

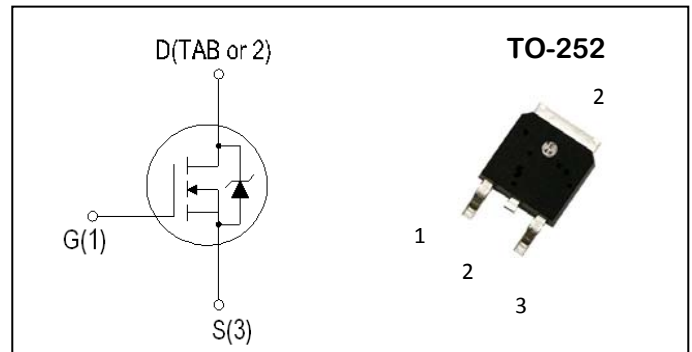
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω)
30V	40A	10m 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 ADM40N30E 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		30	V
V _{GSS}	Gate-Source Voltage		±20V	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to175	°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	160	A
I _D	Continuous Drain Current ⁽¹⁾	T _C =25°C	40	A
		T _C =100°C	26	A
P _D	Maximum Power Dissipation	T _C =25°C	29	W

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max ⁽¹⁾	5.2	$^\circ\text{C/W}$
R_{thJA}	Thermal resistance junction-ambient max ⁽¹⁾	68	$^\circ\text{C/W}$

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	VGS=0V, IDS=250uA	30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=30V,VGS=0V , TJ=25°C	--	--	1.0	uA
VGS(th)	Gate Threshold Voltage	VDS=VGS, IDS=250uA	1.0	1.5	2.5	V
IGSS	Gate Leakage Current	VGS= ± 20V, VDS=0V	--	--	± 100	nA
RDS(ON)	Drain-SourceOn-stateResistance ⁽²⁾	VGS= 10V, IDS=20A	--	7.6	10	mΩ
		VGS= 4.5V, IDS=10A	--	11.5	17	
Dynamic Characteristics						
Ciss	Input Capacitance	VGS=0V,	--	1011	--	pF
Coss	Output Capacitance	VDS=15V,	--	142	--	
Crss	Reverse Transfer Capacitance	Frequency=1MHz	--	119	--	
Switching Characteristics						
td(ON)	Turn-on Delay Time	VDS=30V,	--	6	--	nS
tr	Turn-on Rise Time	ID= 2A, VGS= 10V,	--	5	--	
td(OFF)	Turn-off Delay Time	RGEN=3 Ω	--	25	--	
tr	Turn-off Fall Time		--	7	--	
Qg	Total Gate Charge	VDS=15V, VGS= 10V,	--	19	--	nC
Qgs	Gate-Source Charge	IDS=20A	--	6.3	--	
Qgd	Gate-Drain Charge		--	4.5	--	
Avalanche Characteristics						
EAS	Single Pulse Avalanche Energy ⁽³⁾	L=0.5mH , TC=25°C	--	--	29	mJ
Diode Characteristics						
VSD	Diode Forward Voltage ⁽²⁾	ISD = 30A, VGS = 0	--	--	1.2	V
trr	Reverse Recovery Time	ISD=30A, dISD/dt=100A/μs	--	7	--	ns
qrr	Reverse Recovery Charge		--	6.3	--	nC

NOTES:

