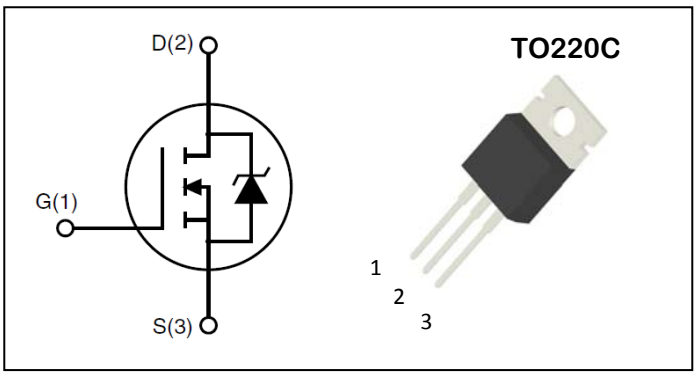
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ)
60V	50A	20mΩ



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°C unless otherwise specifed)

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	°C/W
R_{thJA}	Thermal resistance junction-ambient max (1)	62	°C/W

Electrical Characteristics (T_A=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}=2.5Ω	--	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=25Ω	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

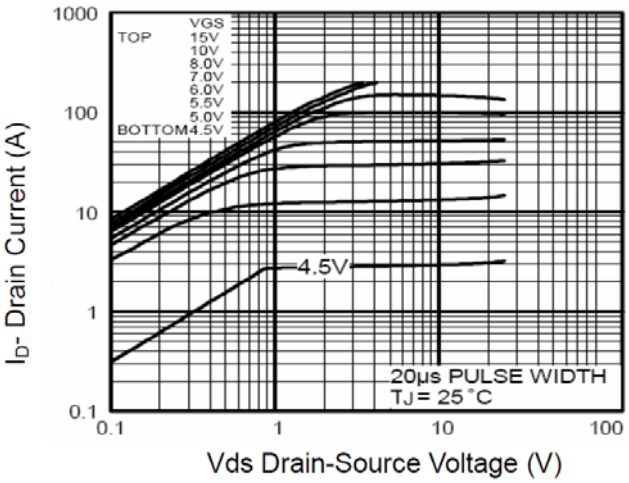


Figure 2: Transfer Characteristics

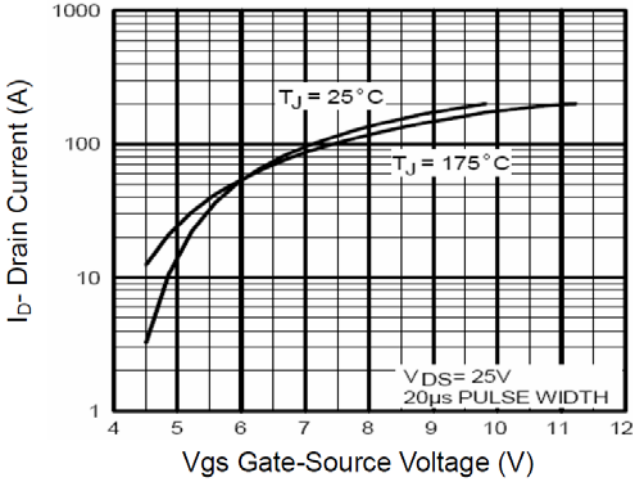


Figure 3: Rdson- Drain Current

