

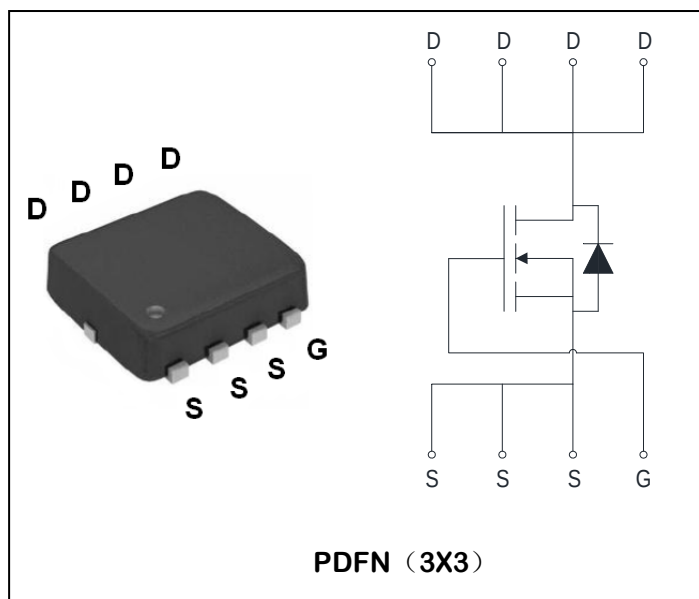
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω)
40V	40A	5.5m 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
- Green Device Available



Description:

The ADM4040Z 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 _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		± 20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	40	A
Mounted on Large Heat Sink				
I _{DM}	300μs Pulse Drain Current Tested ⁽²⁾	T _C =25°C, V _{GS} =10V	120	A
I _D	Continuous Drain Current ⁽¹⁾	T _C =25°C, V _{GS} =10V	40	A
		T _C =100°C V _{GS} =10V	32	A
P _D	Maximum Power Dissipation	T _C =25°C	65	W

