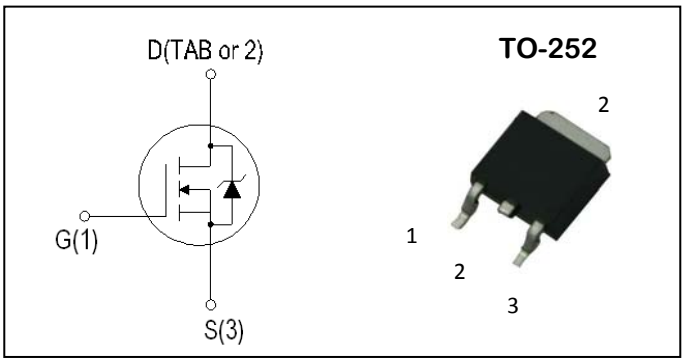
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ)
100V	20A	28mΩ



Features:

- Low Gate Charge for Fast Switching Application
- Low $R_{DS(ON)}$ to Minimize Conductive Loss
- 100% EAS Guaranteed
- Optimized $V_{(BR)DSS}$ Ruggedness
- Lead-Free,RoHS Compliant

Description:

The ADM20N10E uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

Absolute Maximum Ratings (T_A = 25°C unless otherwise specifed)

Symbol	Parameter		Ratings	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		100	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to175	°C
I_S	Diode Continuous Forward Current	T_C =25°C	20	A
Mounted on Large Heat Sink				
I_{DM}	300μs Pulse Drain Current Tested (2)	T_C=25°C	80	A
I_D	Continuous Drain Current (1)	T_C=25°C	20	A
P_D	Maximum Power Dissipation	T_A = 25°C	70	W

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max (1)	2.0	°C/W
R_{thJA}	Thermal resistance junction-ambient max (1)	70	°C/W

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
On/off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250uA	100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V,V_{GS}=0V , T_J=25°C	--	--	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1	1.8	2.4	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	--	--	±100	nA
$R_{DS(ON)}$	Drain-SourceOn-stateResistance (2)	V_{GS}= 10V, I_{DS}=10A	--	28	35	mΩ
		V_{GS}= 4.5V, I_{DS}=10A	--	35	45	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1MHz	--	1550	--	pF
C_{oss}	Output Capacitance		--	89	--	
C_{rss}	Reverse Transfer Capacitance		--	76	--	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	V_{DS}=50V, I_D= 20A, V_{GS}= 10V, R_{GEN}=10Ω	--	29	--	nS
t_r	Turn-on Rise Time		--	13	--	
$t_{d(OFF)}$	Turn-off Delay Time		--	58.2	--	
t_f	Turn-off Fall Time		--	13.4	--	
Q_g	Total Gate Charge	V_{DS}=50V, V_{GS}= 10V, I_{DS}=20A	--	47.5	--	nC
Q_{gs}	Gate-Source Charge		--	14	--	
Q_{gd}	Gate-Drain Charge		--	15.5	--	
Avalanche Characteristics						
EAS	Single Pulse Avalanche Energy (3)		130	--	--	mJ
Diode Characteristics						
V_{SD}	Diode Forward Voltage (2)	I_{SD} = 20A, V_{GS} = 0	--	0.9	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=10A, dI_{SD}/dt=100A/μs	--	58	--	ns
q_{rr}	Reverse Recovery Charge		--	110	--	nC

NOTES:

1. Surface Mounted on FR4 Board, t ≤ 10 sec.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The Min. value is 100% EAS tested guarantee. V_{DD}=50V,V_{GS}=10V,L=0.5mH,Rg=25Ω.

