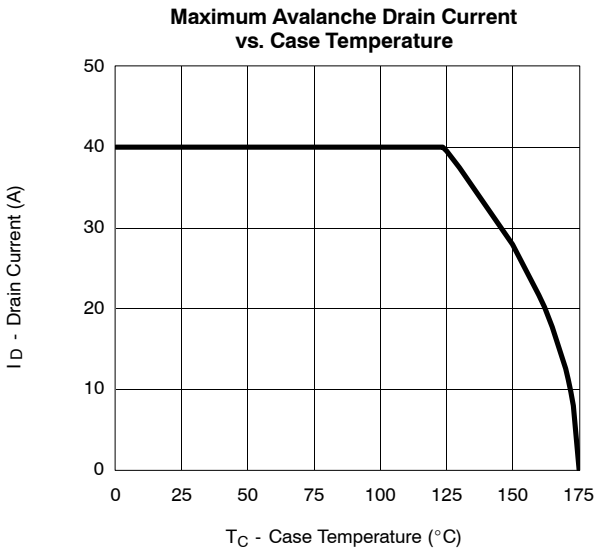
**Gate Charge**



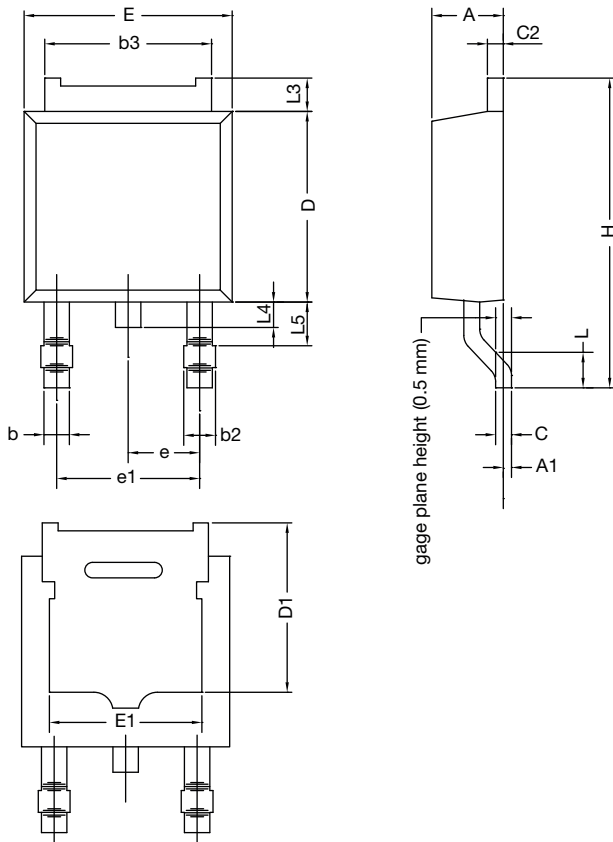
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



**THERMAL RATINGS**



## TO-252AA CASE OUTLINE



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.14	1.52	0.045	0.060
ECN: X12-0247-Rev. M, 24-Dec-12				
DWG: 5347				

**Note**

- Dimension L3 is for reference only.

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