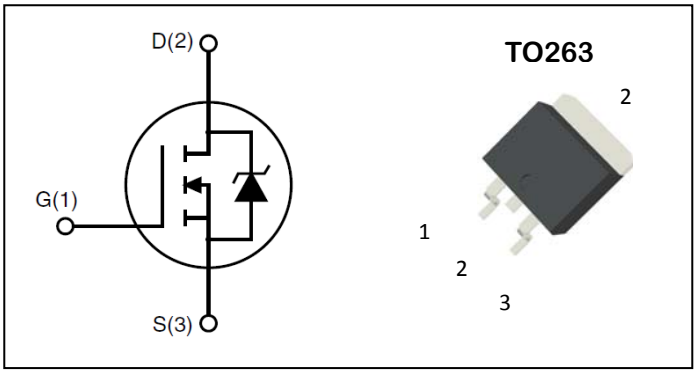
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ)
40V	380A	1.5mΩ



Features:

- Low Gate Charge for Fast Switching Application
- Low $R_{DS(ON)}$ to Minimize Conductive Loss
- 100% EAS Guaranteed
- Fast Recovery Body Diode
- Lead-Free,RoHS Compliant

Description:

The ADM380N04 series MOSFETs is a new technology, which combines an innovative super junction technology and advance process. This new technology achieves low Rdson, energy saving, high reliability and uniformity, superior power density and space saving.

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

Symbol	Parameter		Ratings	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C =25°C	380	A
Mounted on Large Heat Sink				
I_{DM}	300μs Pulse Drain Current Tested (2)	T_C=25°C	1514	A
I_D	Continuous Drain Current (1)	Silicon Limited	380	A
		Package Limited	192	A
P_D	Maximum Power Dissipation	T_C=25°C	397	W

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max (1)	0.38	°C/W
R_{thJA}	Thermal resistance junction-ambient max (1)	61	°C/W

Electrical Characteristics (TA=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	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V,V_{GS}=0V ,T_J=25°C	--	--	1	uA
		V_{DS}=32V,V_{GS}=0V , T_J=125°C	--	--	100	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1.0		3.0	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}=80A	--	1.2	1.5	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1MHz	--	8.9	--	nF
C_{oss}	Output Capacitance		--	1.5	--	
C_{rss}	Reverse Transfer Capacitance		--	0.4	--	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	V_{DS}=20V, I_D= 120A, V_{GS}= 10V, R_{GEN}=2.5Ω	--	18	--	ns
t_r	Turn-on Rise Time		--	25	--	
$t_{d(OFF)}$	Turn-off Delay Time		--	133	--	
t_f	Turn-off Fall Time		--	26	--	
Q_g	Total Gate Charge	V_{DS}=20V, V_{GS}= 10V, I_{DS}=120A	--	166	--	nC
Q_{gs}	Gate-Source Charge		--	27	--	
Q_{gd}	Gate-Drain Charge		--	39	--	
Avalanche Characteristics						
EAS	Single Pulse Avalanche Energy (3)	V_{DD}=20V,L=1mH ,V_{GS}=10V ,R_g=25Ω	648	--	--	mJ
Diode Characteristics						
V_{SD}	Diode Forward Voltage (2)	I_{SD} = 80A, V_{GS} = 0	--	--	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=80A, dI_{SD}/dt=100A/μs	--	60	--	ns
q_{rr}	Reverse Recovery Charge		--	104	--	nC

NOTES:

1.The data tested by surface mounted on a 1 $inch^2$ FR-4 board with 2OZ copper.

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

3.The Min. value is 100% EAS tested guarantee.

