

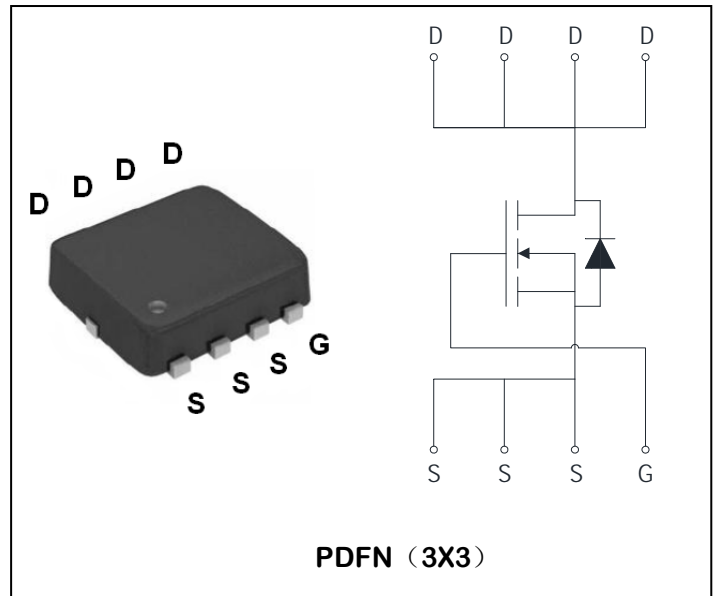
## N-Channel Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

$V_{DSS}$	$I_D$	$R_{DS(ON)}$ (m $\Omega$ )
40V	40A	5.5m $\Omega$

### Features:

- Low Gate Charge for Fast Switching Application
- Low  $R_{DS(ON)}$  to Minimize Conductive Loss
- 100% EAS Guaranteed
- Optimized  $V_{(BR)DSS}$  Ruggedness
- Green Device Available



### Description:

The ADM40N04Z 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 ( $T_A = 25^\circ\text{C}$ unless otherwise specified )

Symbol	Parameter		Ratings	Unit
Common Ratings				
V <sub>DSS</sub>	Drain-Source Voltage		40	V
V <sub>GSS</sub>	Gate-Source Voltage		±20	
T <sub>J</sub>	Maximum Junction Temperature		150	°C
T <sub>STG</sub>	Storage Temperature Range		-55 to150	°C
I <sub>S</sub>	Diode Continuous Forward Current	T <sub>C</sub> =25°C	40	A
Mounted on Large Heat Sink				
I <sub>DM</sub>	300μs Pulse Drain Current Tested <sup>(2)</sup>	T <sub>C</sub> =25°C, V <sub>GS</sub> =10V	120	A
I <sub>D</sub>	Continuous Drain Current <sup>(1)</sup>	T <sub>C</sub> =25°C, V <sub>GS</sub> =10V	40	A
		T <sub>C</sub> =100°C V <sub>GS</sub> =10V	32	A
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C	65	W

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{thJC}$	Thermal resistance junction-case max <sup>(1)</sup>	1.92	$^\circ\text{C/W}$
$R_{thJA}$	Thermal resistance junction-ambient max <sup>(1)</sup>	30	$^\circ\text{C/W}$

