

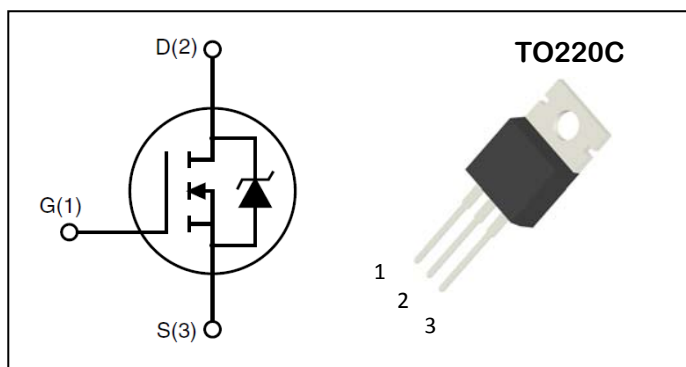
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (m Ω)
60V	50A	20m 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 ADM50N06 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		60	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	50	A
Mounted on Large Heat Sink				
I _{DM}	300μs Pulse Drain Current Tested ⁽²⁾	T _C =25°C	220	A
I _D	Continuous Drain Current ⁽¹⁾	T _C =25°C	50	A
		T _C =100°C	35	A
P _D	Maximum Power Dissipation	T _C =25°C	80	W

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max ⁽¹⁾	1.88	$^\circ\text{C/W}$
R_{thJA}	Thermal resistance junction-ambient max ⁽¹⁾	62	$^\circ\text{C/W}$

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	60	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V , T _J =25°C	--	--	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	1.2	2.0	2.5	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} =20A	--	17	20	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V,	--	900	--	pF
C _{oss}	Output Capacitance	V _{DS} =25V,	--	104	--	
C _{rss}	Reverse Transfer Capacitance	Frequency=1MHz	--	33	--	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DS} =30V,	--	25	--	nS
t _r	Turn-on Rise Time	I _D = 2A, V _{GS} = 10V,	--	5	--	
t _{d(OFF)}	Turn-off Delay Time	R _{GEN} =2.5 Ω	--	50	--	
t _f	Turn-off Fall Time		--	6	--	
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} = 10V,	--	30	--	nC
Q _{gs}	Gate-Source Charge	I _{DS} =50A	--	10	--	
Q _{gd}	Gate-Drain Charge		--	5	--	
Avalanche Characteristics						
EAS	Single Pulse Avalanche Energy ⁽³⁾	V _{DD} =30V,L=0.5mH ,V _{GS} =10V,R _g =25 Ω	115	--	--	mJ
Diode Characteristics						
V _{SD}	Diode Forward Voltage ⁽²⁾	I _{SD} = 40A, V _{GS} = 0	--	--	1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =40A, dI _{SD} /dt=100A/μs	--	50	--	ns
q _{rr}	Reverse Recovery Charge		--	100	--	nC