Typical Performance Characteristics

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

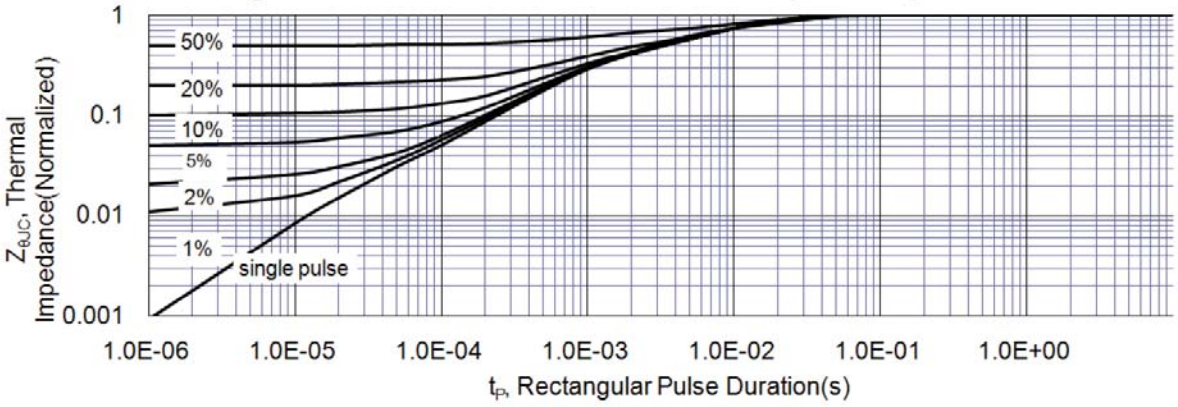


Figure 2. Maximum Power Dissipation vs. Case Temperature

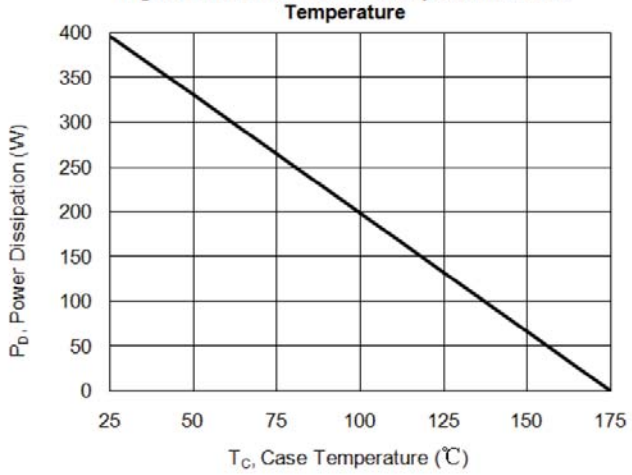


Figure 3. Maximum Continuous Drain Current vs Case Temperature

