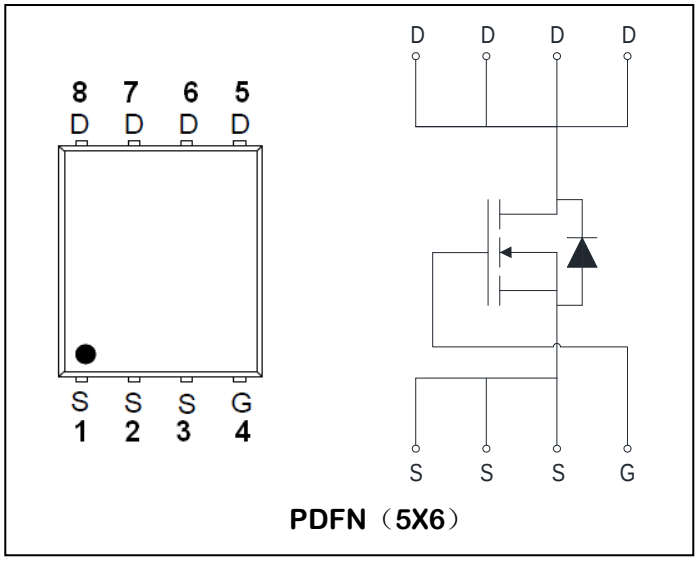
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ)
30V	60A	5mΩ



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 ADM60N03Q 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		30	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	60	A
Mounted on Large Heat Sink				
I_{DM}	300μs Pulse Drain Current Tested (2)	T_C=25°C	240	A
I_D	Continuous Drain Current (1)	T_C=25°C	60	A
		T_C=100°C	39	A
P_D	Maximum Power Dissipation	T_C=25°C	31	W

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max (1)	4	°C/W
R_{thJA}	Thermal resistance junction-ambient max (1)	38	°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	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V,V_{GS}=0V , T_J=25°C	--	--	1	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250uA	1	1.5	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}=45A	--	3.8	5	mΩ
		V_{GS}= 4.5V, I_{DS}=45A	--	7.5	11	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1MHz	--	2100	--	pF
C_{oss}	Output Capacitance		--	326	--	
C_{rss}	Reverse Transfer Capacitance		--	282	--	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	V_{DS}=15V, I_D= 30A, V_{GS}= 10V, R_{GEN}=3Ω	--	21	--	nS
t_r	Turn-on Rise Time		--	32	--	
$t_{d(OFF)}$	Turn-off Delay Time		--	59	--	
t_f	Turn-off Fall Time		--	34	--	
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}= 10V, I_{DS}=30A	--	45	--	nC
Q_{gs}	Gate-Source Charge		--	3	--	
Q_{gd}	Gate-Drain Charge		--	15	--	
Avalanche Characteristics						
EAS	Single Pulse Avalanche Energy (3)	L=0.5mH	85	--	--	mJ
Diode Characteristics						
V_{SD}	Diode Forward Voltage (2)	I_{SD} = 45A, V_{GS} = 0	--	--	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=90A, dI_{SD}/dt=100A/μs	--	48	--	ns
q_{rr}	Reverse Recovery Charge		--	60	--	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. Limited by TJmax, IAS =18.4A, V_{DD} = 15V, R_G = 25Ω, Starting T_J = 25°C.