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

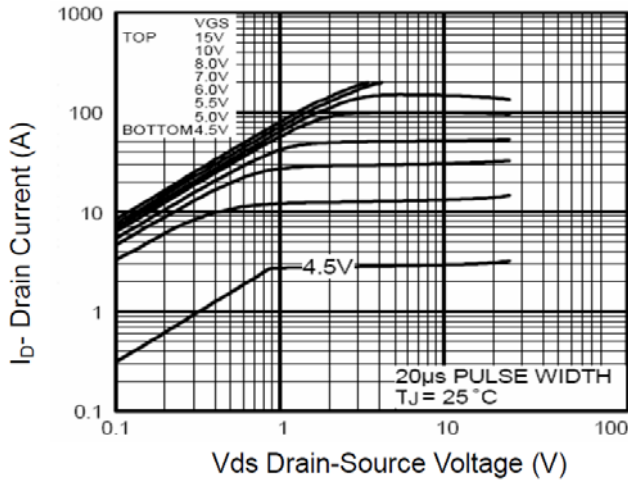


Figure 2: Transfer Characteristics

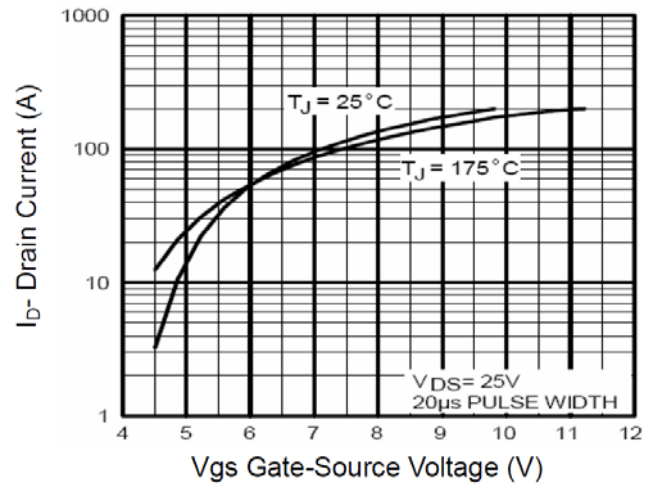


Figure 3: Rdson- Drain Current

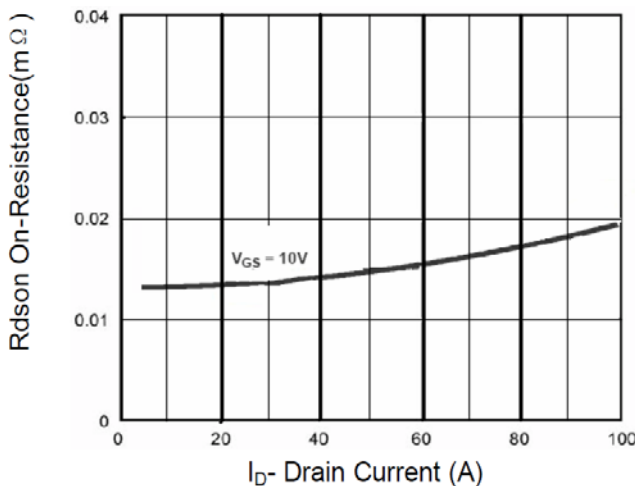


Figure 4: Rdson-Junction Temperature