**Electrical Characteristics** (T<sub>A</sub>=25°C Unless Otherwise Noted)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
On/off Characteristics						
BV <sub>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> = 40V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C	--	--	10	uA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	1.1	1.6	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-SourceOn-stateResistance <sup>(2)</sup>	V <sub>GS</sub> = 10V, I <sub>DS</sub> =30A	--	5.5	7	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>DS</sub> =20A	--	9	12	
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V,	--	980	--	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 20V,	--	160	--	
C <sub>rss</sub>	Reverse Transfer Capacitance	Frequency=1.0MHz	--	80	--	
Switching Characteristics						
t <sub>d(ON)</sub>	Turn-on Delay Time <sup>(1)</sup>	V <sub>DD</sub> =20V,	--	6	--	ns
t <sub>r</sub>	Turn-on Rise Time <sup>(1)</sup>	I <sub>D</sub> = 20A, V <sub>GS</sub> = 10V,	--	10	--	
t <sub>d(OFF)</sub>	Turn-off Delay Time <sup>(1)</sup>	R <sub>GEN</sub> =4.7 Ω	--	24	--	
t <sub>f</sub>	Turn-off Fall Time <sup>(1)</sup>		--	5	--	
Q <sub>g</sub>	Total Gate Charge <sup>(1)</sup>	V <sub>DS</sub> =32V, V <sub>GS</sub> = 10V,	--	18	23	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>(1)</sup>	I <sub>DS</sub> =20A	--	2.5	--	
Q <sub>gd</sub>	Gate-Drain Charge <sup>(1)</sup>		--	5	--	
Avalanche Characteristics						
EAS	Single Pulse Avalanche Energy <sup>(3)</sup>	V <sub>DD</sub> =24V,L=0.5mH ,V <sub>GS</sub> =10 V,R <sub>g</sub> =50 Ω , I <sub>AS</sub> =13A T <sub>J</sub> =25°C	50			mJ
Diode Characteristics						
V <sub>SD</sub>	Diode Forward Voltage <sup>(2)</sup>	I <sub>SD</sub> = 20A, V <sub>GS</sub> = 0 ,T <sub>J</sub> =25°C	--	--	1.2	V