Typical Performance Characteristics

Figure 1: On-Region Characteristics

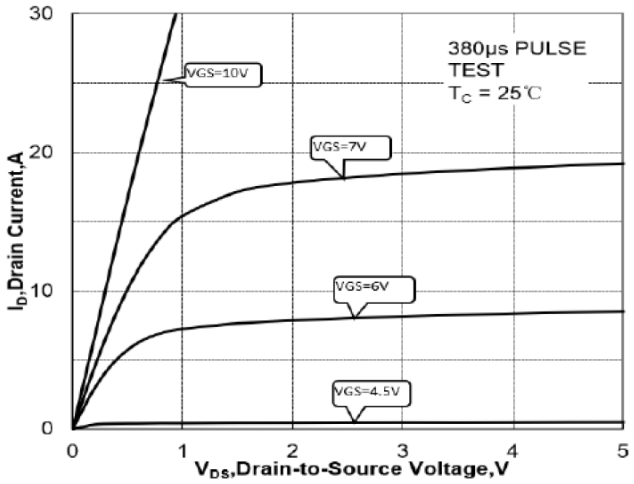


Figure 2: Transfer Characteristics

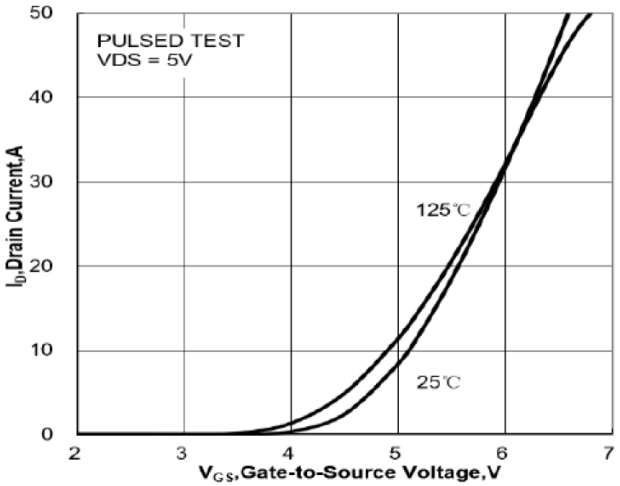


Figure 3: Rdson- Drain Current

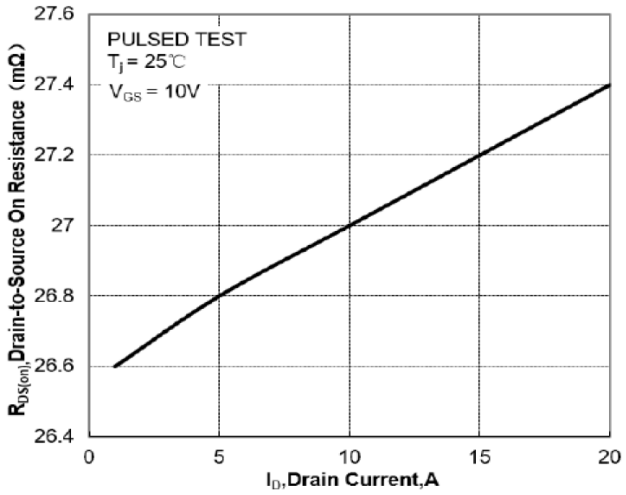


Figure 4: Rdson-JunctionTemperature