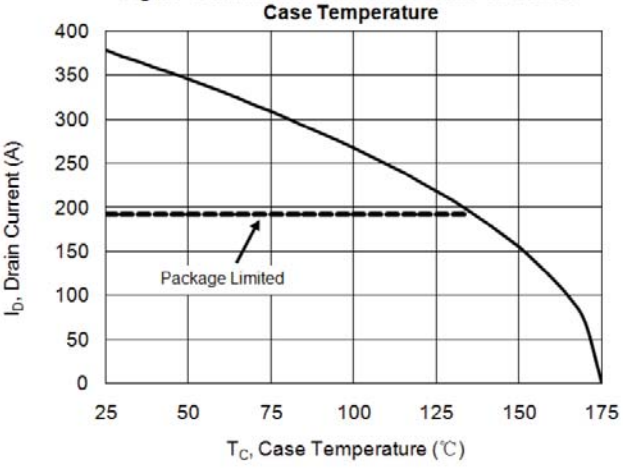


Figure 4. Typical Output Characteristics

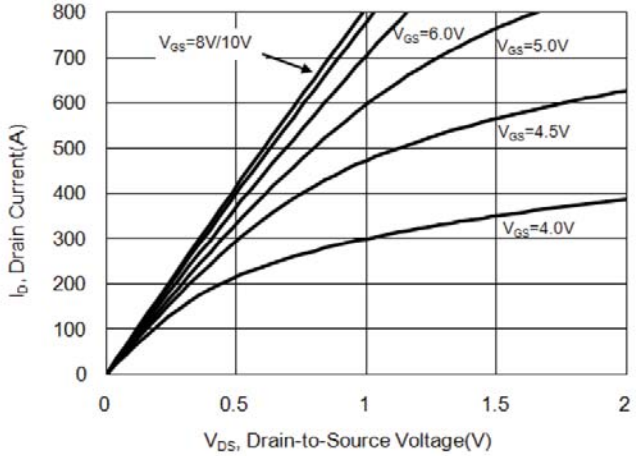


Figure 5. Typical Drain-to-Source ON Resistance vs. Gate Voltage

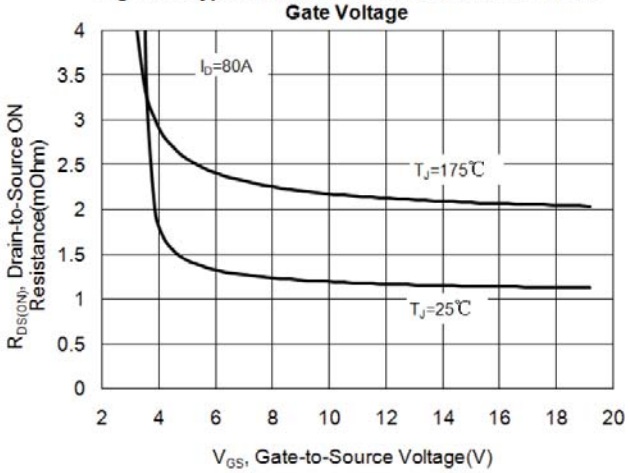


Figure 6. Maximum Peak Current Capability

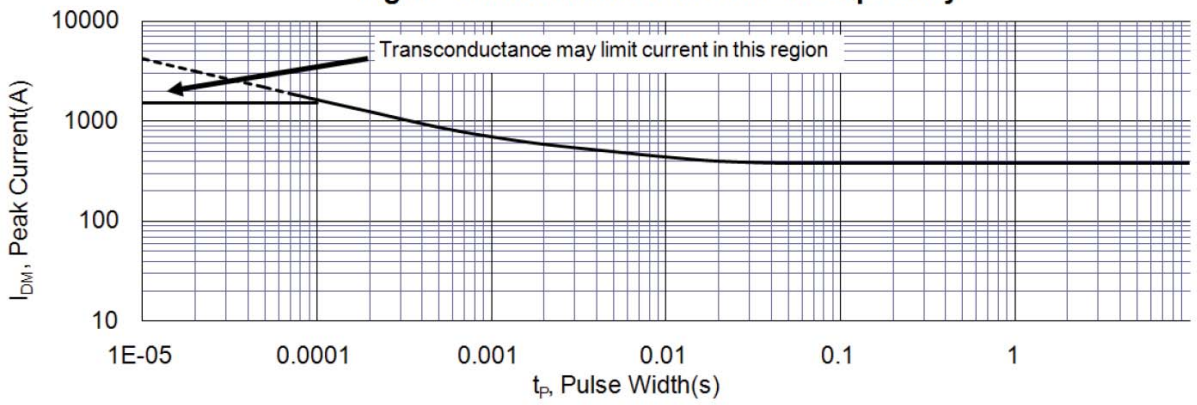