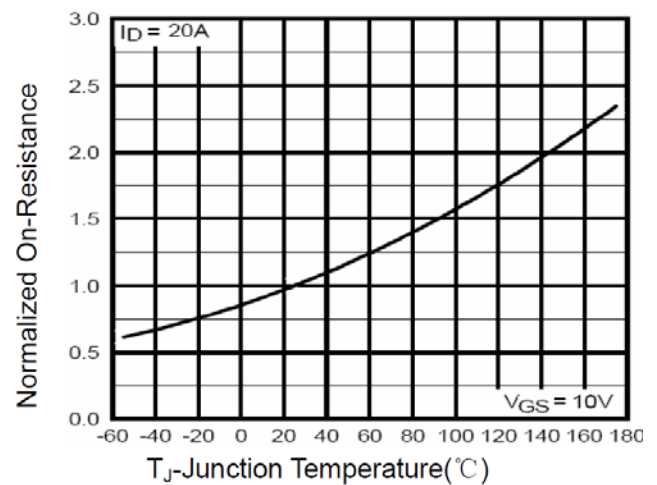


Figure 5: Source- Drain Diode Forward

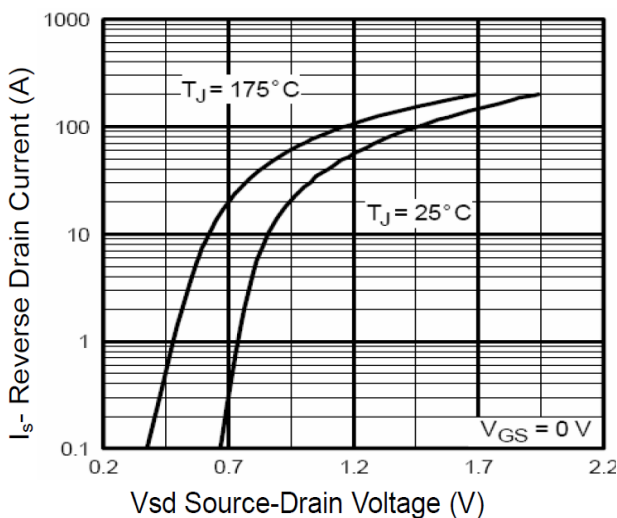


Figure 6: Gate Charge Characteristics

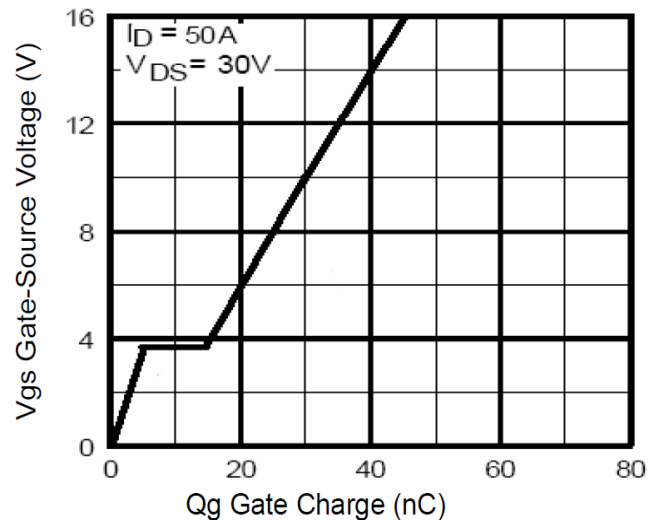


Figure 7: Capacitance vs Vds

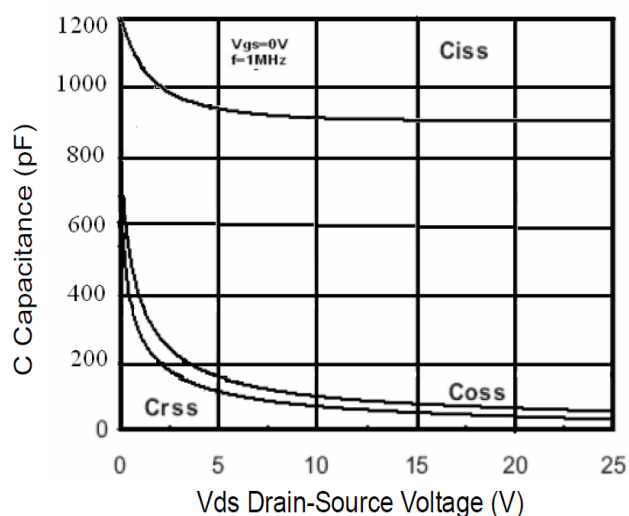


Figure 8: Safe Operation Area