1. Surface Mounted on FR4 Board, t ≤ 10 sec.

2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 0.5%

3. The Min. value is 100% EAS tested guarantee. T_J=25°C, V_{DD}=15V, V_G=10V, R_G=25 Ω, L=0.5mH, I_{AS}=10.8A

Typical Performance Characteristics

Figure 1: On-Region Characteristics

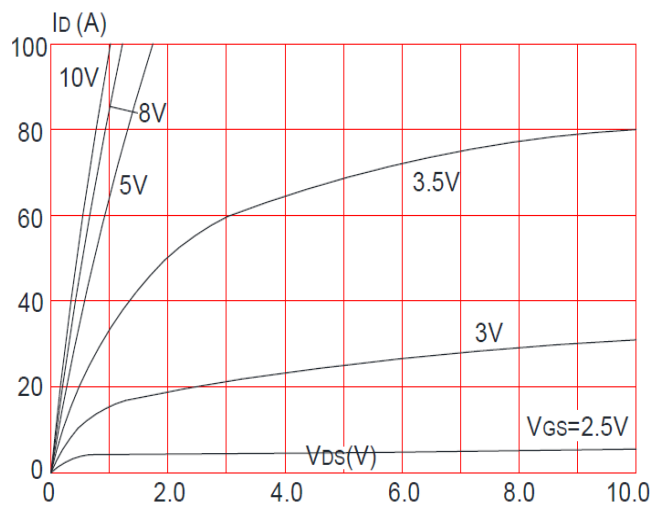


Figure 2: Transfer Characteristics

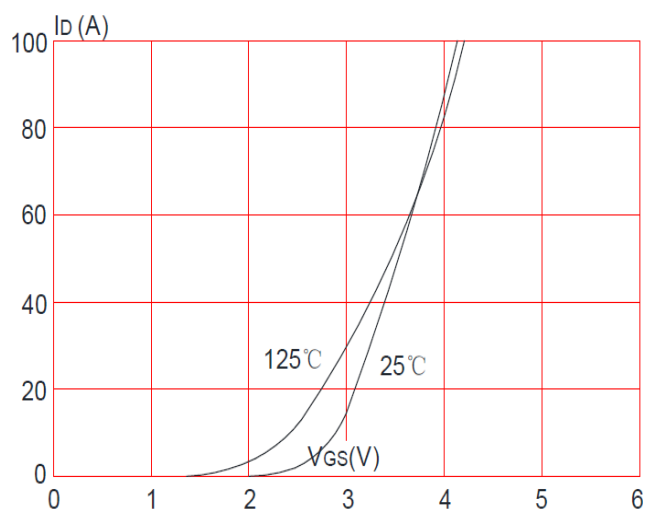


