

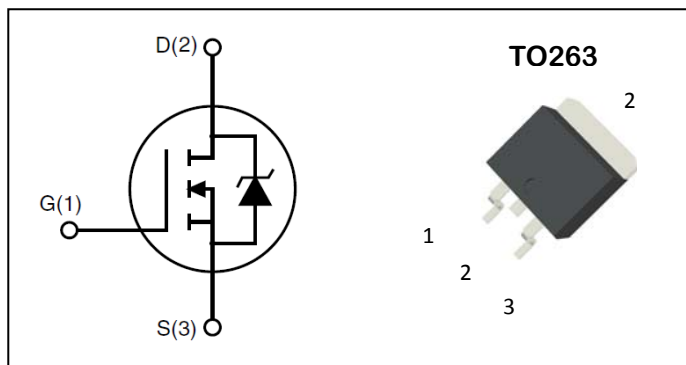
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω)
40V	170A	3.3m Ω

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 ADM170N04G series MOSFETs is a new technology, which combines an innovative super junction technology and advance process. This new technology achieves low $R_{ds(on)}$, energy saving, high reliability and uniformity, superior power density and space saving.

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise specified)

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	174	A
Mounted on Large Heat Sink				
I _{DM}	300μs Pulse Drain Current Tested ⁽²⁾	T _C =25°C	695	A
I _D	Continuous Drain Current ⁽¹⁾	Silicon Limited	174	A
		Package Limited	123	A
P _D	Maximum Power Dissipation	T _C =25°C	192	W

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max ⁽¹⁾	0.78	$^\circ\text{C/W}$
R_{thJA}	Thermal resistance junction-ambient max ⁽¹⁾	63	$^\circ\text{C/W}$

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	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} =80A	--	2.7	3.3	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V,	--	3700	--	pF
C _{oss}	Output Capacitance	V _{DS} =20V,	--	630	--	
C _{rss}	Reverse Transfer Capacitance	Frequency=1MHz	--	200	--	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DS} =20V,	--	19	--	ns
t _r	Turn-on Rise Time	I _D = 40A, V _{GS} = 10V,	--	19	--	
t _{d(OFF)}	Turn-off Delay Time	R _{GEN} =10 Ω	--	46	--	
t _f	Turn-off Fall Time		--	15	--	
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} = 10V,	--	62	--	nC
Q _{gs}	Gate-Source Charge	I _{DS} =80A	--	20	--	
Q _{gd}	Gate-Drain Charge		--	16	--	
Avalanche Characteristics						
EAS	Single Pulse Avalanche Energy ⁽³⁾	V _{DD} =20V, L=1mH ,V _{GS} =10V ,R _g =25 Ω	379	--	--	mJ
Diode Characteristics						
V _{SD}	Diode Forward Voltage ⁽²⁾	I _{SD} = 80A, V _{GS} = 0	--	0.9	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =80A, dI _{SD} /dt=100A/μs	--	43	--	ns
q _{rr}	Reverse Recovery Charge		--	70	--	nC

NOTES:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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: On-Region Characteristics