## 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.

## Typical Performance Characteristics

Figure 1: On-Region Characteristics

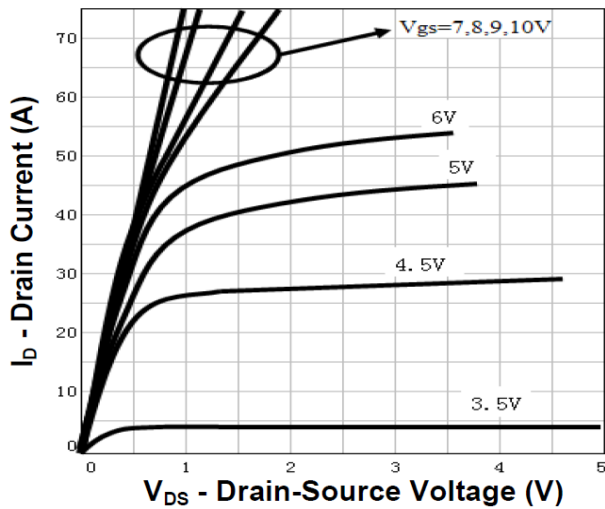


Figure 2: Normalized RDSON vs. T<sub>J</sub>

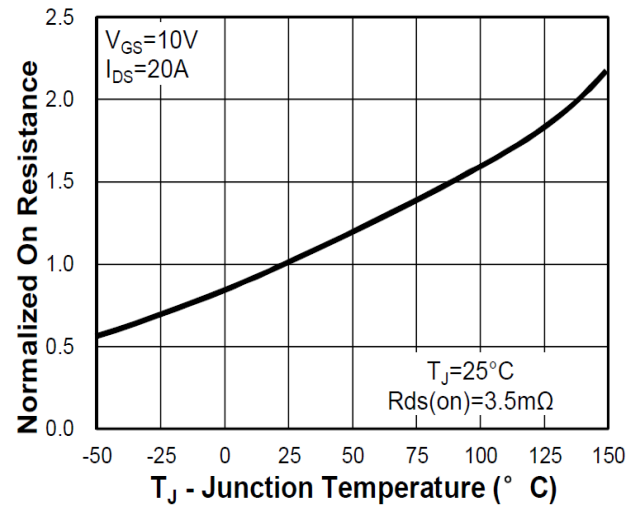


Figure 3: Drain-Source On Resistance

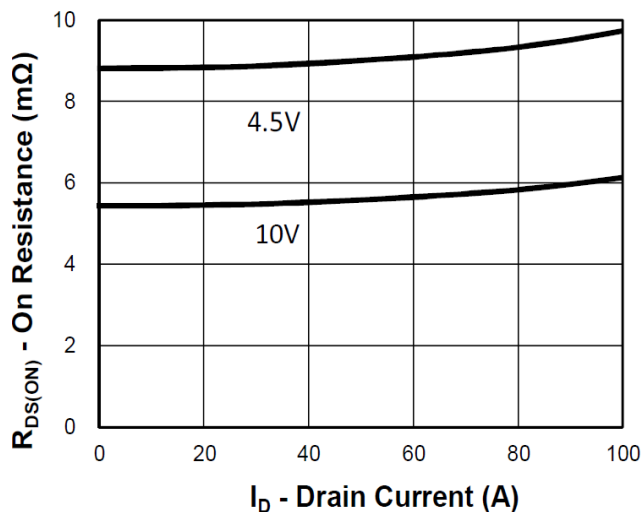


Figure 4: Gate Charge Waveform

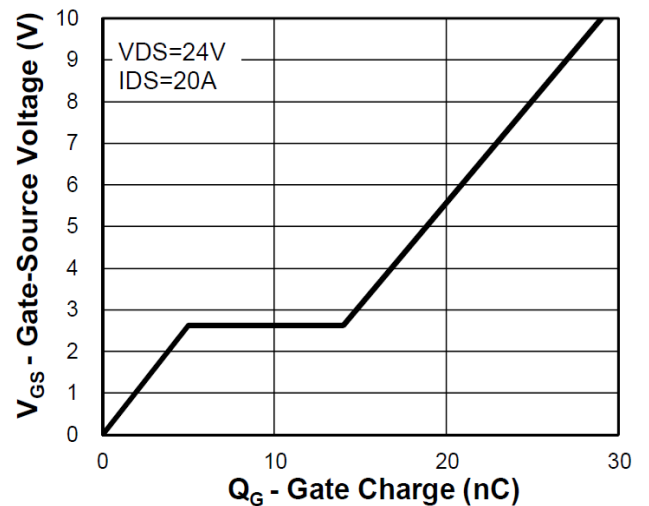


Figure 5: Maximum Continuous Drain Current v.s. Ambient Temperature

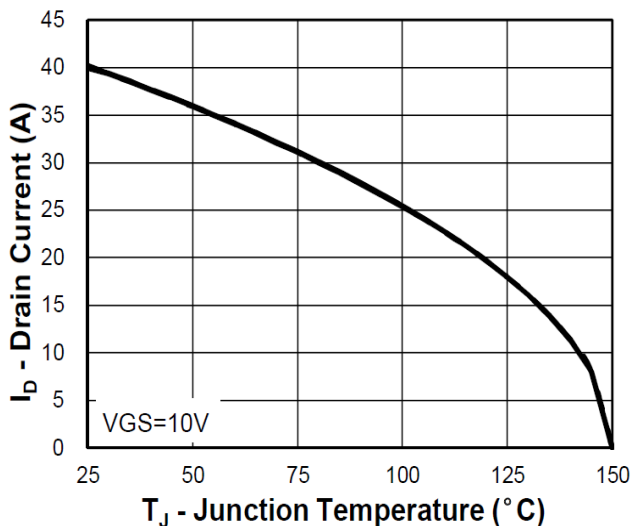


Figure 6: Maximum Safe Operation Area

