

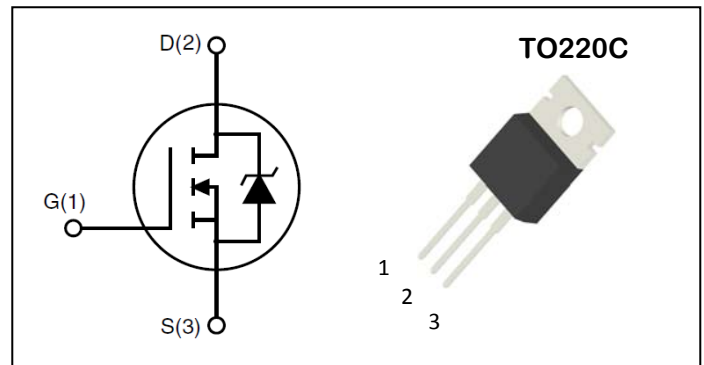
## N-Channel Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

$V_{DSS}$	$I_D$	$R_{DS(ON)}$ (m $\Omega$ )
40V	200A	3.0m $\Omega$

### 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 ADM200N04 series MOSFETs is a new technology, which combines an innovative super junction technology and advance process. This new technology achieves low  $R_{dson}$ , 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
<b>Common Ratings</b>				
$V_{DSS}$	Drain-Source Voltage		40	V
$V_{GSS}$	Gate-Source Voltage		$\pm 20$	
$T_J$	Maximum Junction Temperature		175	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range		-55 to 175	$^\circ\text{C}$
$I_S$	Diode Continuous Forward Current	$T_C = 25^\circ\text{C}$	200	A
<b>Mounted on Large Heat Sink</b>				
$I_{DM}$	300 $\mu\text{s}$ Pulse Drain Current Tested <sup>(2)</sup>	$T_C = 25^\circ\text{C}$	758	A
$I_D$	Continuous Drain Current <sup>(1)</sup>	Silicon Limited	200	A
		Package Limited	135	A
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$	208	W

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{thJC}$	Thermal resistance junction-case max <sup>(1)</sup>	0.7	$^\circ\text{C}/\text{W}$
$R_{thJA}$	Thermal resistance junction-ambient max <sup>(1)</sup>	63	$^\circ\text{C}/\text{W}$

## Electrical Characteristics (TA=25°C Unless Otherwise Noted)

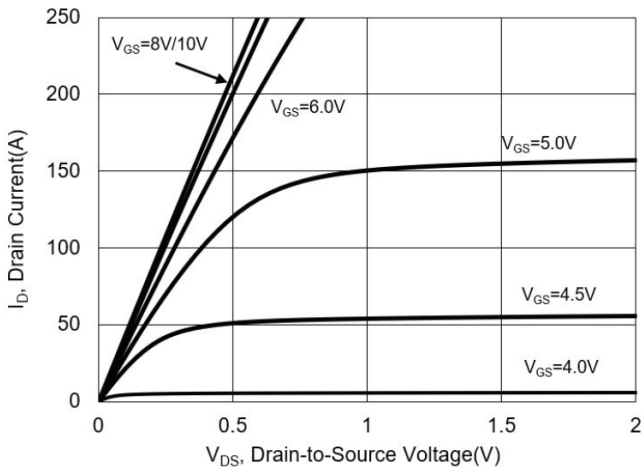
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
<b>On/off Characteristics</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250uA	40	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	--	--	1	uA
		V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	--	--	100	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	2		4	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
R <sub>DS(ON)</sub>	Drain-Source On-state Resistance <sup>(2)</sup>	V <sub>GS</sub> =10V, I <sub>DS</sub> =80A	--	2.2	3.0	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, Frequency=1MHz	--	4290	--	pF
C <sub>oss</sub>	Output Capacitance		--	230	--	
C <sub>rss</sub>	Reverse Transfer Capacitance		--	720	--	
<b>Switching Characteristics</b>						
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DS</sub> =20V, I <sub>D</sub> =80A, V <sub>GS</sub> =10V, R <sub>GEN</sub> =2.5Ω	--	19	--	ns
t <sub>r</sub>	Turn-on Rise Time		--	19	--	
t <sub>d(OFF)</sub>	Turn-off Delay Time		--	46	--	
t <sub>f</sub>	Turn-off Fall Time		--	15	--	
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>DS</sub> =80A	--	71	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	23	--	
Q <sub>gd</sub>	Gate-Drain Charge		--	18	--	
<b>Avalanche Characteristics</b>						
EAS	Single Pulse Avalanche Energy <sup>(3)</sup>	V <sub>DD</sub> =30V, L=1mH, V <sub>GS</sub> =10V, R <sub>g</sub> =25Ω	435	--	--	mJ
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage <sup>(2)</sup>	I <sub>SD</sub> =80A, V <sub>GS</sub> =0	--	--	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =80A, dI <sub>SD</sub> /dt=100A/μs	--	46	--	ns
q <sub>rr</sub>	Reverse Recovery Charge		--	78	--	nC