Figure 7. Typical Transfer Characteristics

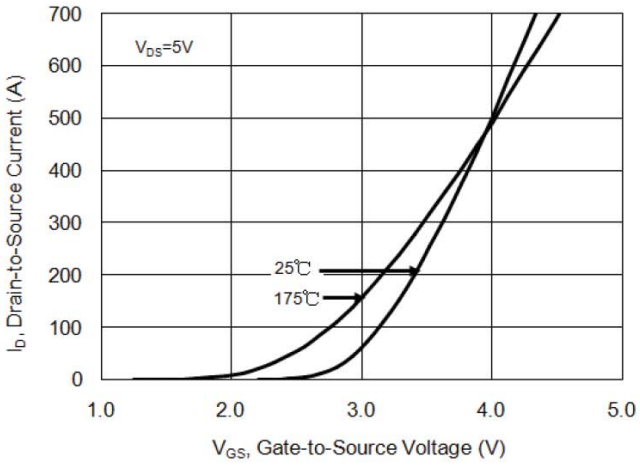


Figure 8. Unclamped Inductive Switching Capability

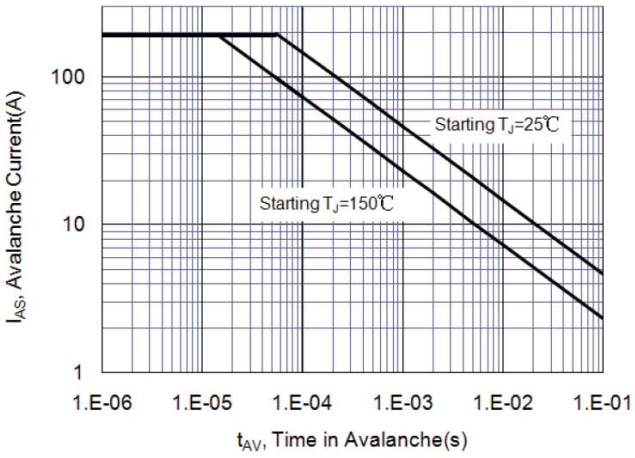


Figure 9. Typical Drain-to-Source ON Resistance

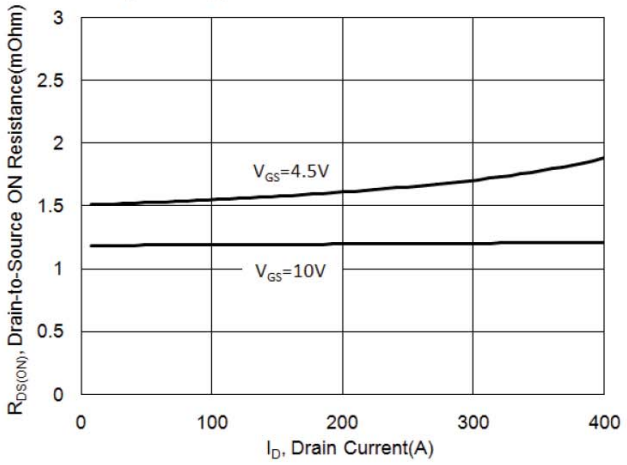


Figure 10. Typical Drain-to-Source On Resistance vs. Junction Temperature