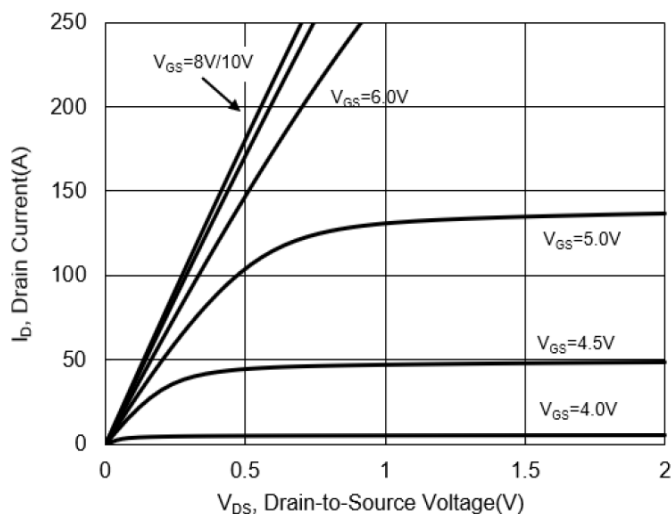


Figure 2: Power Dissipation

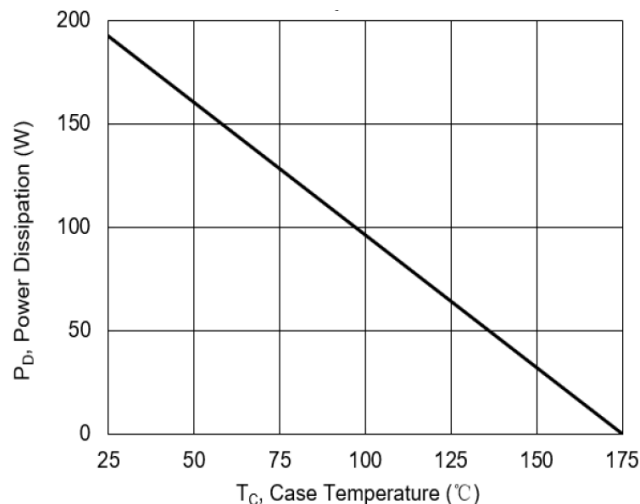


Figure 3: Drain Current

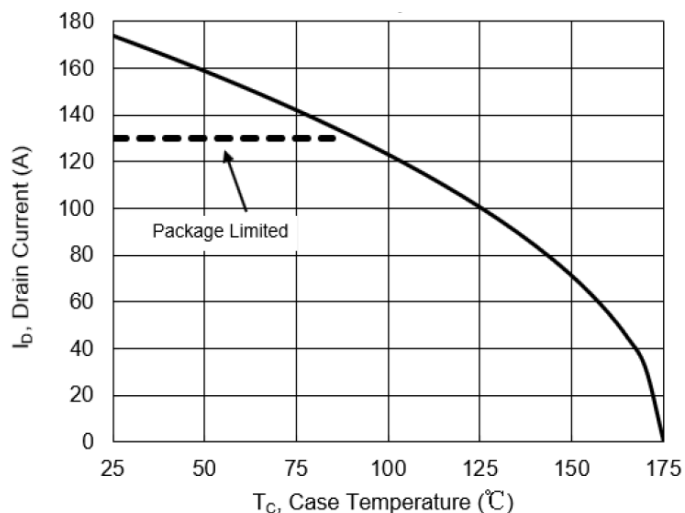


Figure 4: Drain-to-Source Breakdown Voltage

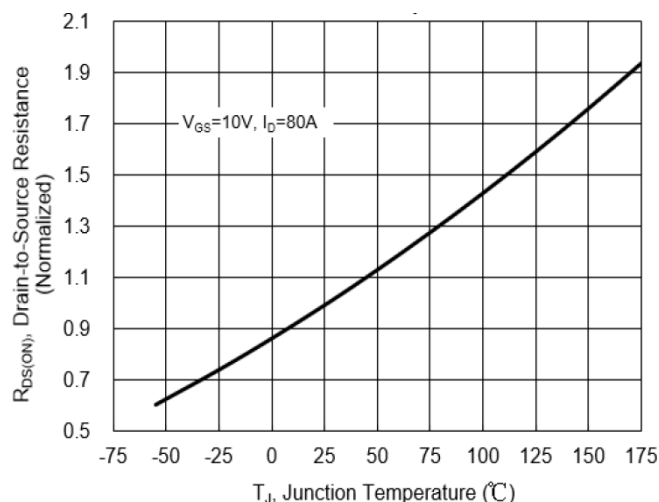