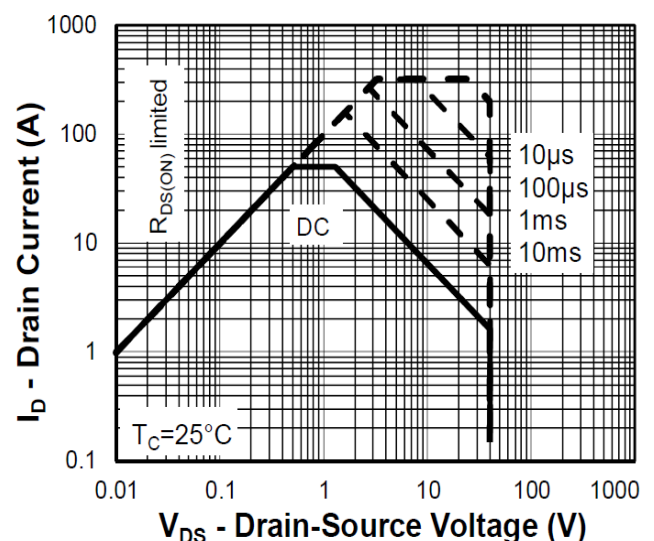


Figure 7: Capacitance vs Vds

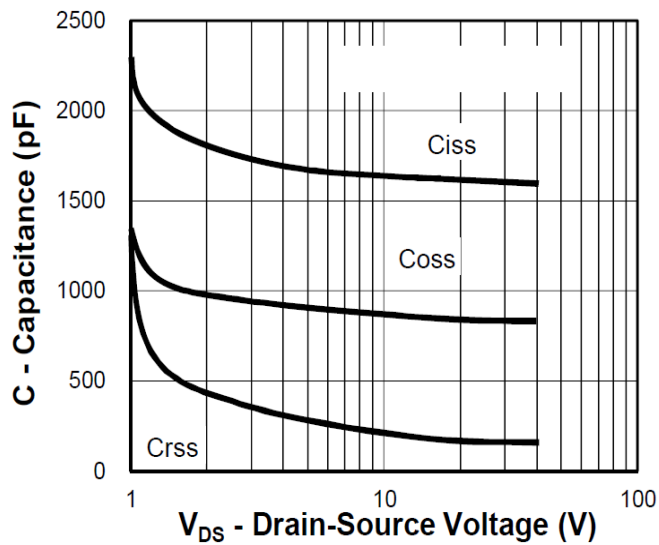


Figure 8: Typical Source-Drain Diode Forward Voltage

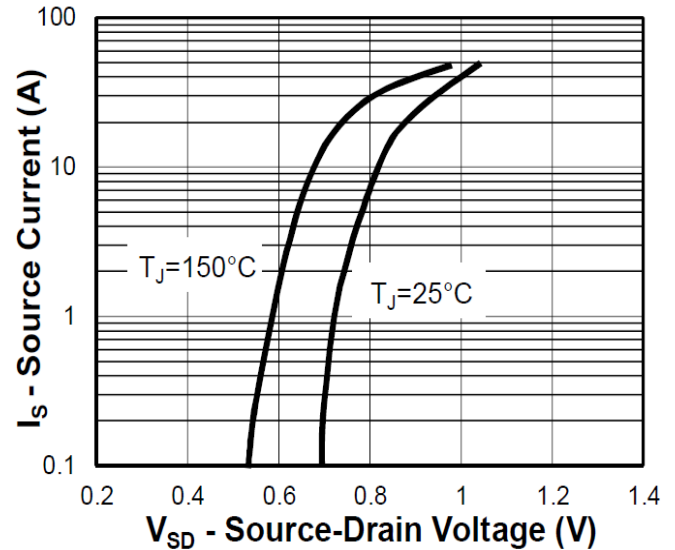


Figure 9: Effective Transient Thermal Impedance

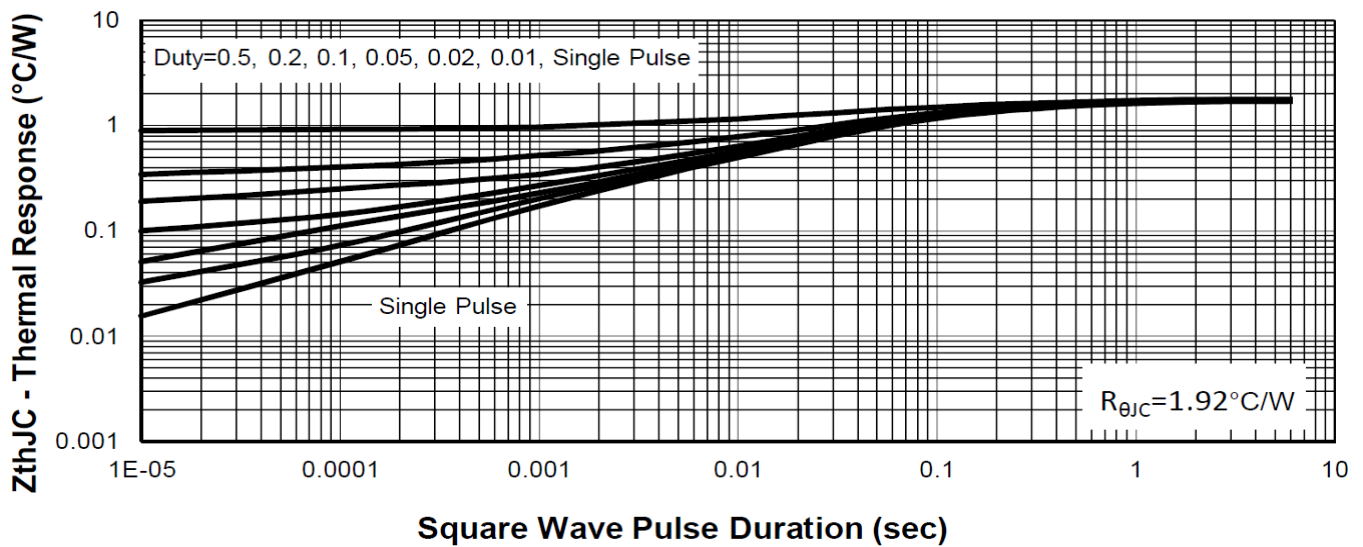


Figure 10: Switching Time Waveform

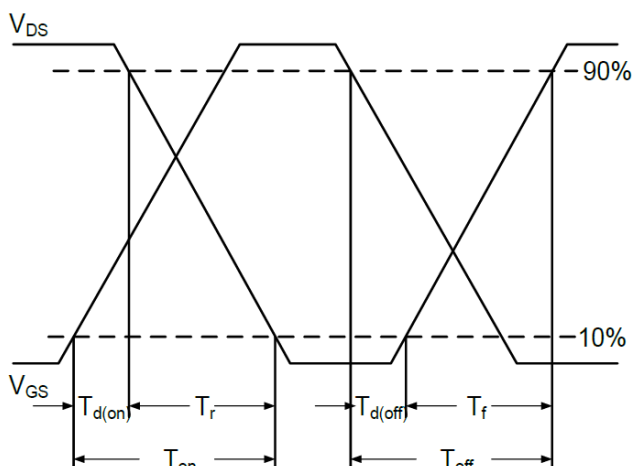
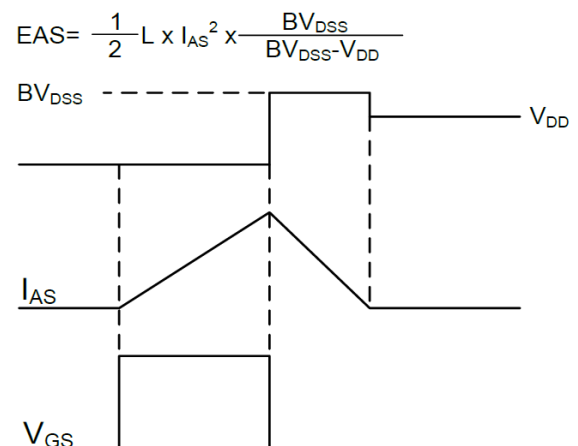
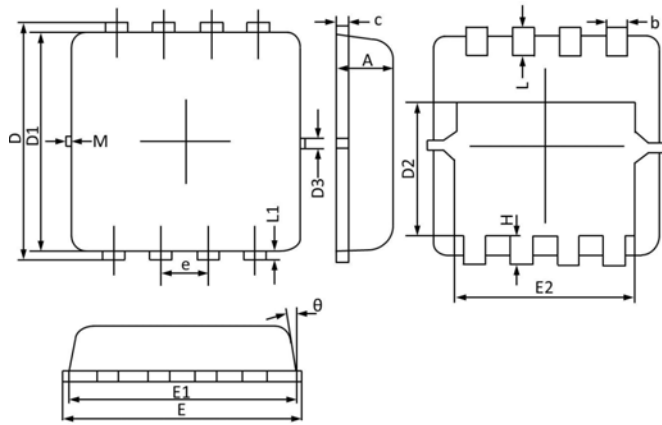


Figure 11: EAS Waveform



## PACKAGE MECHANICAL DATA

### PDFN (3X3) Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.013
c	0.100	0.250	0.004	0.009
D	3.250	3.450	0.128	0.135
D1	3.000	3.200	0.119	0.125
D2	1.780	1.980	0.070	0.077
D3	0.130REF		0.005REF	
E	3.200	3.400	0.126	0.133
E1	3.000	3.200	0.119	0.125
E2	2.390	2.590	0.094	0.102
H	0.300	0.500	0.011	0.019
M	0.150REF		0.006REF	
e	0.650 TYP.		0.026 TYP.	
L	0.300	0.500	0.011	0.019
L1	0.130REF		0.005REF	
θ	0°	12°	0°	12°

## Ordering information

Part number	Package	Marking	Packing	Quantity
ADM40N04Z	PDFN3*3	M40N04Z	Embossed tape	5000pcs

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