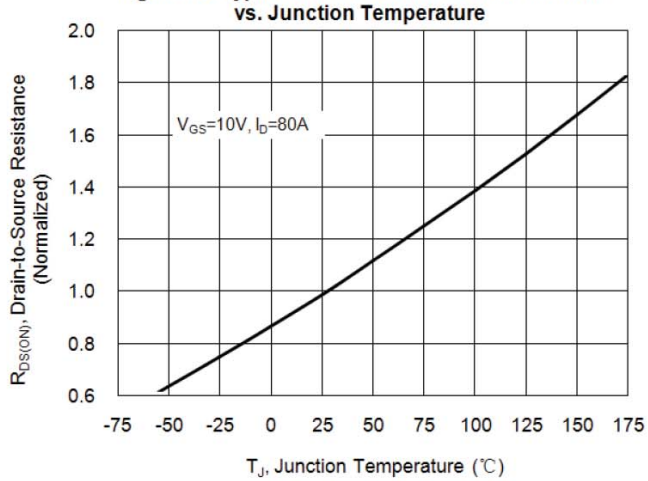


Figure 11.Typical Breakdown Voltage vs. Junction Temperature

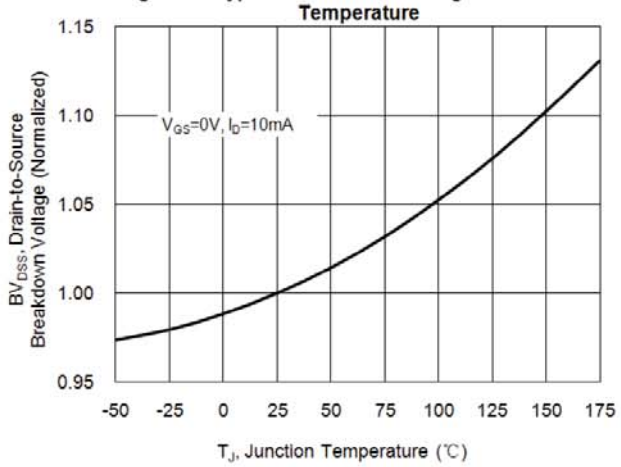


Figure 12.Typical Threshold Voltage vs. Junction Temperature

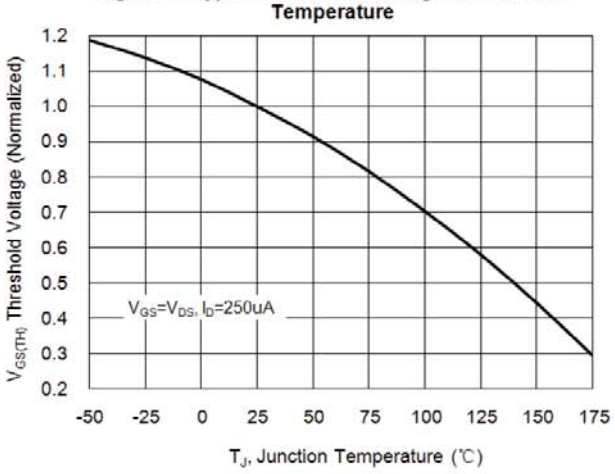


Figure 13. Maximum Forward Safe Operation Area