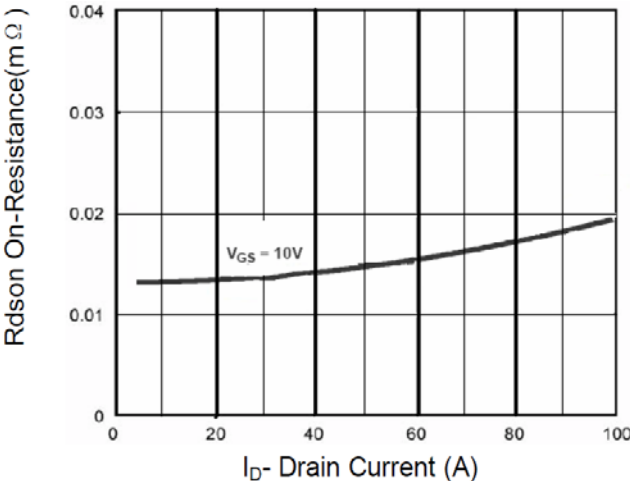


Figure 4: Rdson-JunctionTemperature

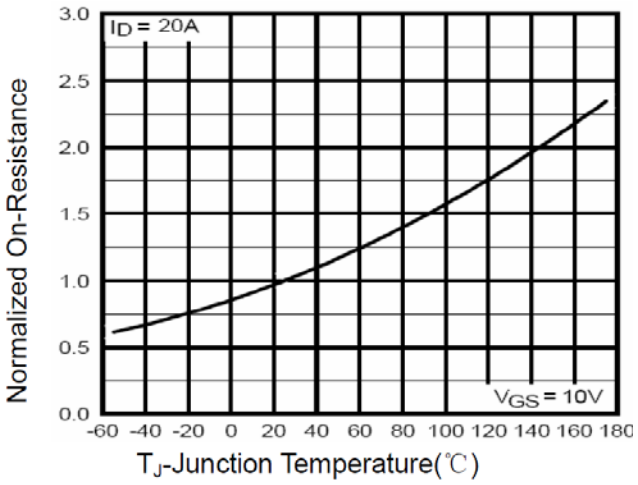


Figure 5: Source- Drain Diode Forward

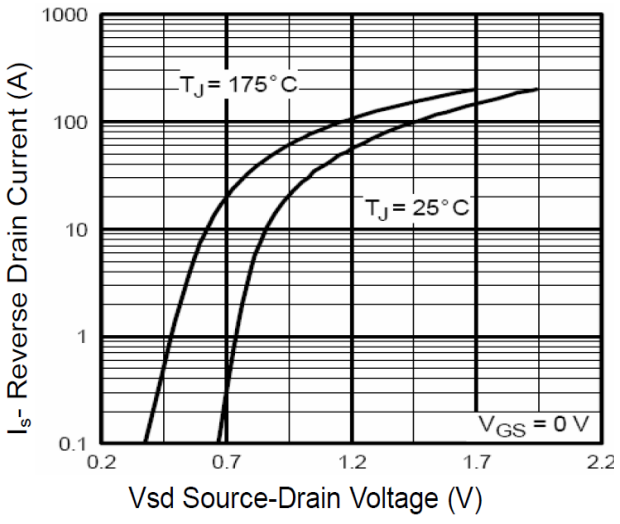


Figure 6: Gate Charge Characteristics

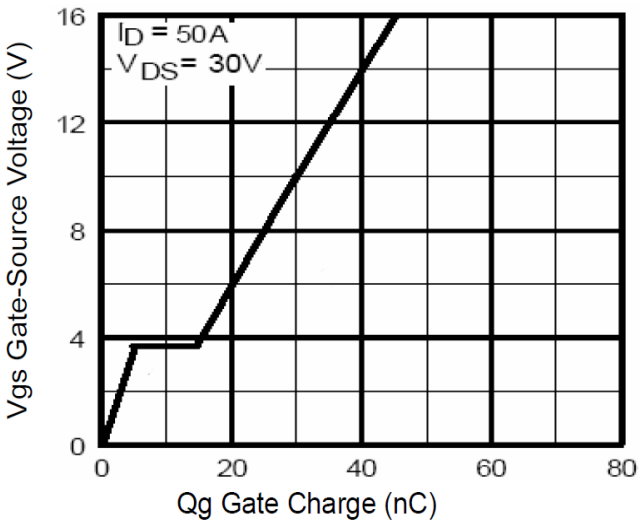


Figure 7: Capacitance vs Vds

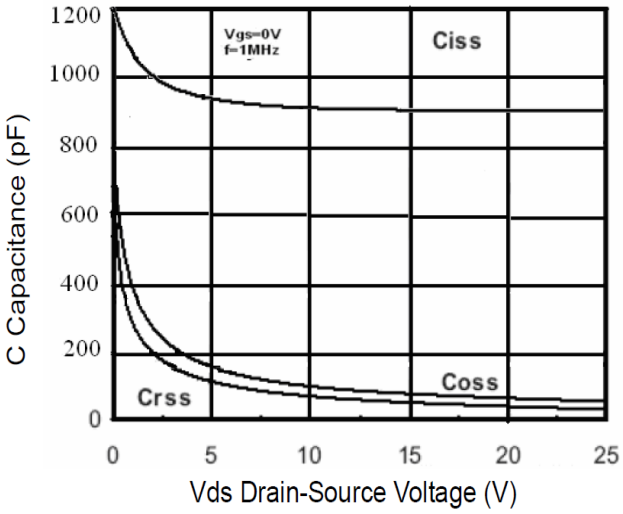