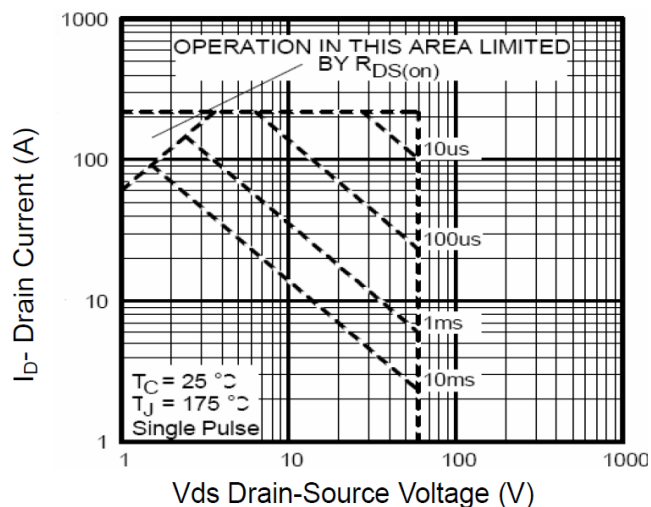


Figure 9: BV_{DSS} vs Junction Temperature

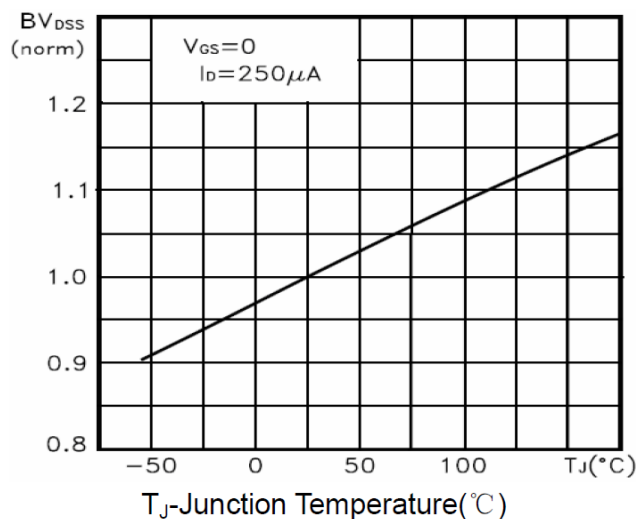


Figure 10: V_{GS(th)} vs Junction Temperature

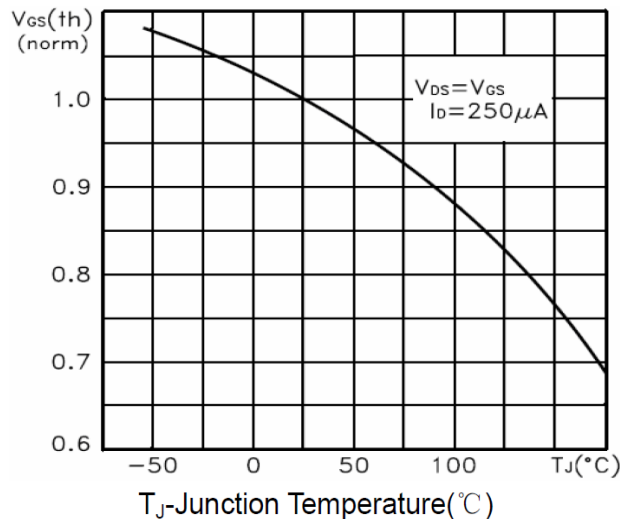
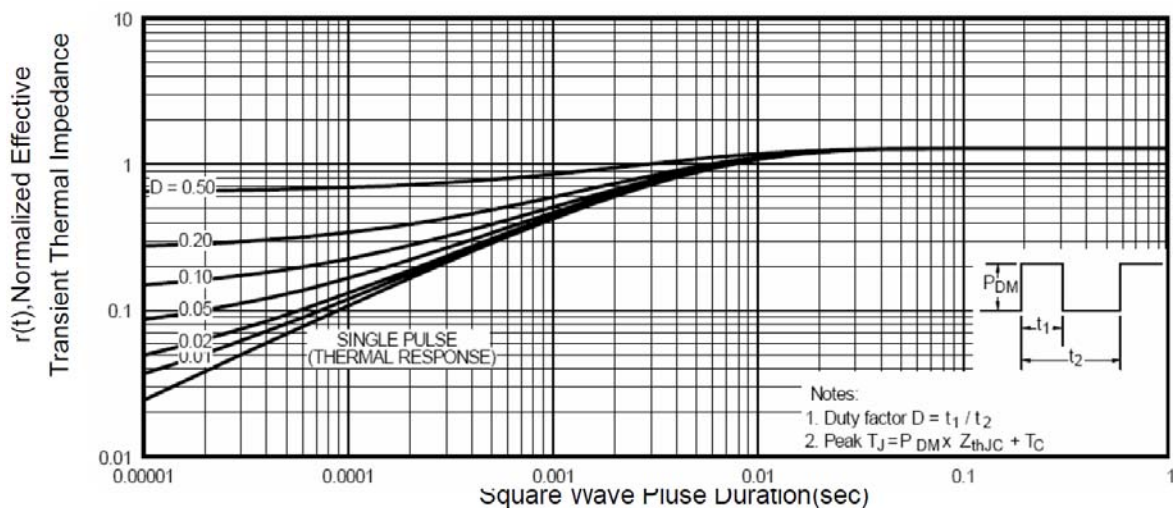
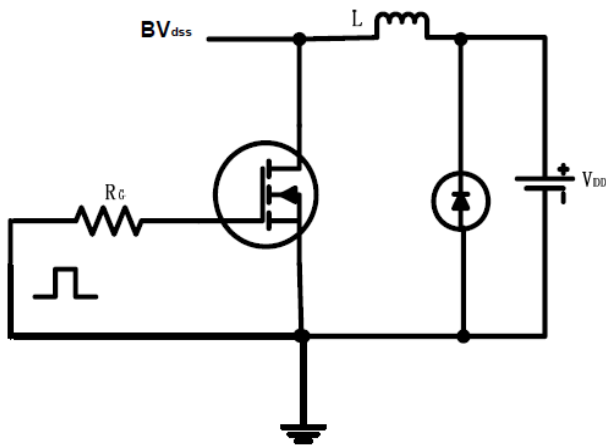