Typical Performance Characteristics

Figure 1: On-Region Characteristics

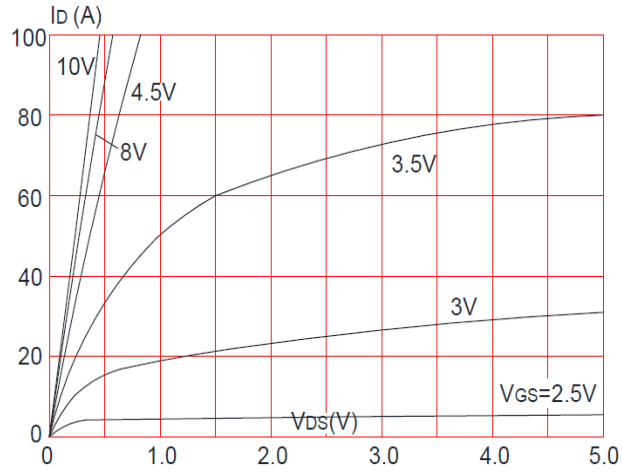


Figure 2: Typical Transfer Characteristics

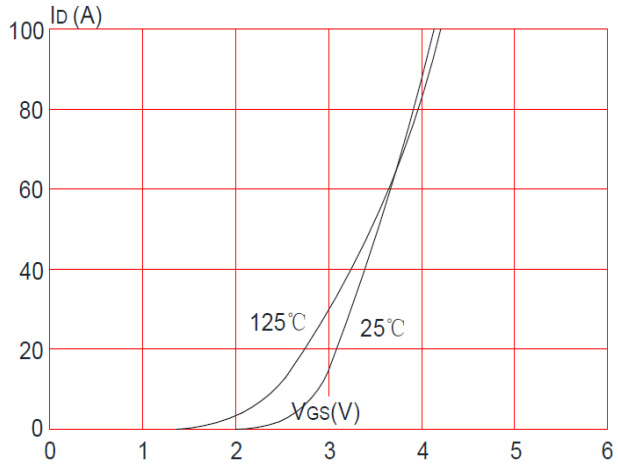


Figure 3: Forward Characteristics of Reverse

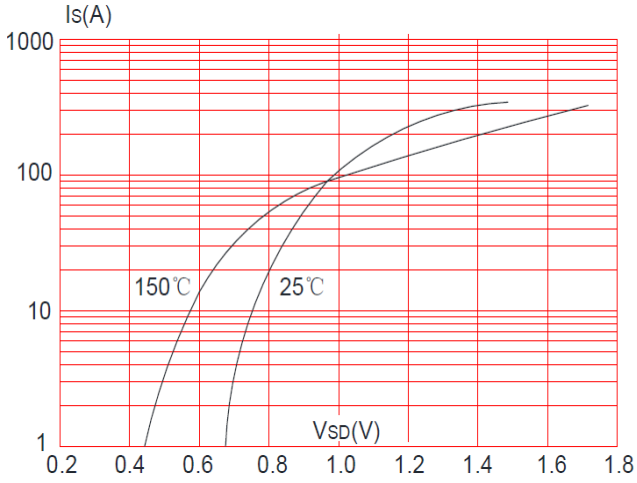


Figure 4: Normalized Breakdown Voltage vs. Junction Temperature

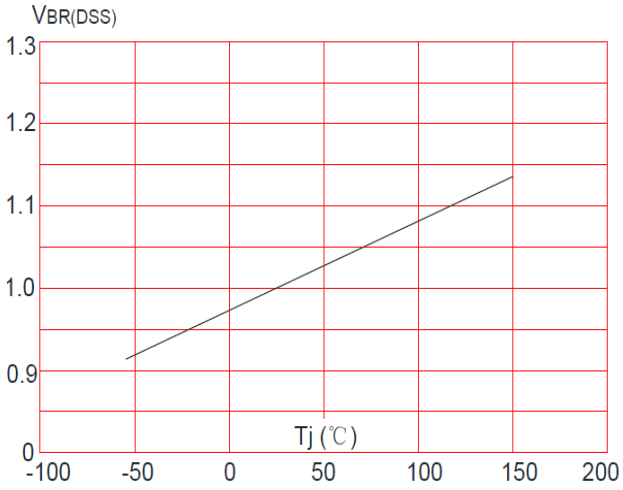