### NOTES:

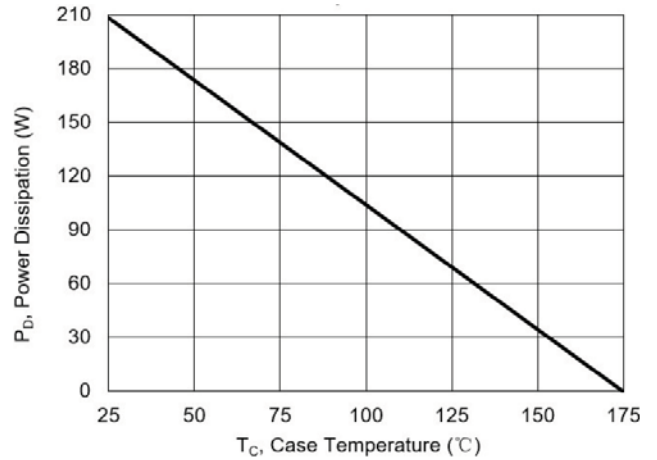
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The Min. value is 100% EAS tested guarantee.

## Typical Performance Characteristics

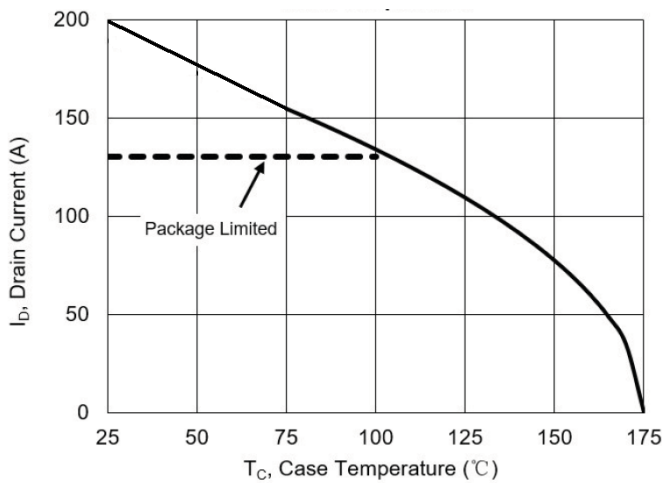
**Figure 1: On-Region Characteristics**



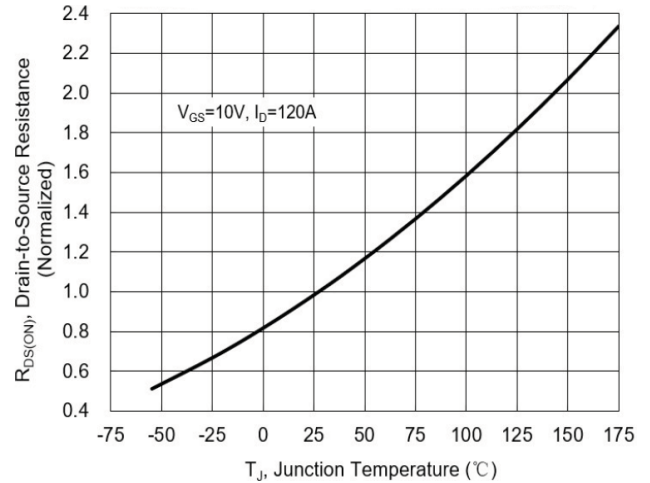