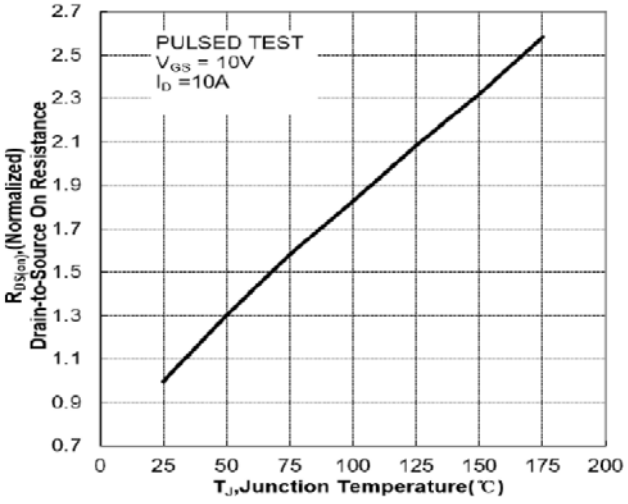


Figure 5: Source- Drain Diode Forward

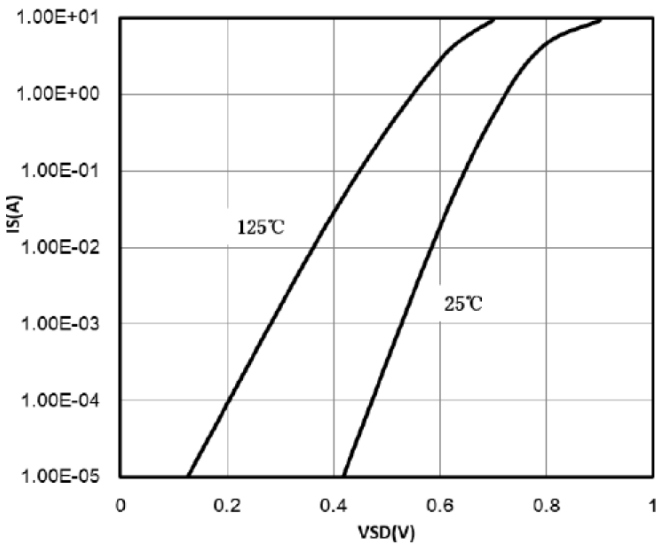


Figure 6: Gate Charge Characteristics

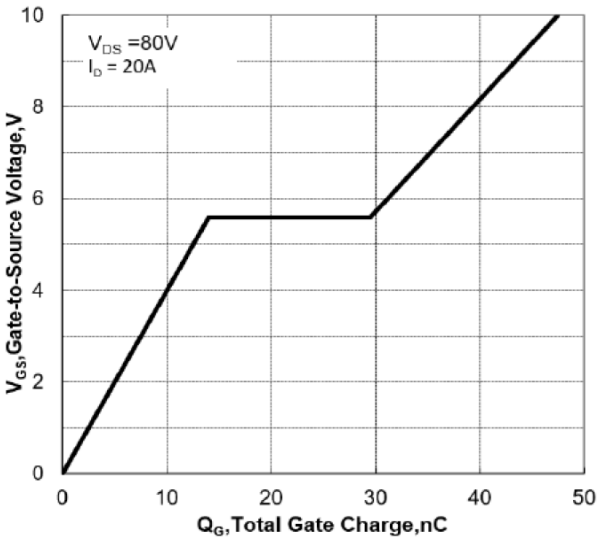


Figure 7: Capacitance vs Vds

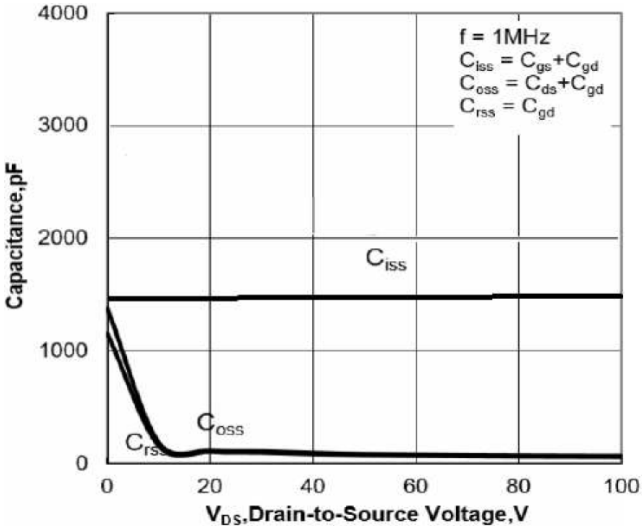


Figure 8: Safe Operation Area