Figure 5: Capacitance Characteristics

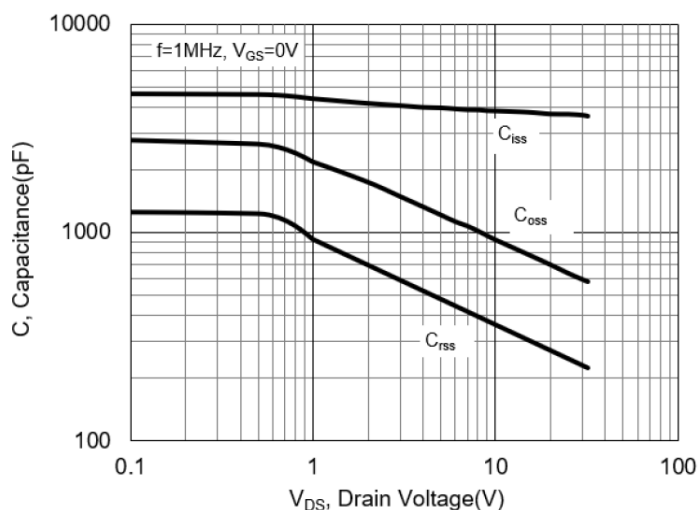


Figure 6: Gate Charge Characteristics

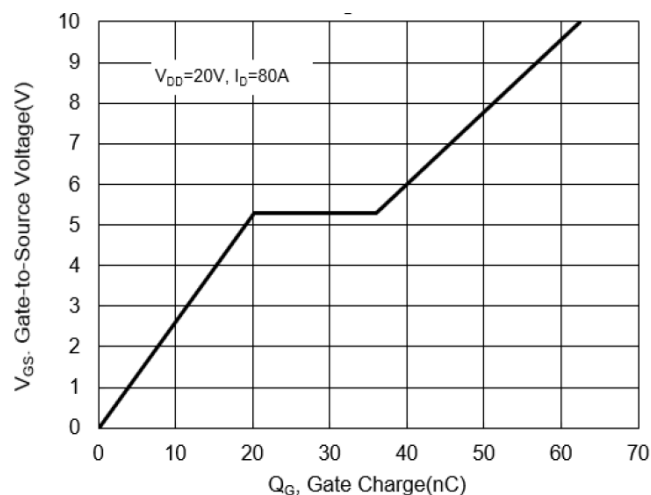


Figure 7: Gate Threshold Voltage

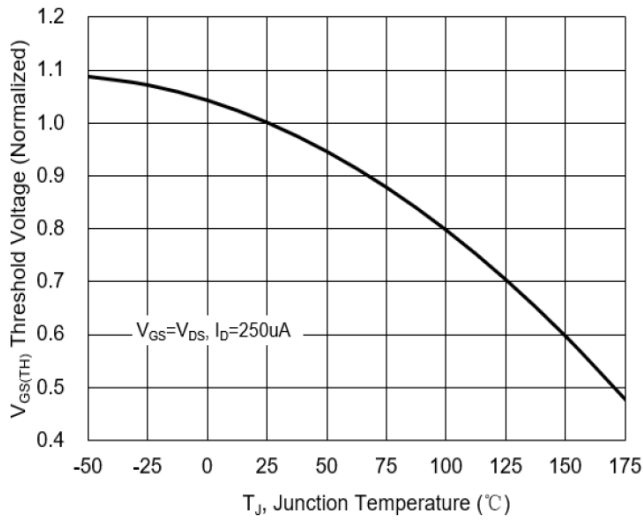


Figure 8: Drain-to-Source On-Resistance