Figure 3: Rds(on)- Drain Current

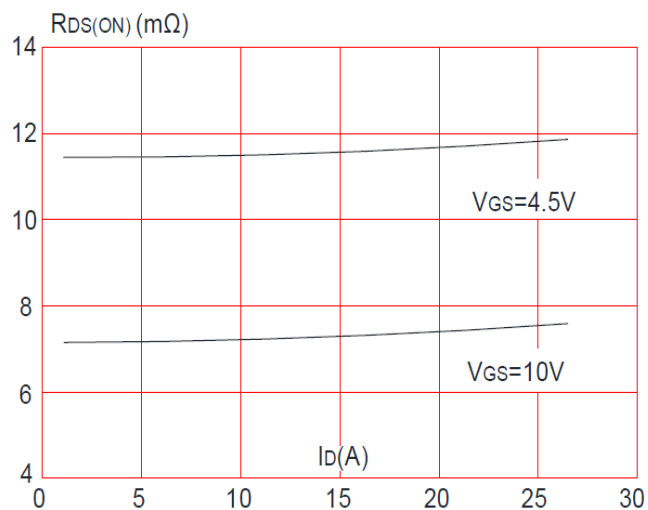


Figure 4: Normalized on Resistance vs. Junction Temperature

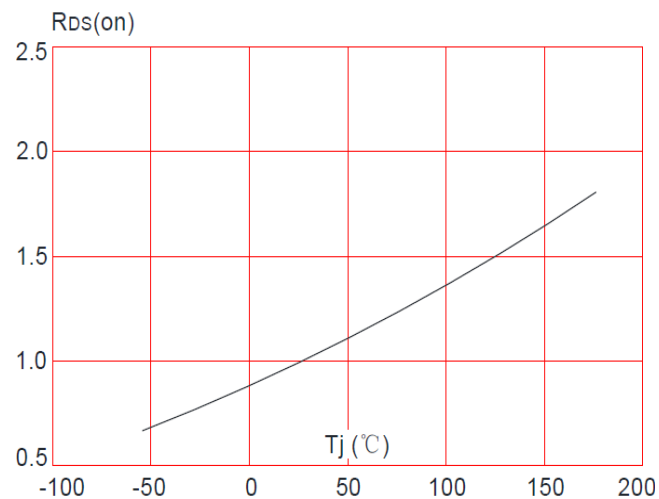


Figure 5: Source- Drain Diode Forward

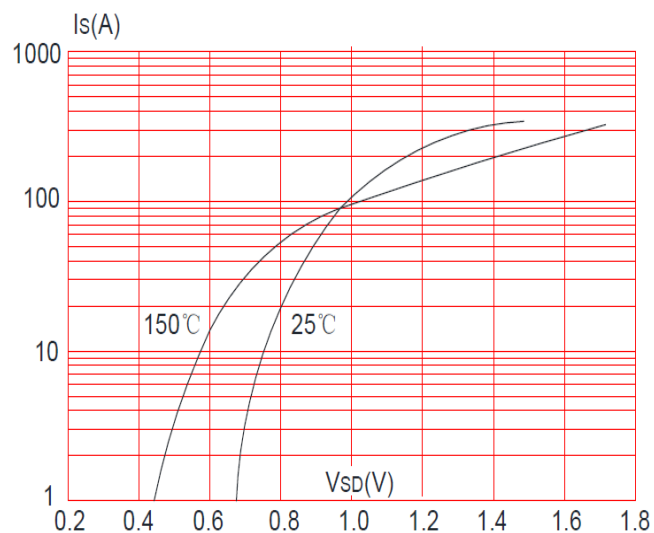


Figure 6: Gate Charge Characteristics

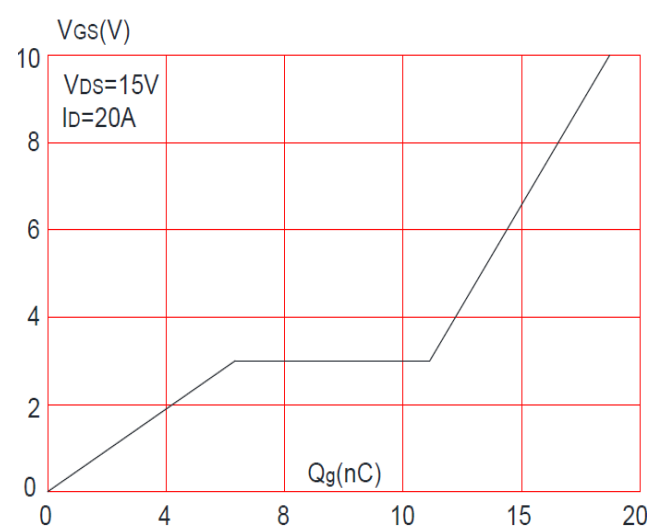


Figure 7: Capacitance vs Vds