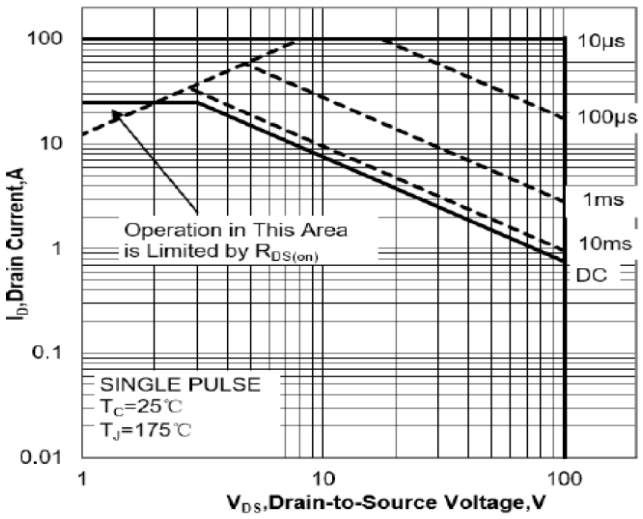


Figure 9: Single Pulse Power Rating Junction-to-Ambient

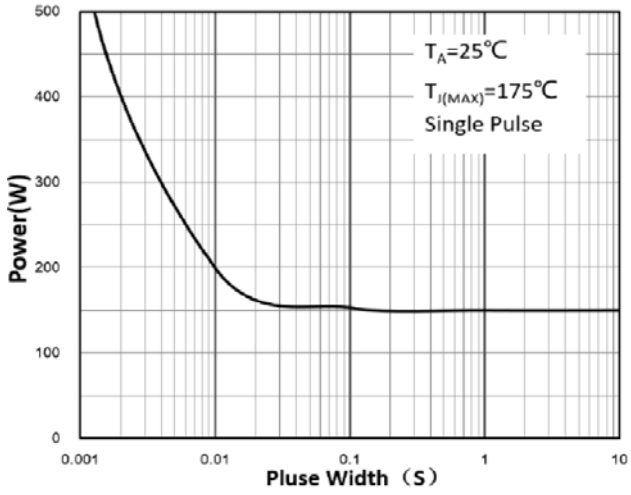


Figure 10: On-Resistance vs. Gate-Source Voltage

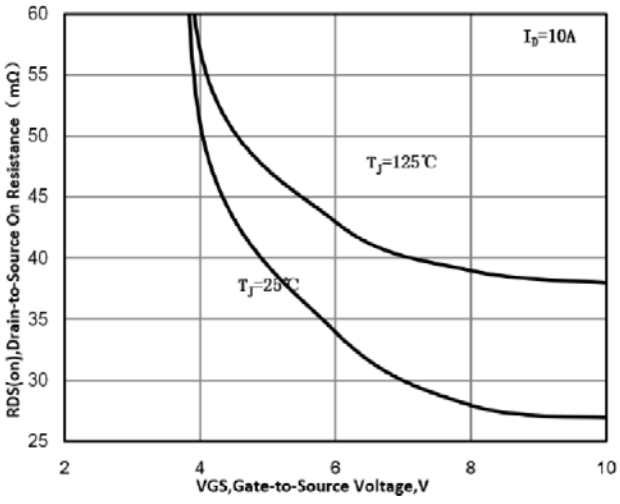
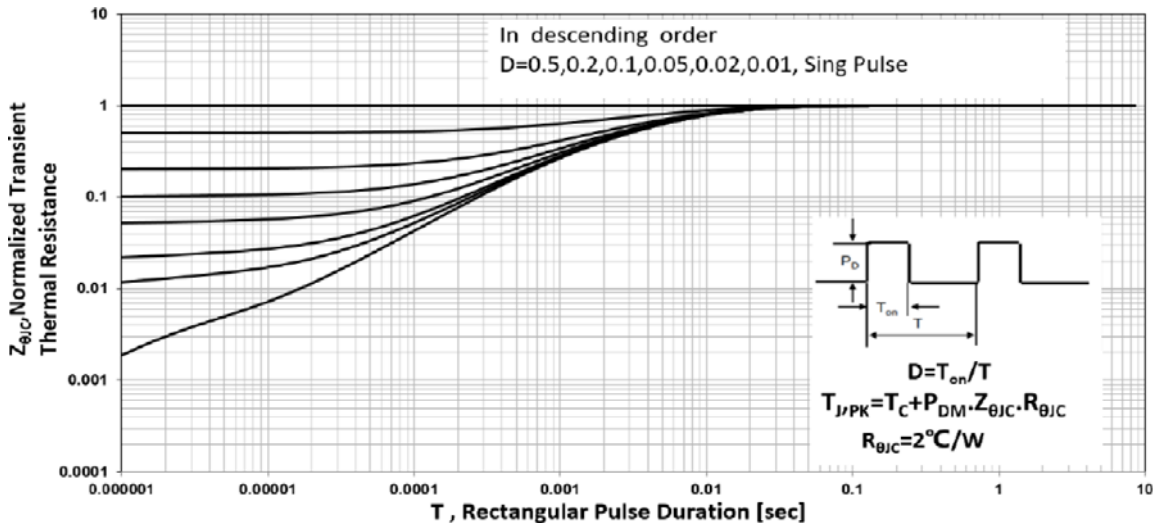
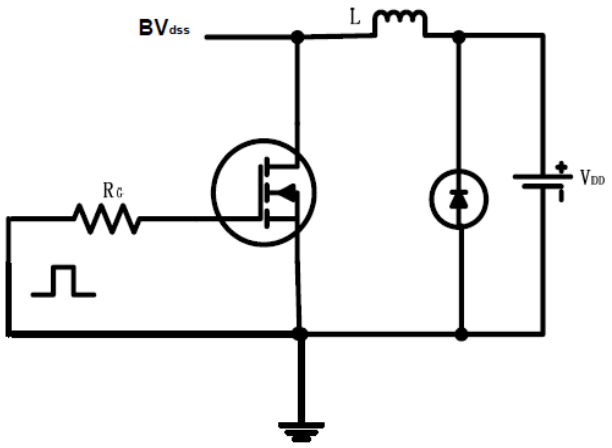