Figure 11: Normalized Maximum Transient Thermal Impedance

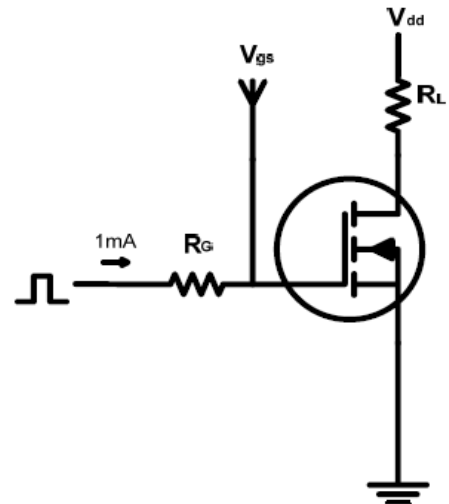


Test circuits and Waveforms

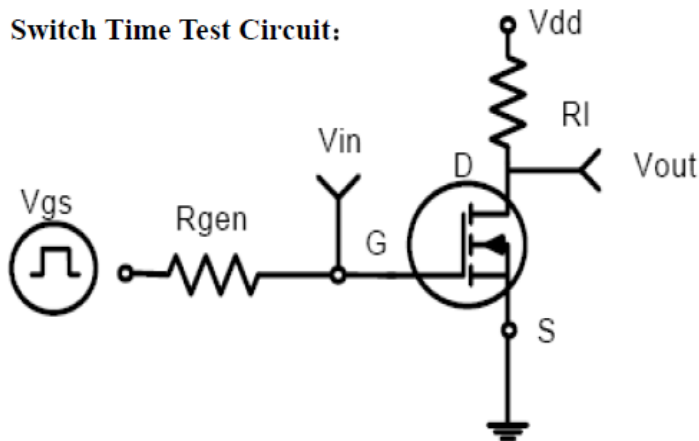
EAS test circuits:



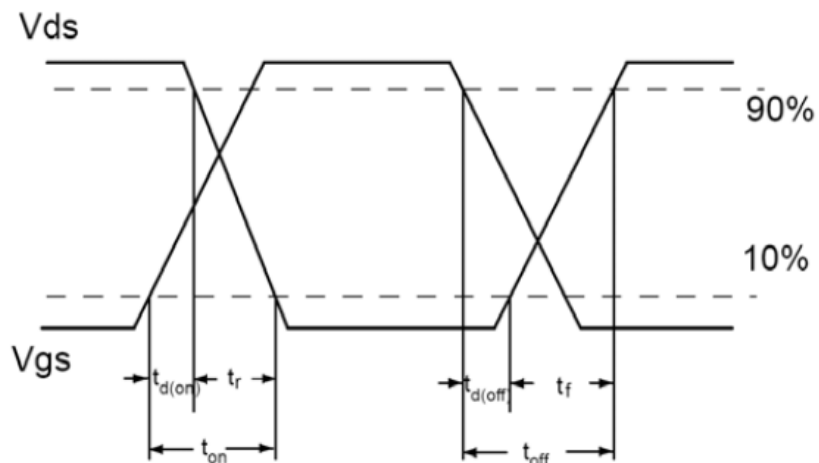
Gate charge test circuit:



Switch Time Test Circuit:

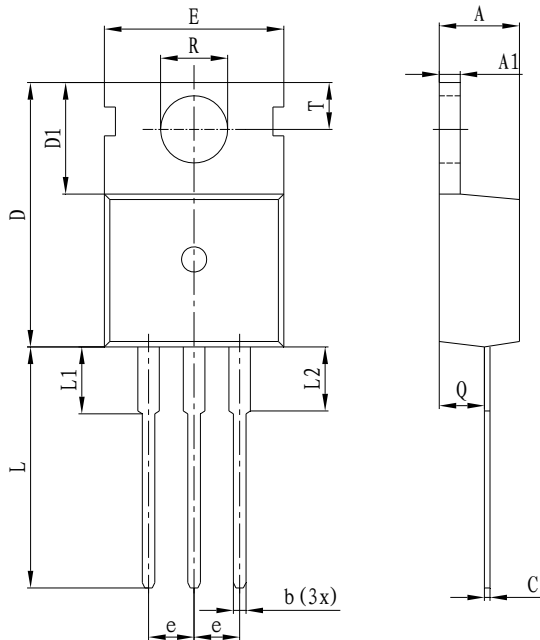


Switch Waveforms:



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
ADM50N06	TO-220C	ADM50N06	Tube	50pcs