Figure 5: Normalized R_{DSON} vs. T_J

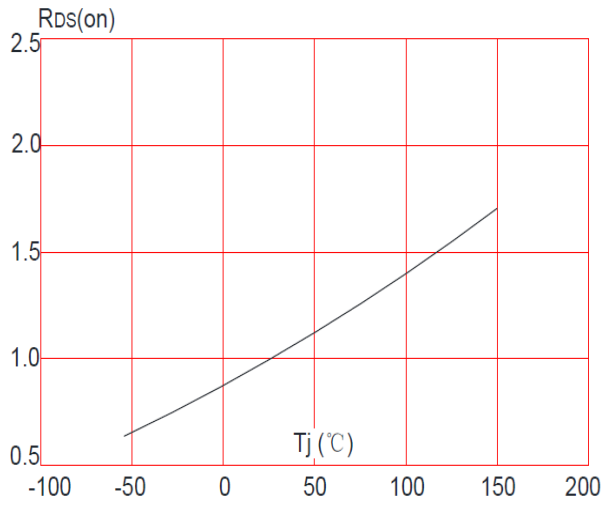


Figure 6: Gate Charge Characteristics

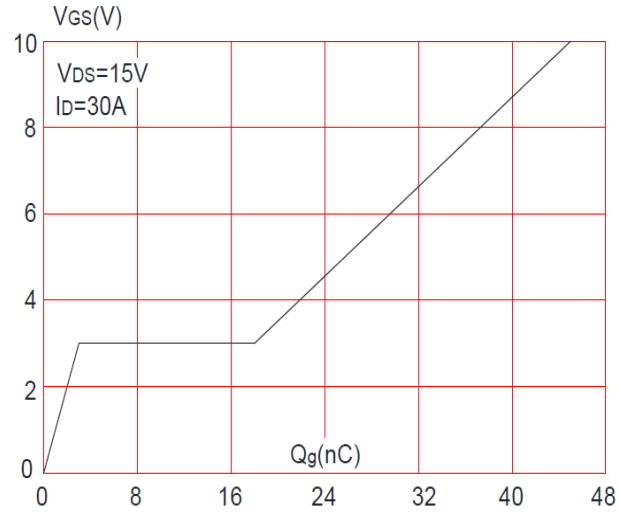


Figure 7: Capacitance

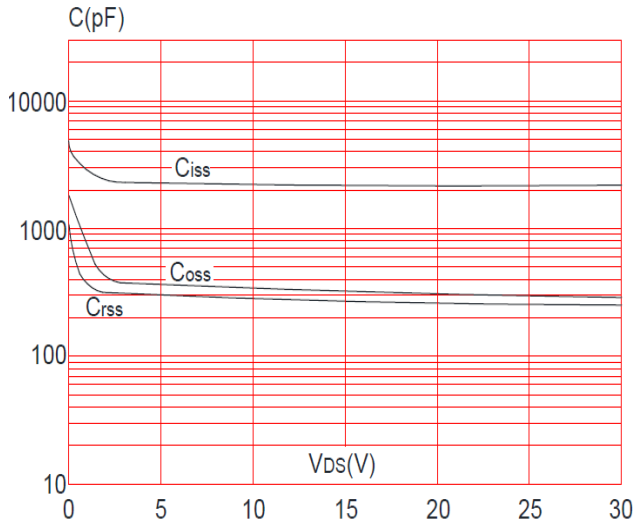


Figure 8: Safe Operating Area

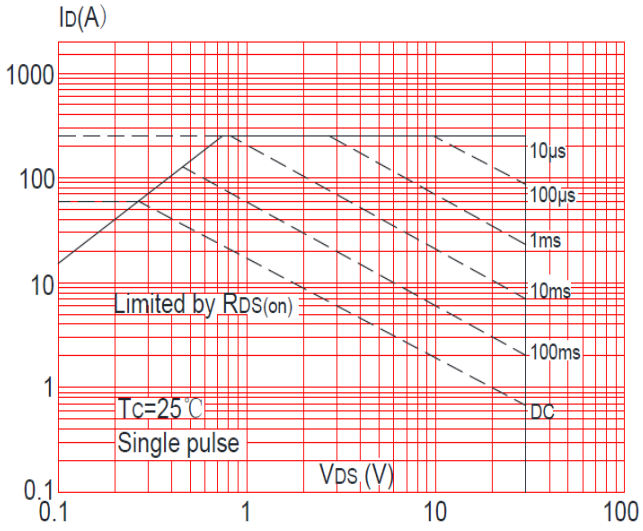
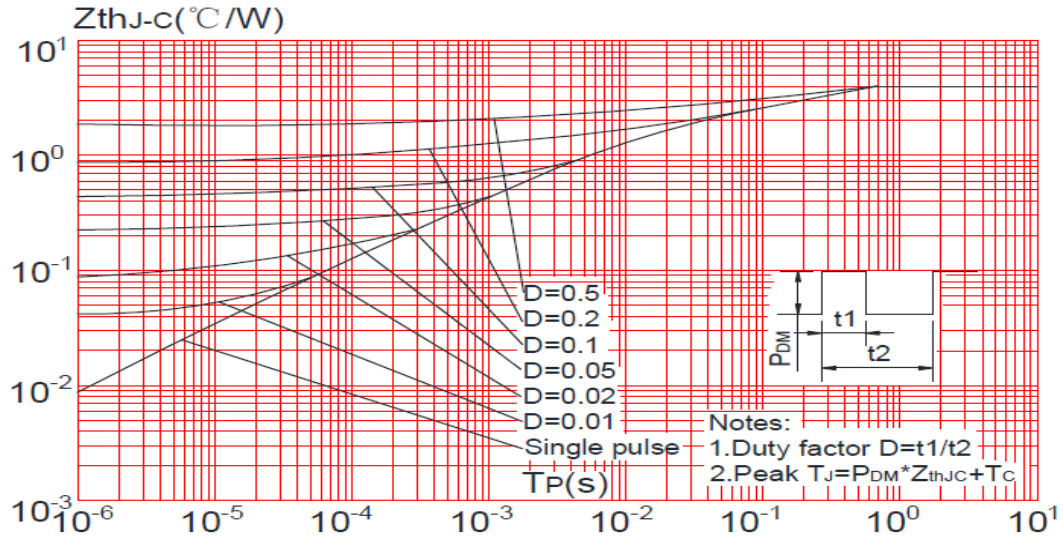
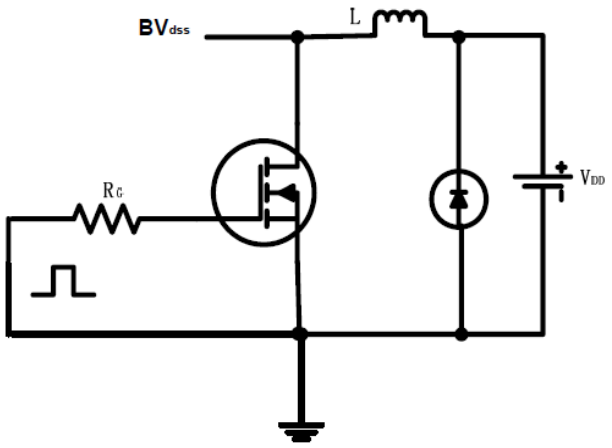