Figure 11: Normalized Maximum Transient Thermal Impedance

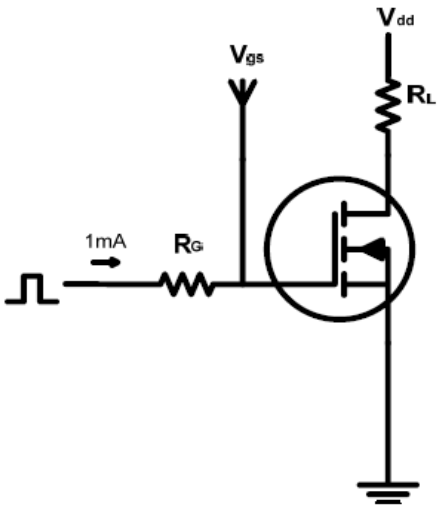


Test circuits and Waveforms

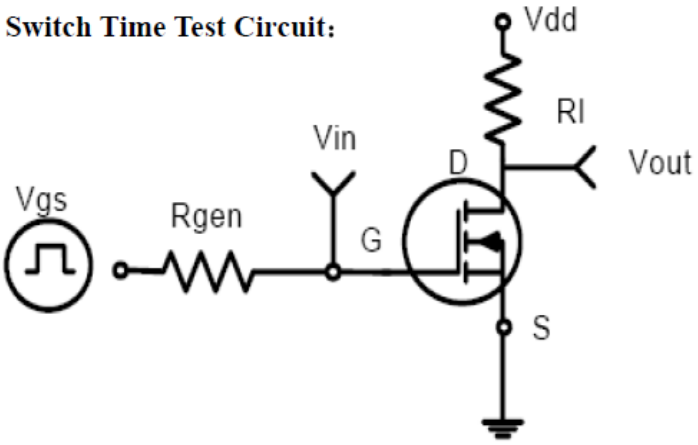
EAS test circuits:



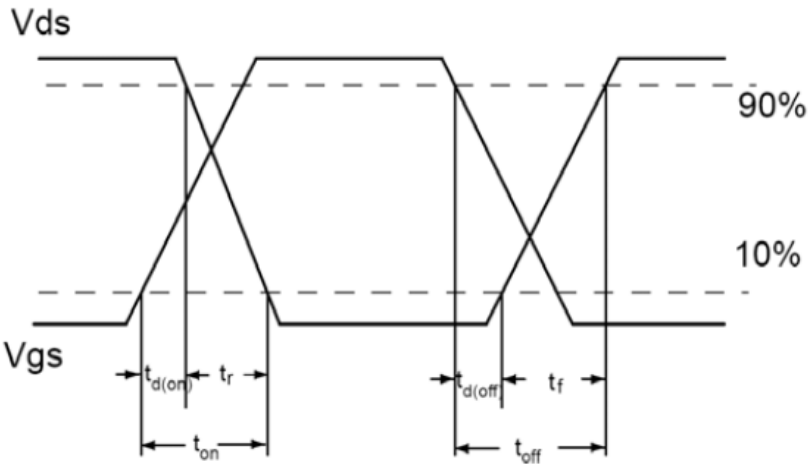
Gate charge test circuit:



Switch Time Test Circuit:

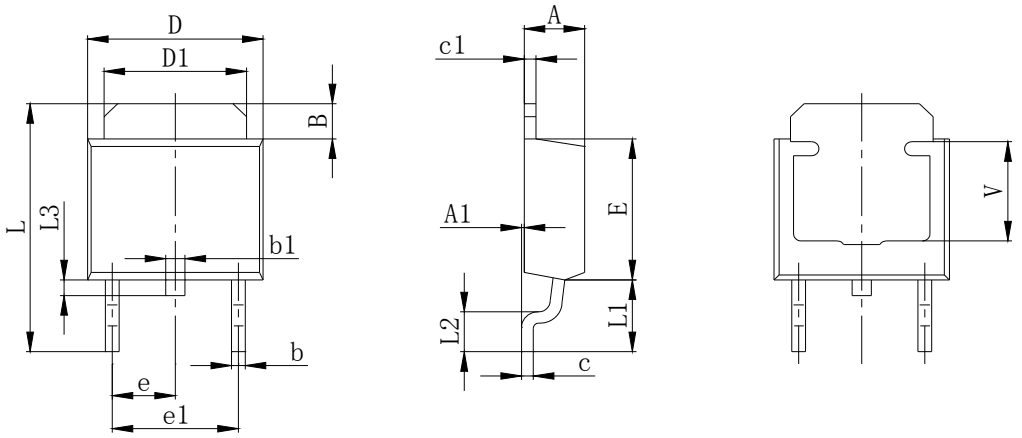


Switch Waveforms:



PACKAGE MECHANICAL DATA

TO-252 Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	