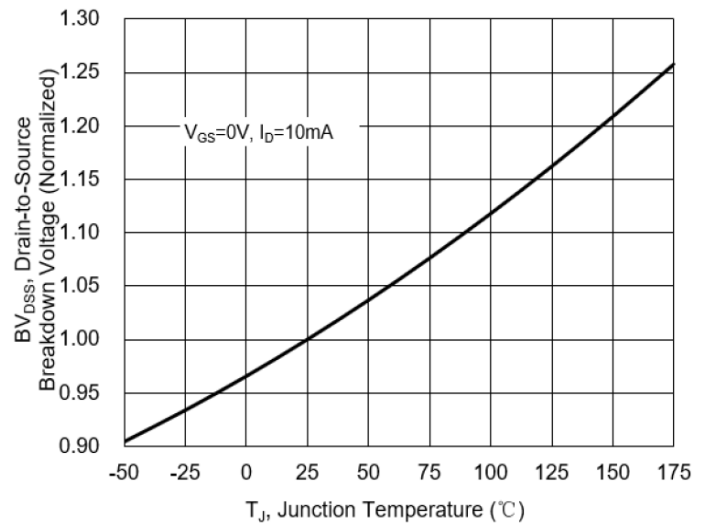


Figure 9: Avalanche Characteristics

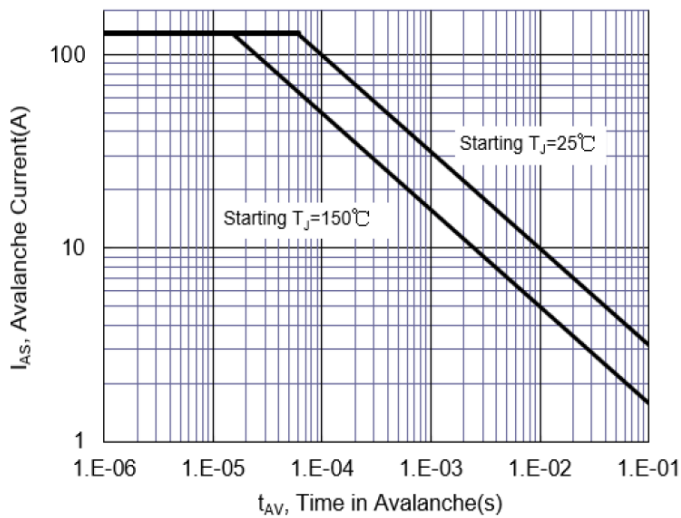


Figure 10: Forward Characteristics of reverse diode

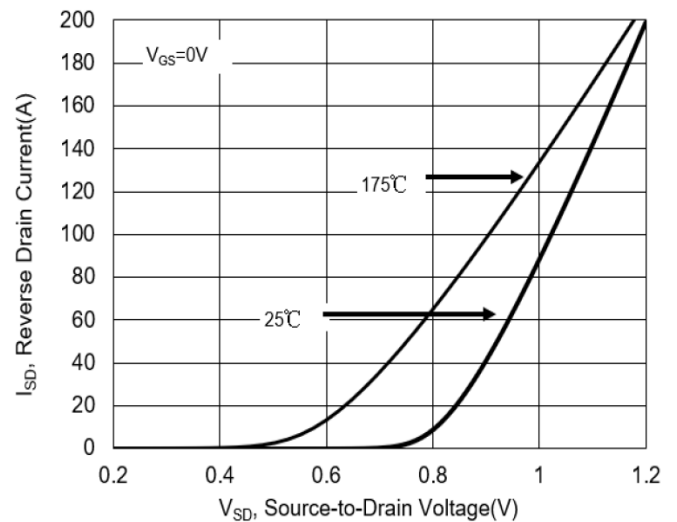
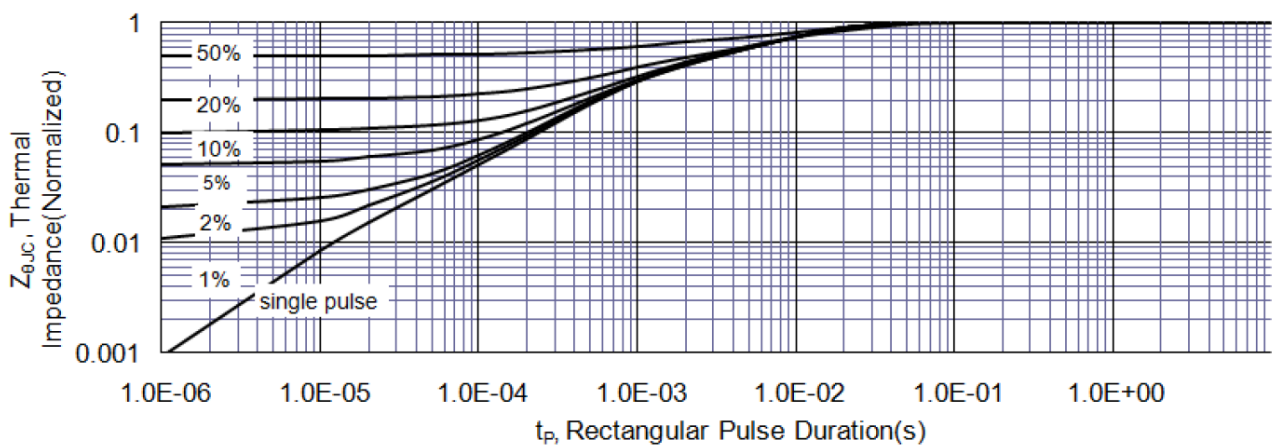
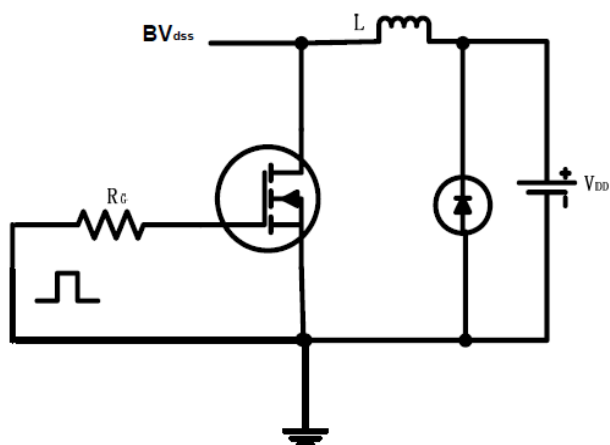