Thermal Characteristics

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

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

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

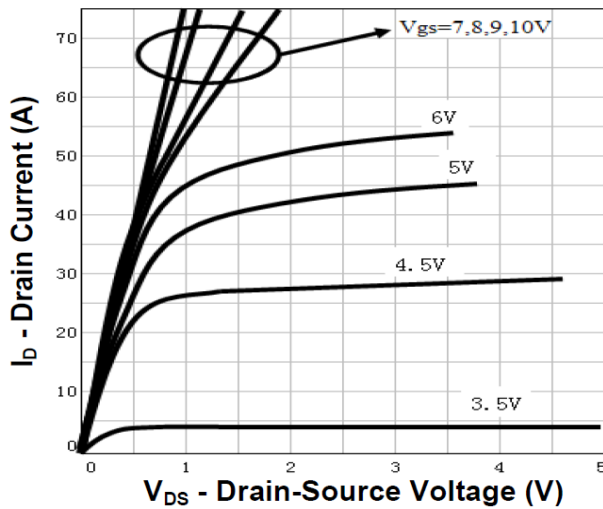


Figure 2: Normalized RDSON vs. T_J

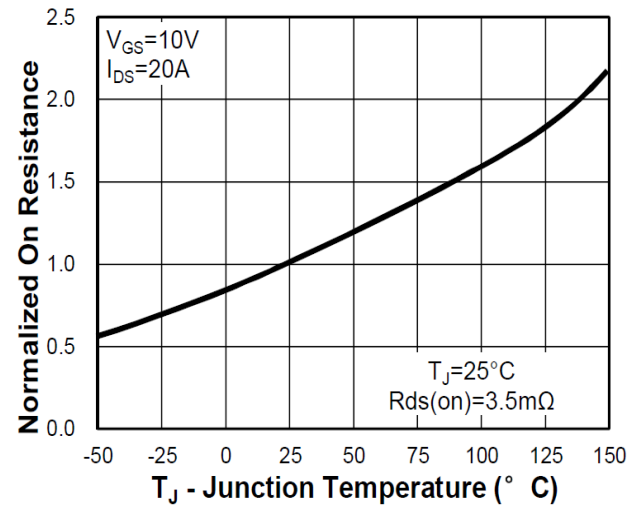


Figure 3: Drain-Source On Resistance

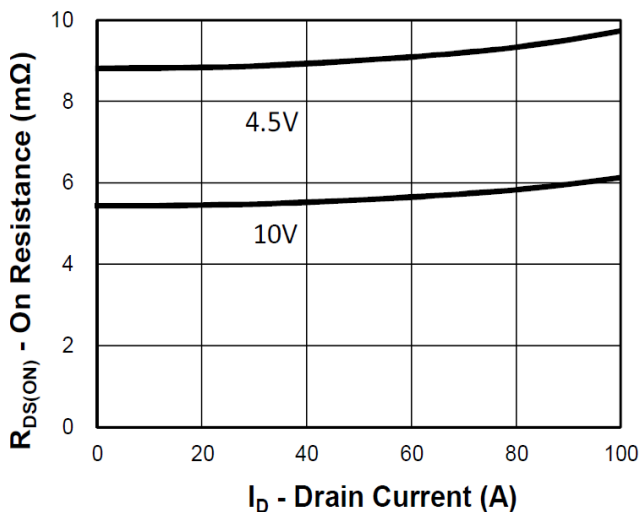


Figure 4: Gate Charge Waveform