**Figure 2: Power Dissipation**



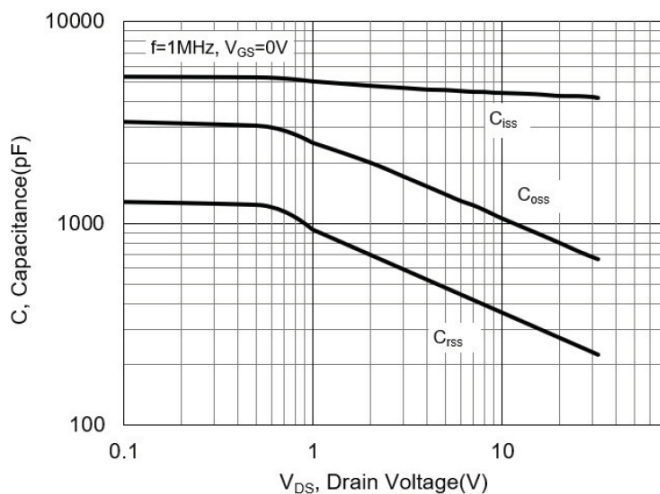
**Figure 3: Drain Current**



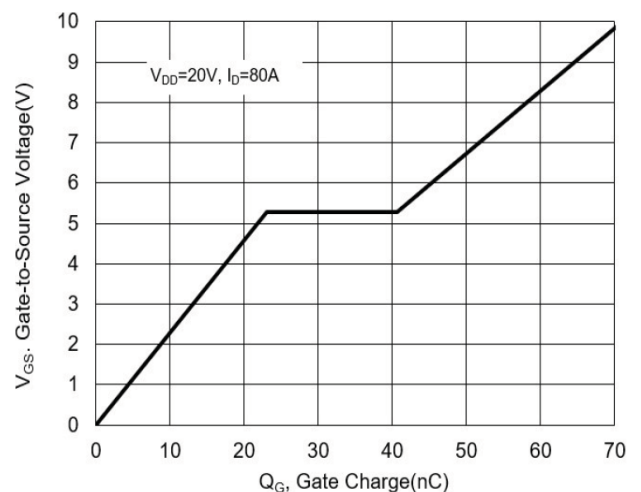
**Figure 4: Drain-to-Source Onresistance vs junction Temperature**



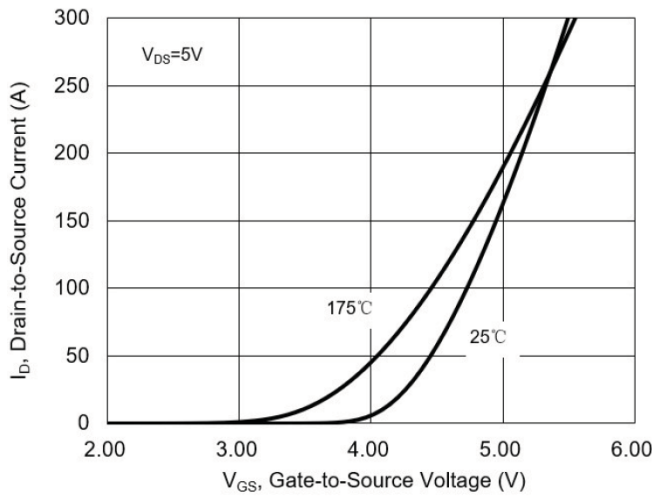
**Figure 5: Capacitance Characteristics**