Figure 11: Maximum Effective Thermal Impedance, Junction-to-Case

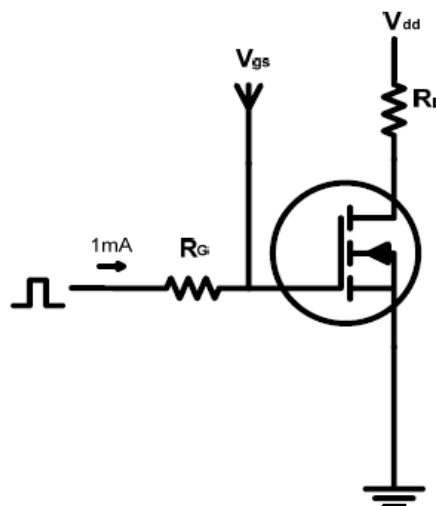


Test circuits and Waveforms

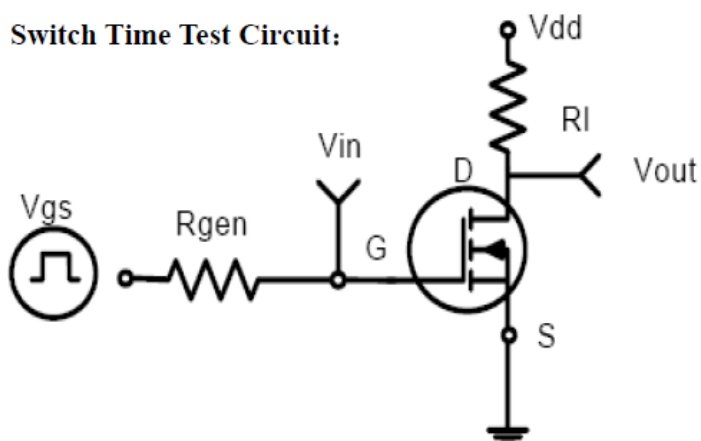
EAS test circuits:



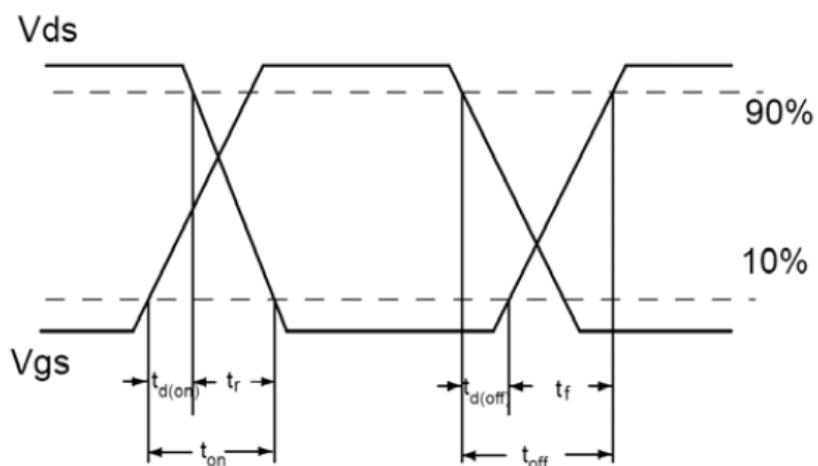
Gate charge test circuit:



Switch Time Test Circuit:

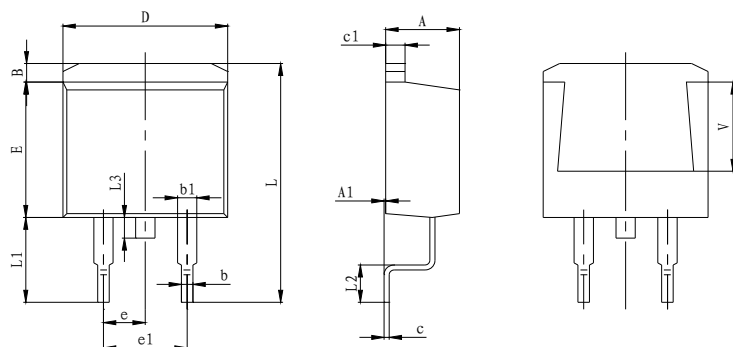


Switch Waveforms:



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
ADM170N04G	TO-263-2	ADM170N04G	Tube	50pcs
			Embossed tape	800pcs