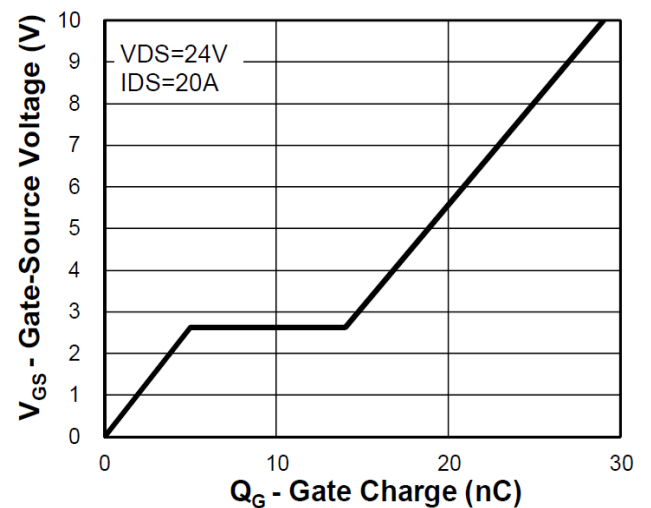


Figure 5: Maximum Continuous Drain Current v.s. Ambient Temperature

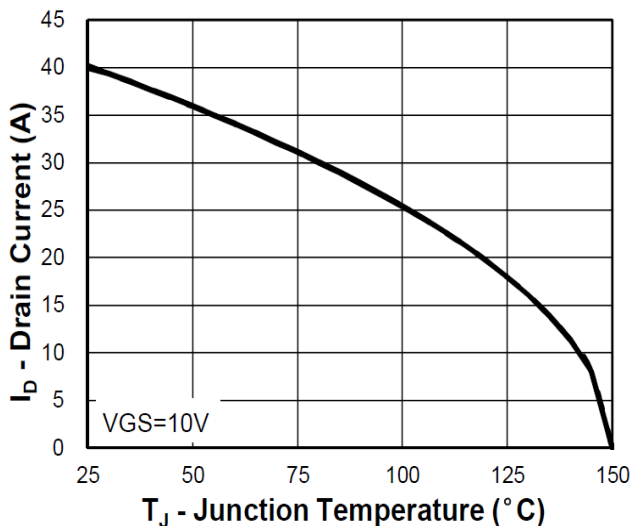


Figure 6: Maximum Safe Operation Area

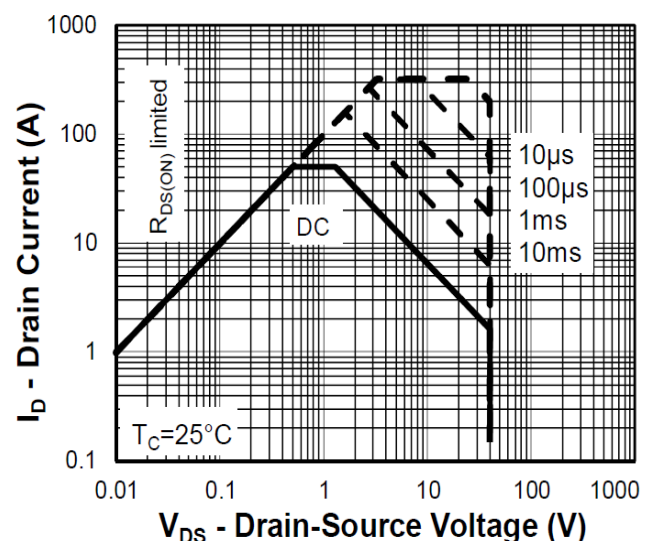


Figure 7: Capacitance vs Vds

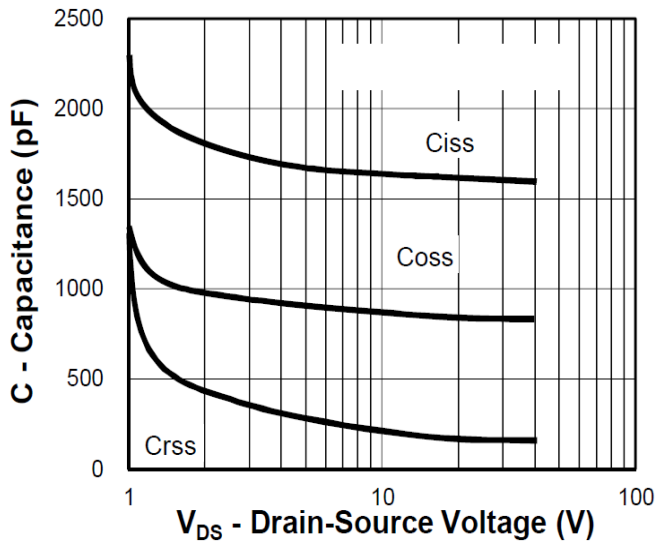


Figure 8: Typical Source-Drain Diode Forward Voltage

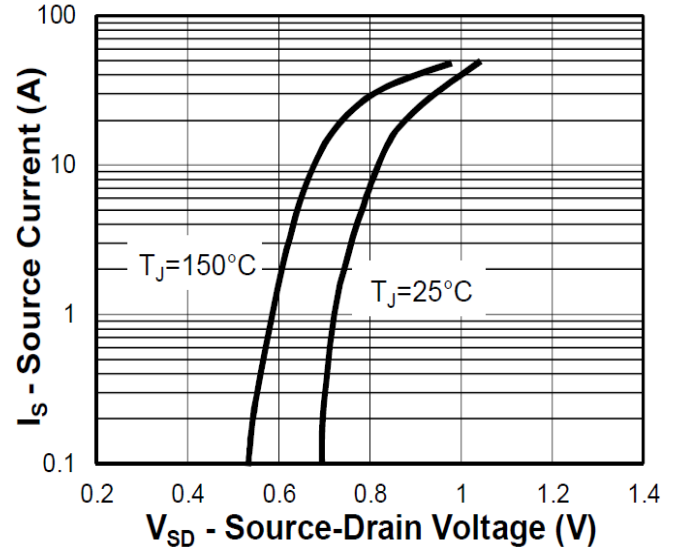