Figure 8: Safe Operation Area

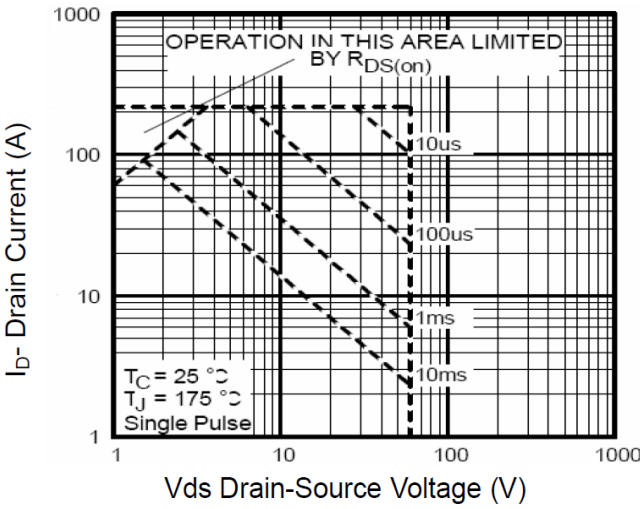


Figure 9: BV_{DSS} vs Junction Temperature

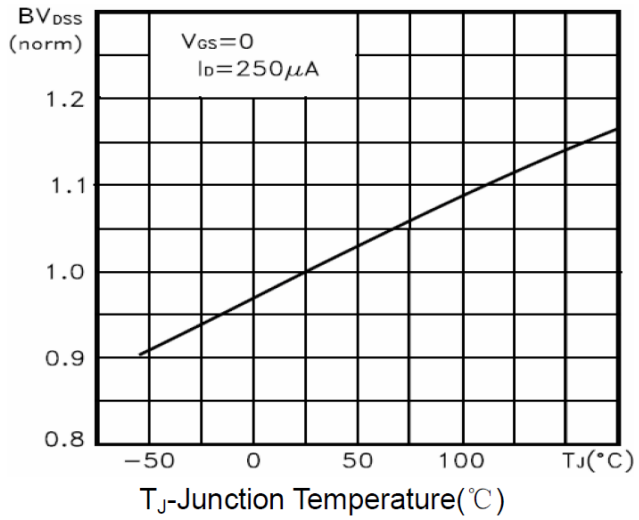


Figure 10: $V_{GS(th)}$ vs Junction Temperature

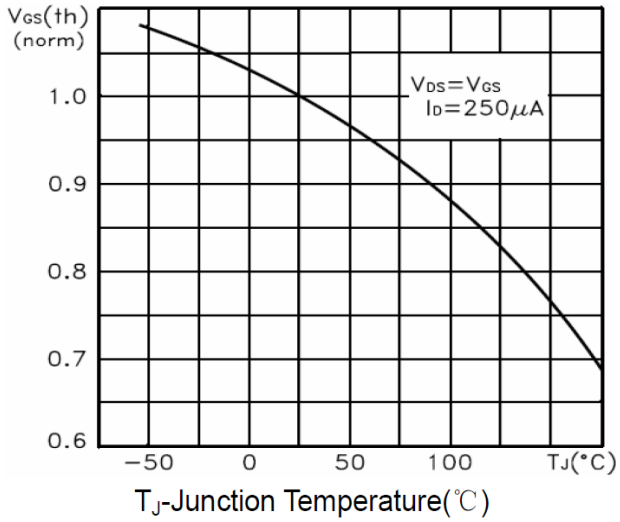
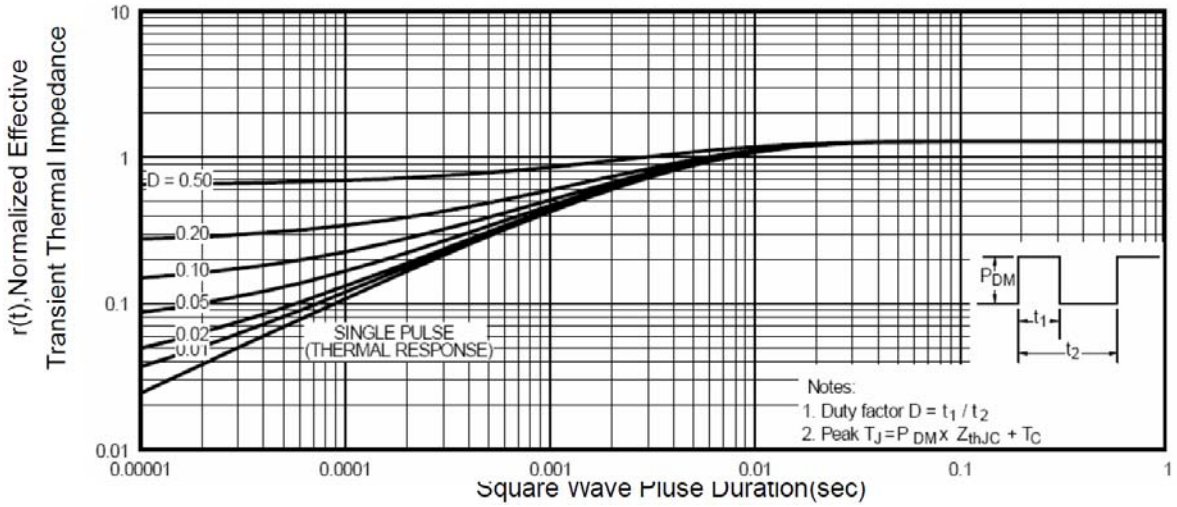
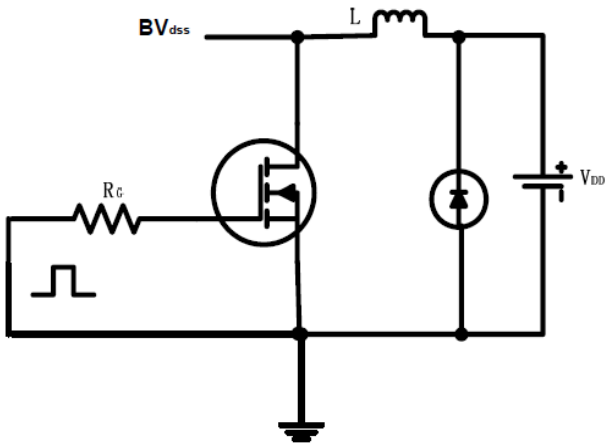