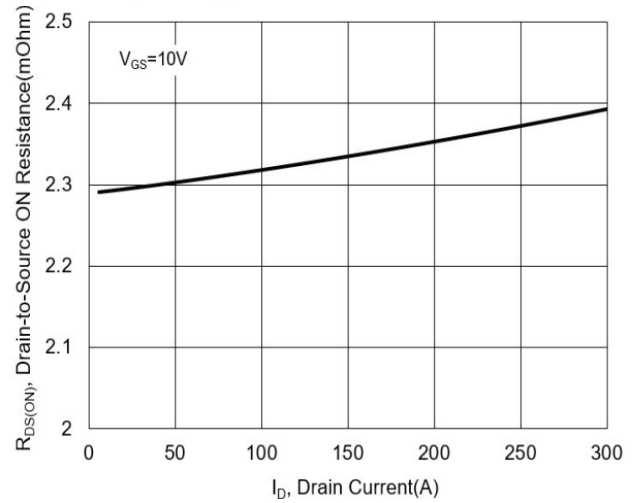
**Figure 6: Gate Charge Characteristics**



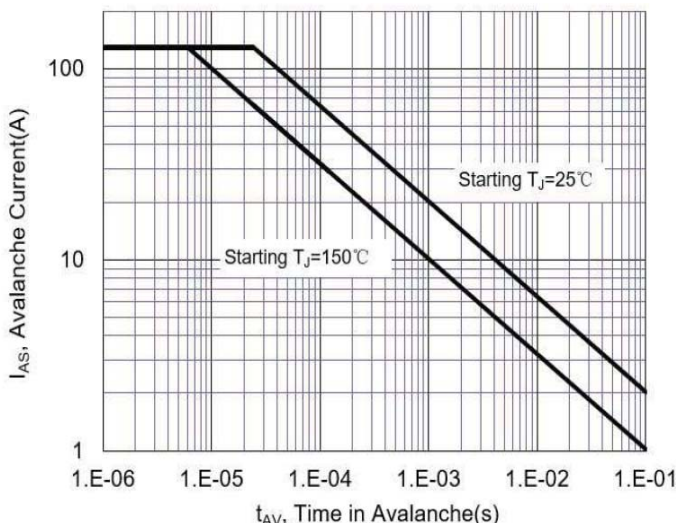
**Figure 7: Typical transfer Characteristics**



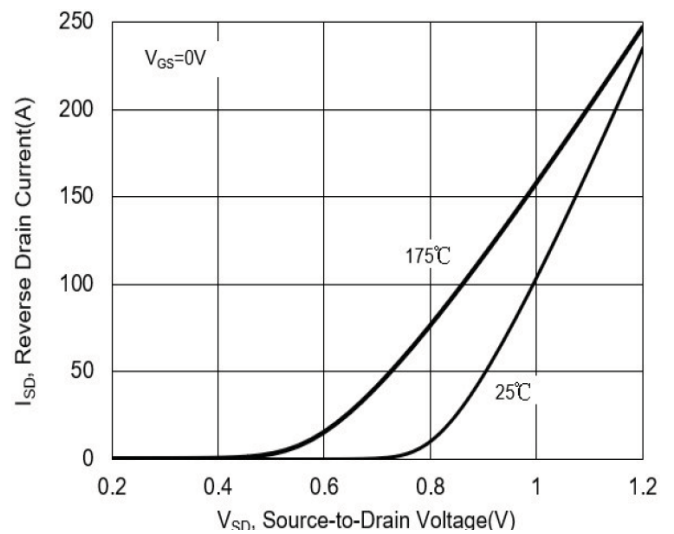
**Figure 8: Drain-to-Source On-Resistance**