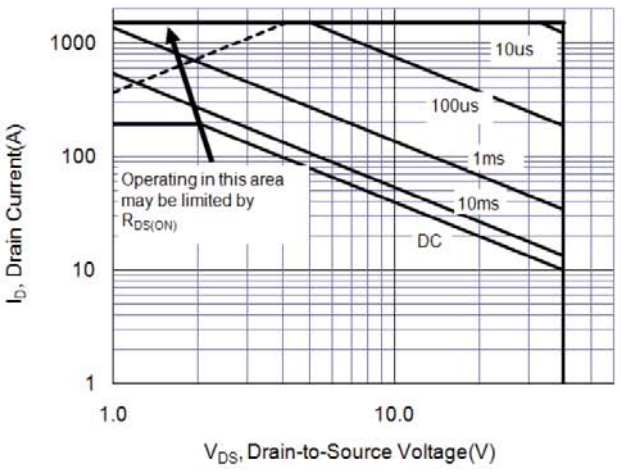


Figure 14. Typical Capacitance vs. Drain-to-Source Voltage

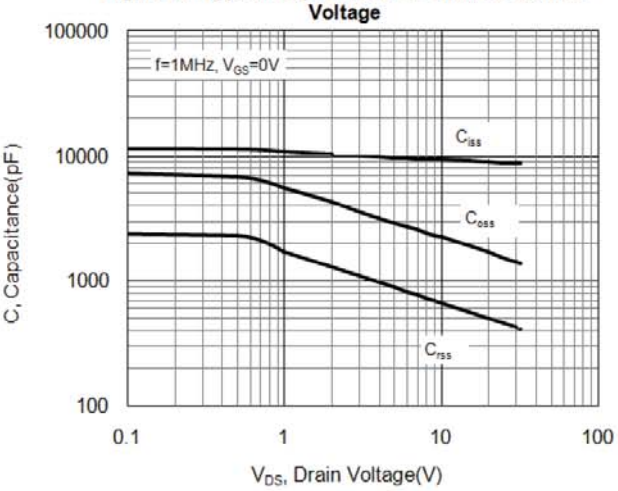


Figure 15. Typical Gate Charge vs. Gate-to-Source Voltage

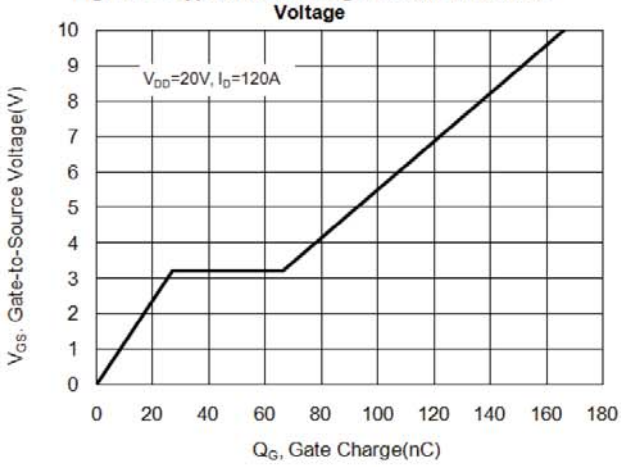
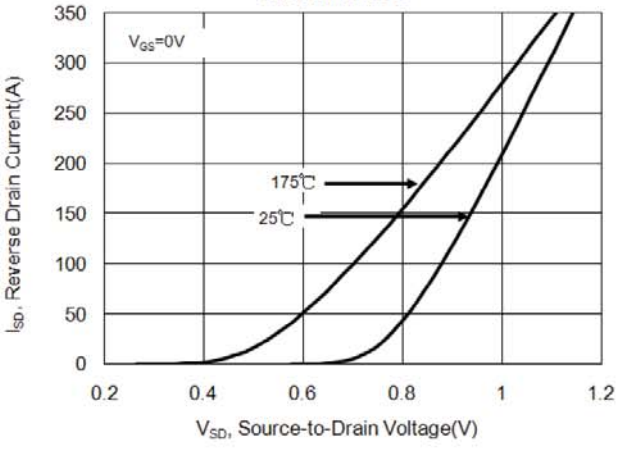
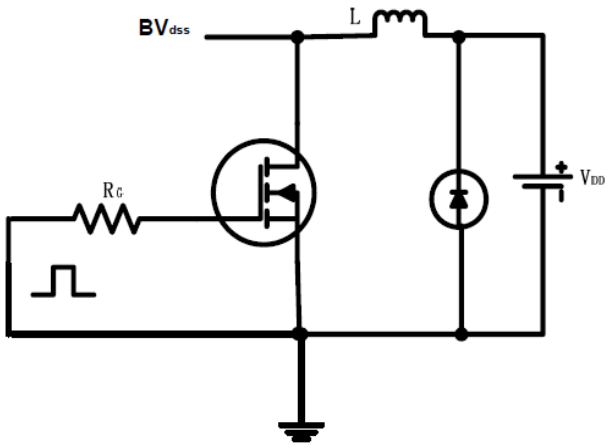