Figure 11: Normalized Maximum Transient Thermal Impedance

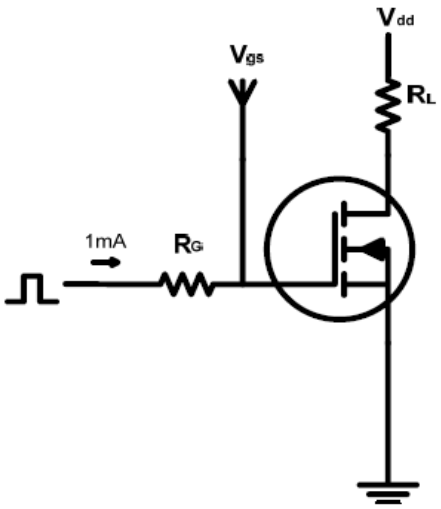


Test circuits and Waveforms

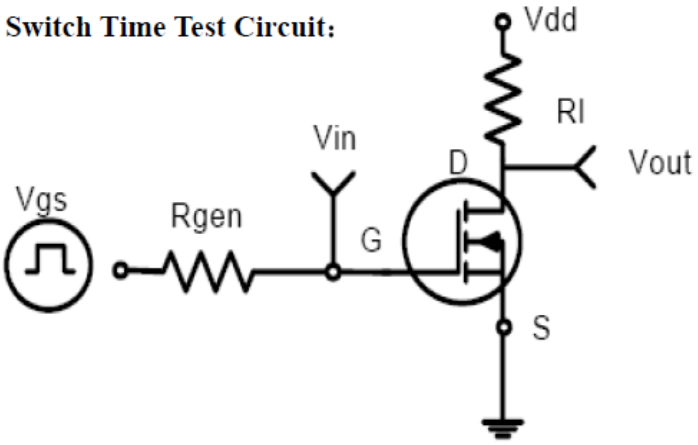
EAS test circuits:



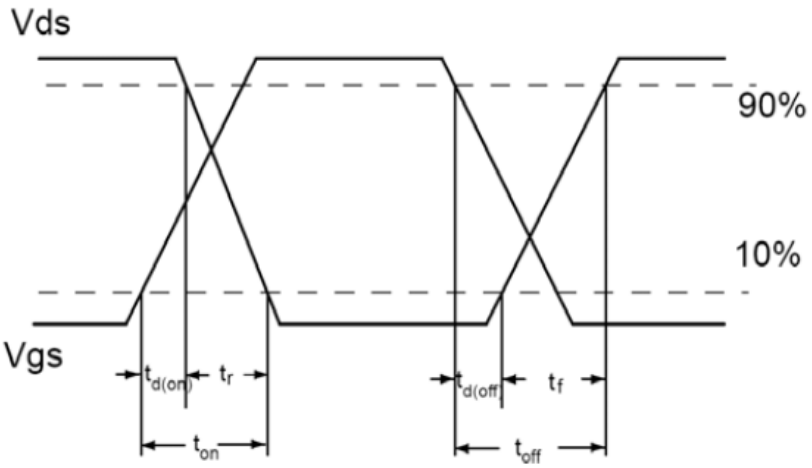
Gate charge test circuit:



Switch Time Test Circuit:

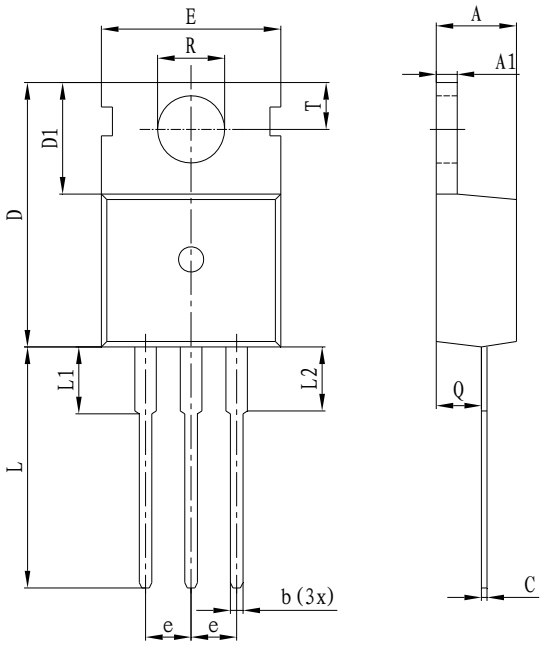


Switch Waveforms:



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