Figure 9: Effective Transient Thermal Impedance

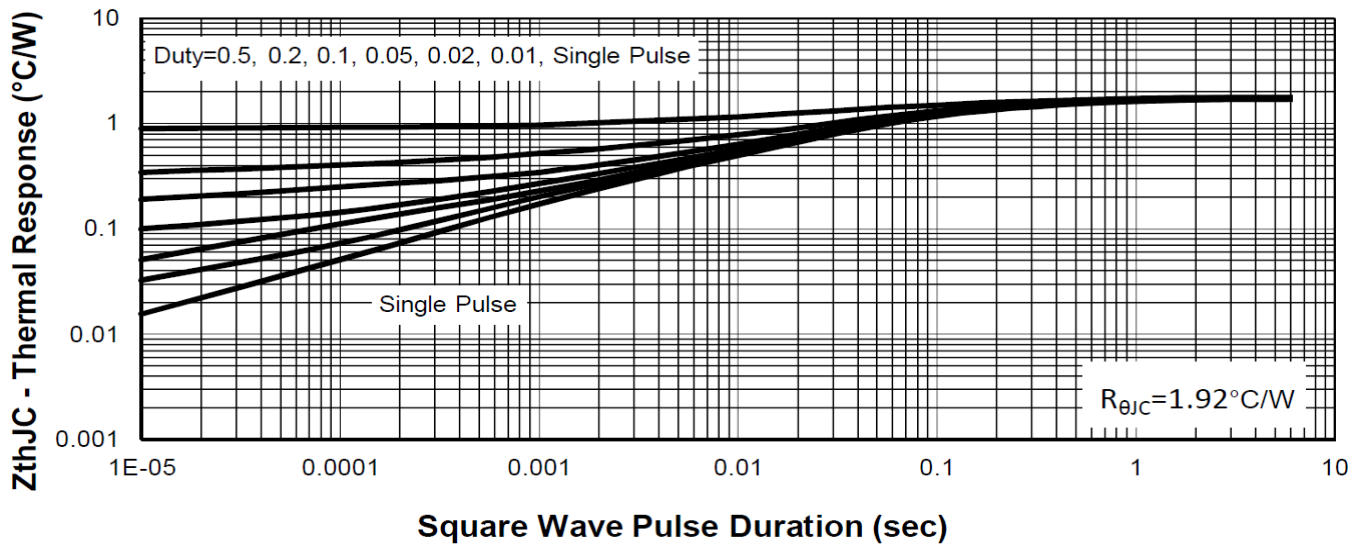


Figure 10: Switching Time Waveform

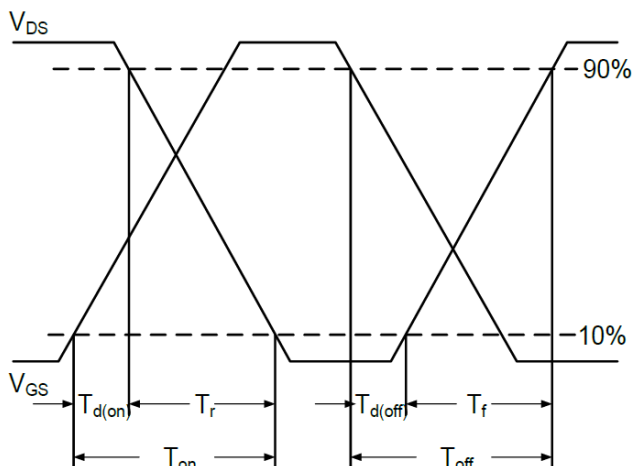
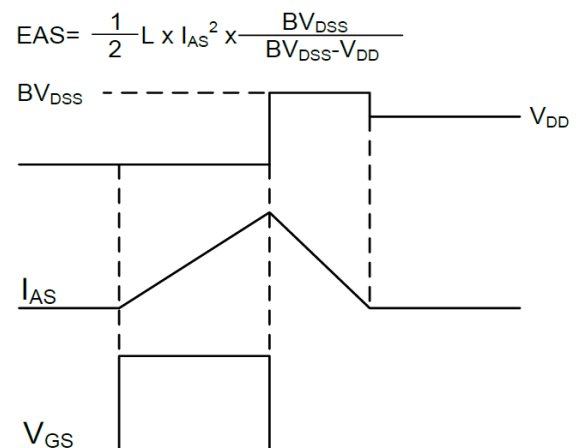
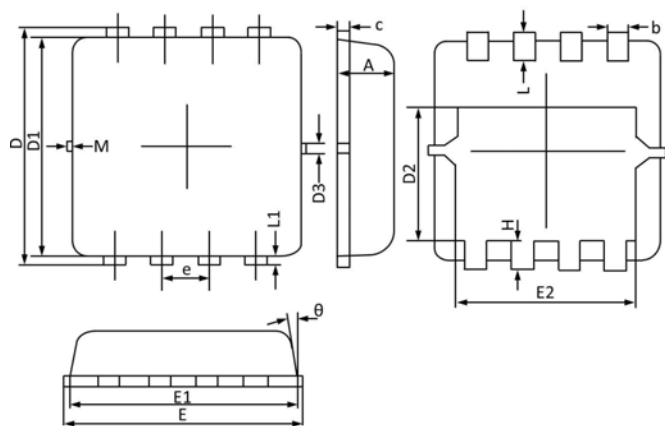


Figure 11: EAS Waveform



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
ADM4040Z	PDFN3*3	M4040Z	Embossed tape	5000pcs

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