Figure 16. Typical Body Diode Transfer Characteristics

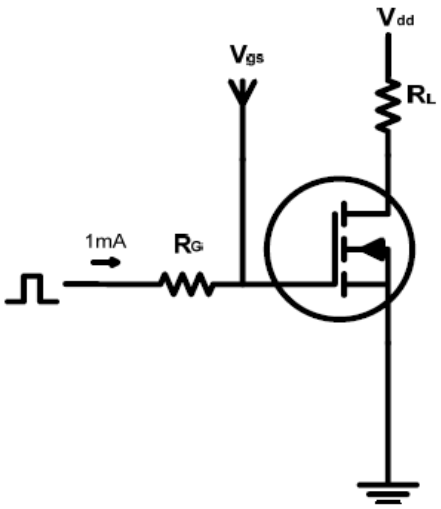


Test circuits and Waveforms

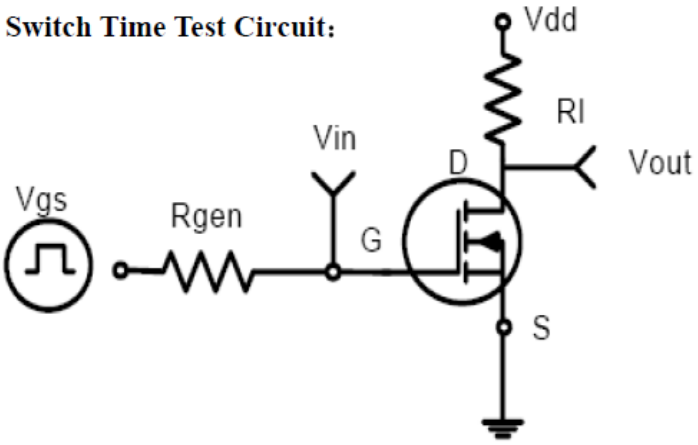
EAS test circuits:



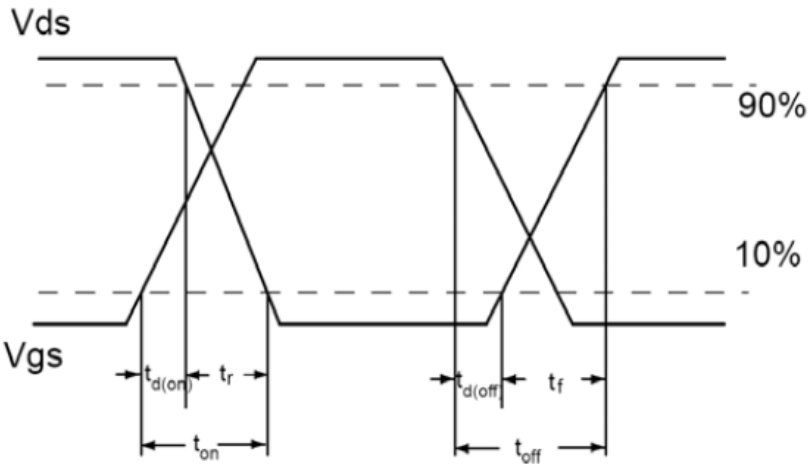
Gate charge test circuit:



Switch Time Test Circuit:

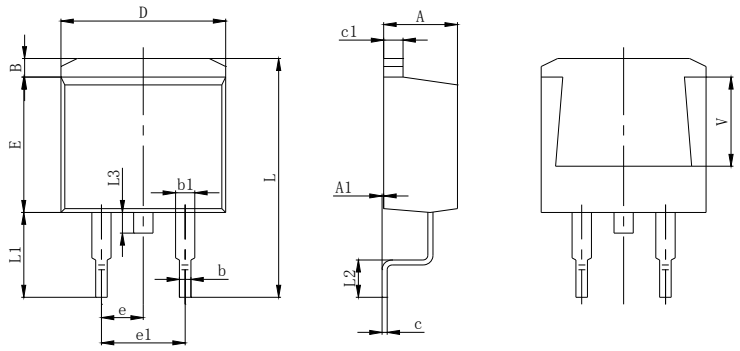


Switch Waveforms:



PACKAGE MECHANICAL DATA

TO-263-2 Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF		0.220 REF	

Ordering information

Part number	Package	Marking	Packing	Quantity
ADM380N04G	TO-263-2	ADM380N04G	Tube	50pcs
			Embossed tape	800pcs