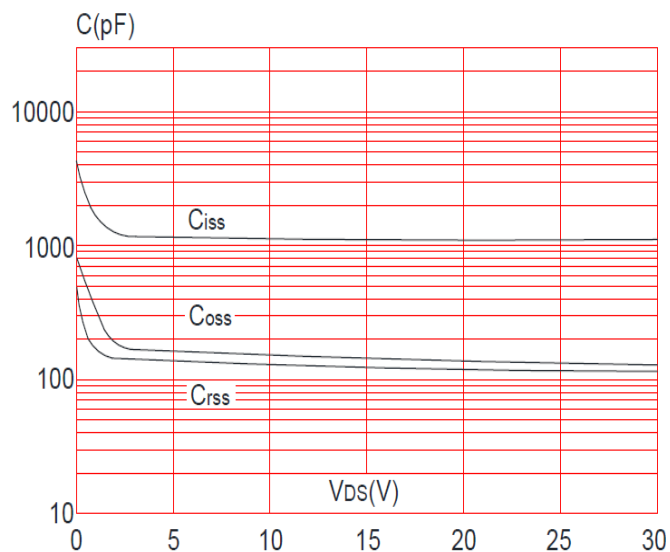


Figure 8: Safe Operation Area

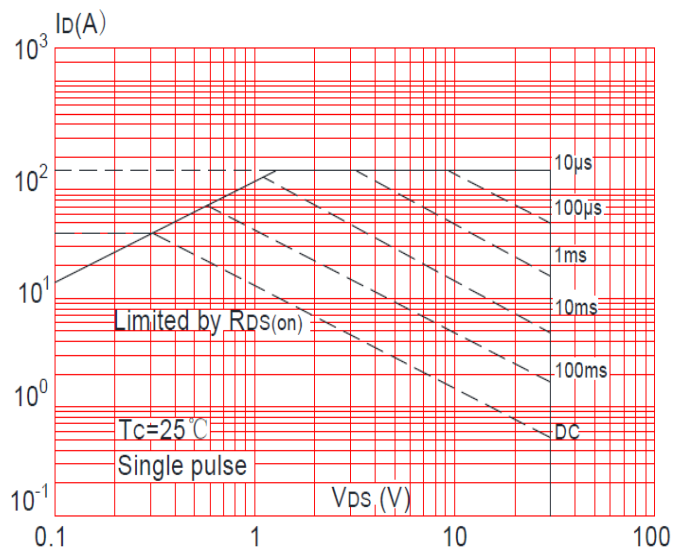


Figure 9: Maximum Drain Current vs. Case Temperature

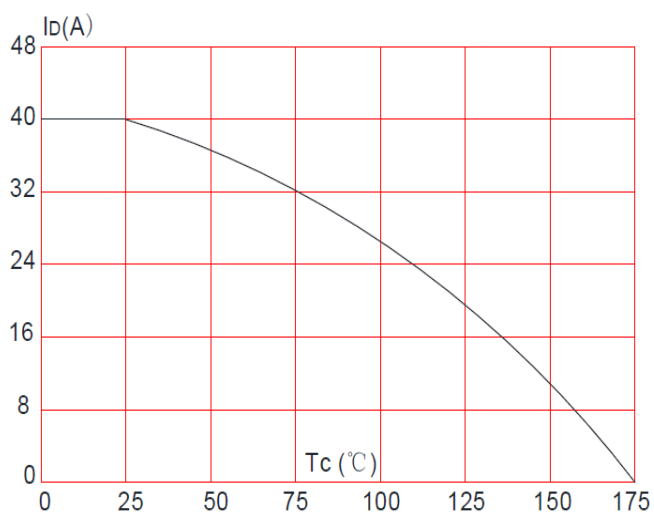


Figure 10: Normalized Breakdown Voltage vs. Junction Temperature

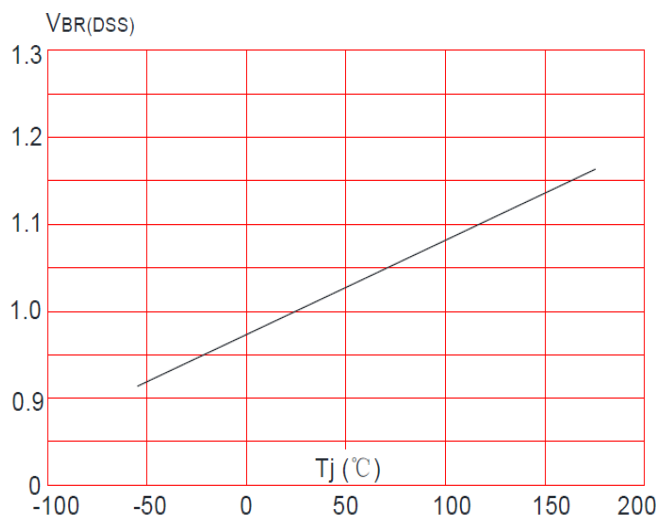
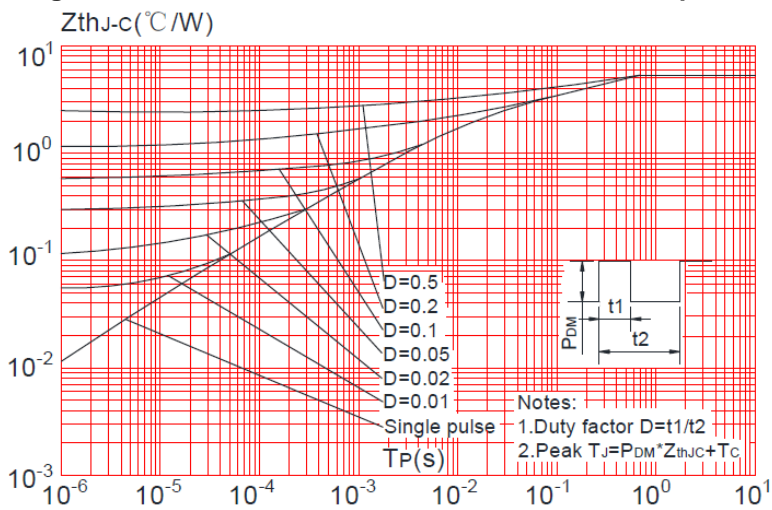
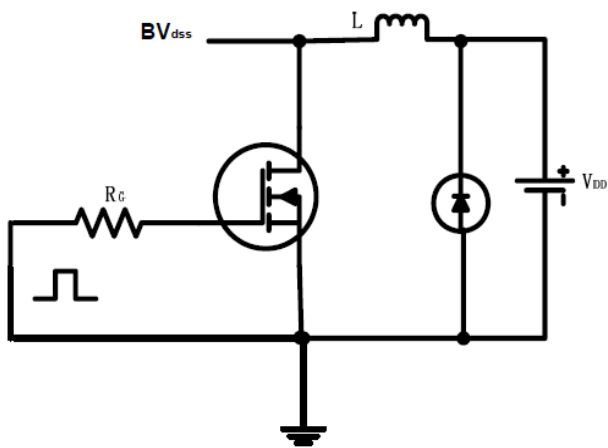