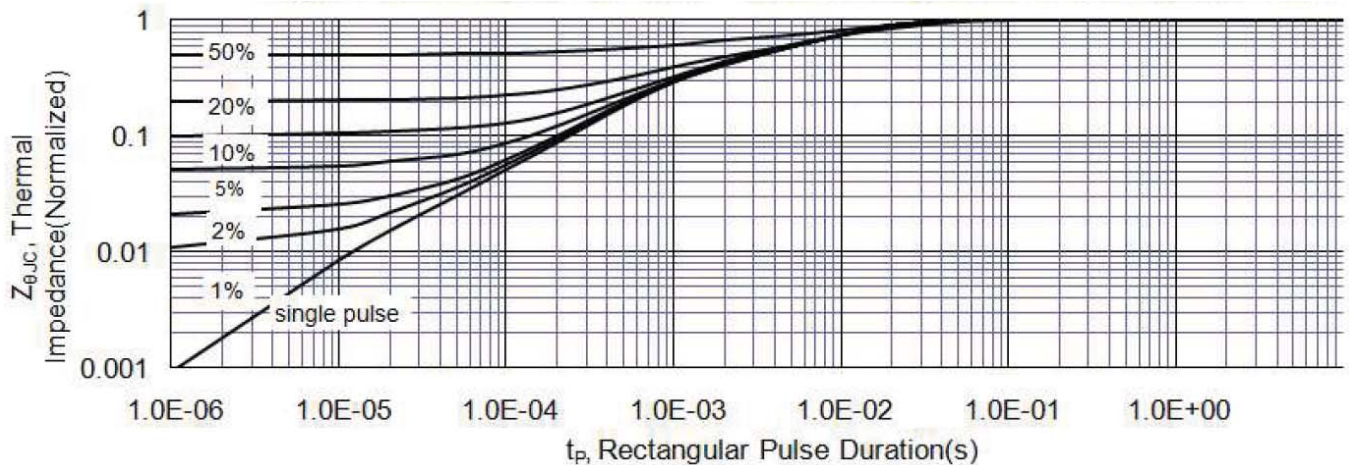
**Figure 9: Avalanche Characteristics**



**Figure 10: Forward Characteristics of reverse diode**

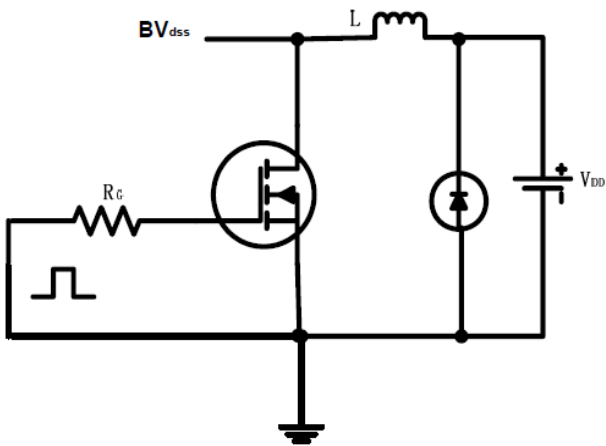


**Figure 11: Maximum Effective Thermal Impedance ,Junction-to-Case**

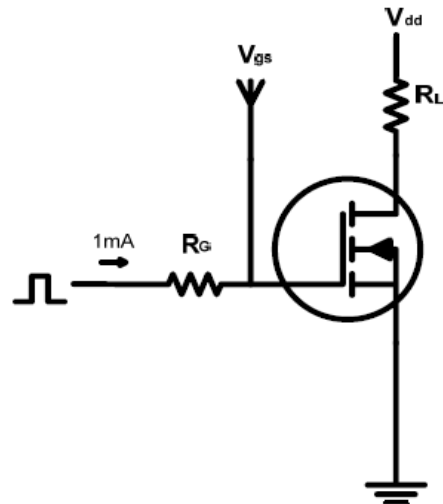


## Test circuits and Waveforms

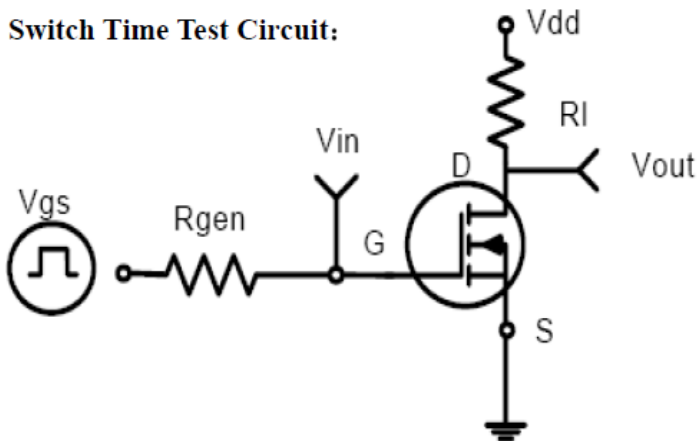
EAS test circuits:



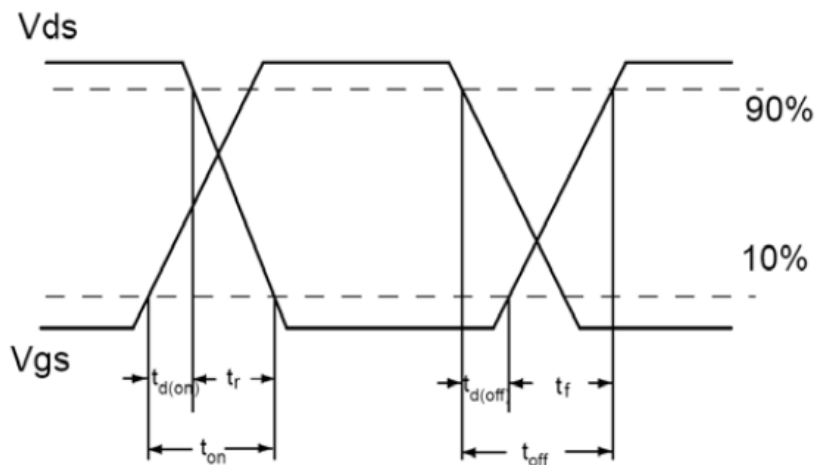
Gate charge test circuit:



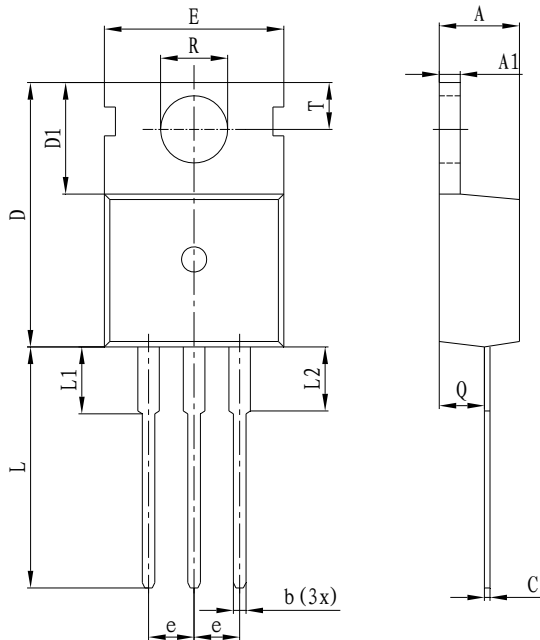
Switch Time Test Circuit:



Switch Waveforms:



**PACKAGE MECHANICAL DATA**  
**TO-220C Package Dimension**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
e	2.54 TYP		0.099TYP	
A	4.10	4.70	0.161	0.185
A1	1.25	1.40	0.049	0.055
b	0.60	0.90	0.023	0.035
C	0.40	0.70	0.016	0.027
D	15.20	16.00	0.598	0.630
D1	5.90	6.60	0.232	0.259
E	9.70	10.30	0.382	0.405
L	12.80	15.00	0.504	0.590
L1	2.79	3.30	0.110	0.130
R	3.50	3.80	0.138	0.149
T	2.70	3.00	0.106	0.118
Q	2.20	2.60	0.086	0.102
L2		3.00		0.118

**Ordering information**

Part number	Package	Marking	Packing	Quantity
ADM200N04	TO-220C	ADM200N04	Tube	50pcs