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

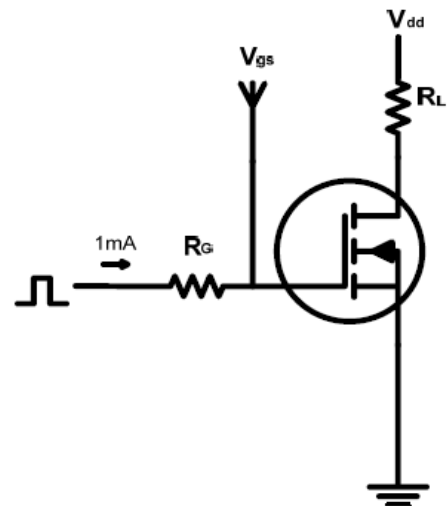


Test circuits and Waveforms

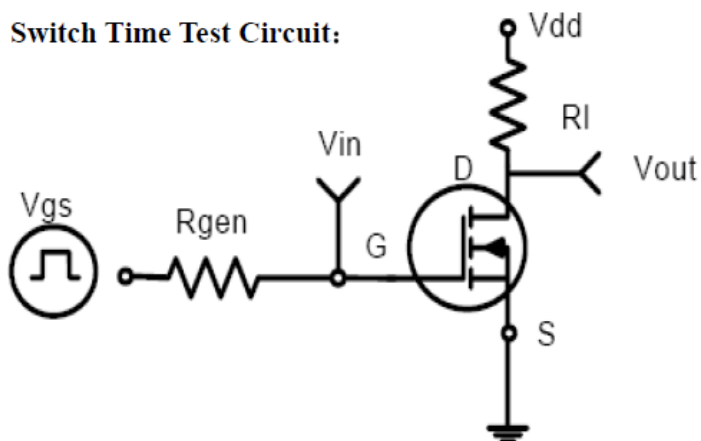
EAS test circuits:



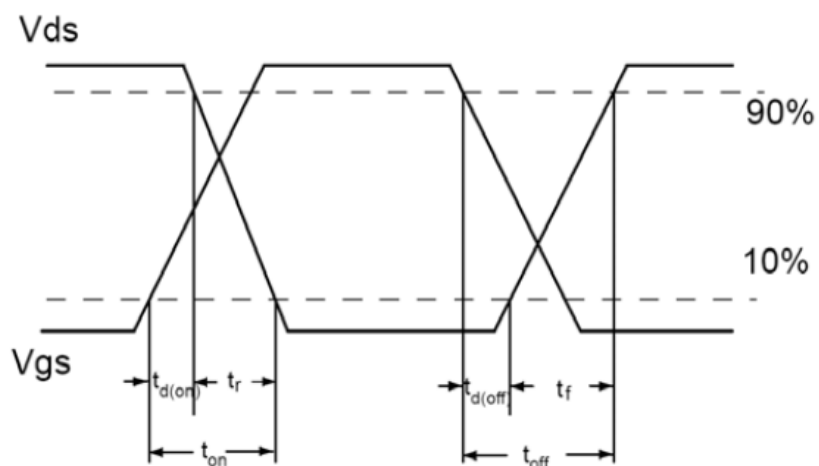
Gate charge test circuit:



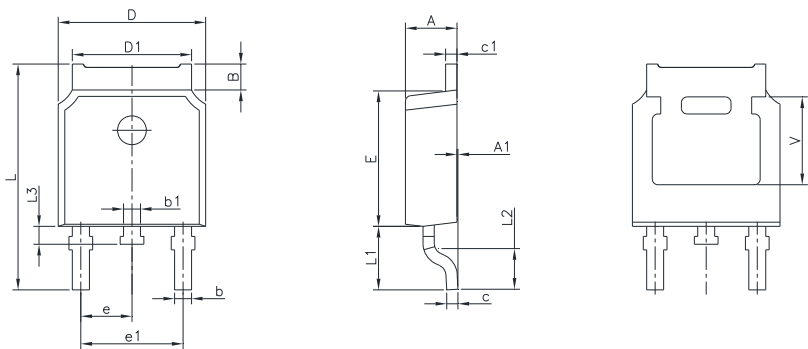
Switch Time Test Circuit:



Switch Waveforms:



PACKAGE MECHANICAL DATA
TO-252-2 Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.070	1.220	0.042	0.048
b	0.720	0.850	0.028	0.033
b1	0.720	0.850	0.028	0.033
c	0.450	0.620	0.017	0.024
c1	0.450	0.620	0.017	0.024
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.900	6.200	0.232	0.244
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	10.60	0.374	0.396
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.950 REF.		0.155 REF.	

Ordering information

Part number	Package	Marking	Packing	Quantity
ADM40N30E	TO-252-2	ADM40N30E	Tube	80pcs
			Embossed tape	2500pcs

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