Figure 9: Maximum Effective Transient Thermal Impedance, Junction-to-Case

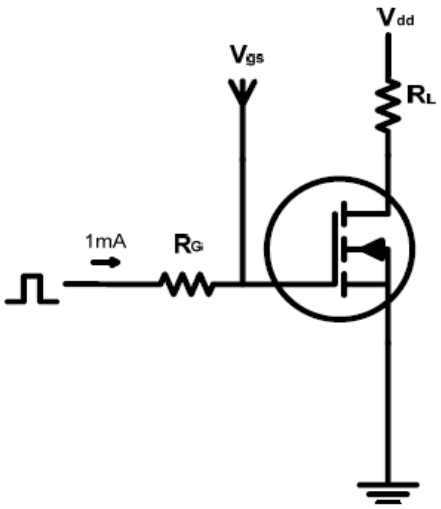


Test circuits and Waveforms

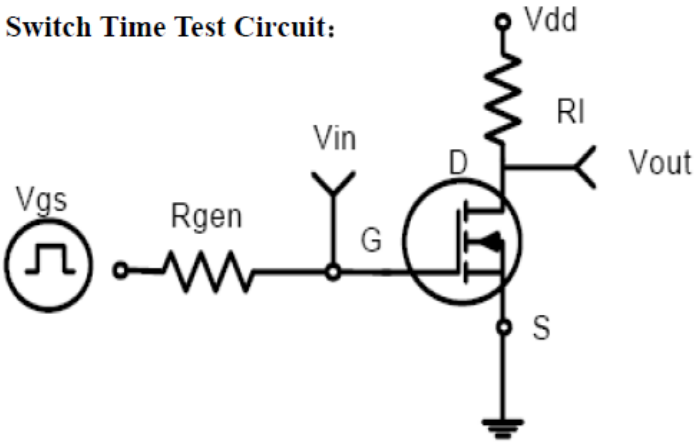
EAS test circuits:



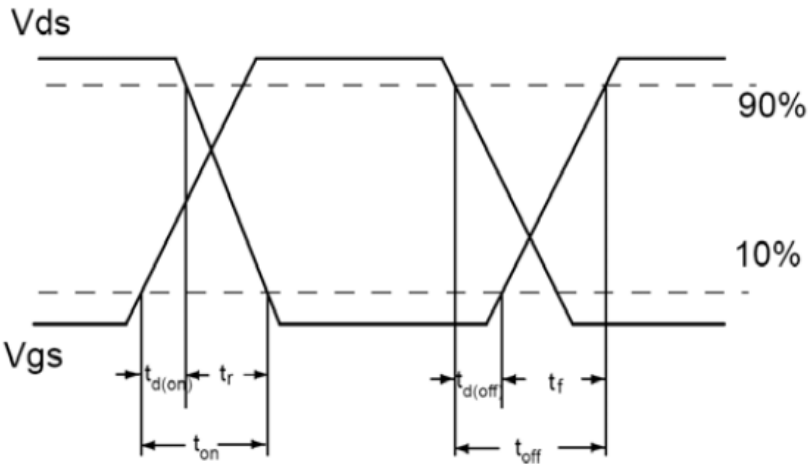
Gate charge test circuit:



Switch Time Test Circuit:

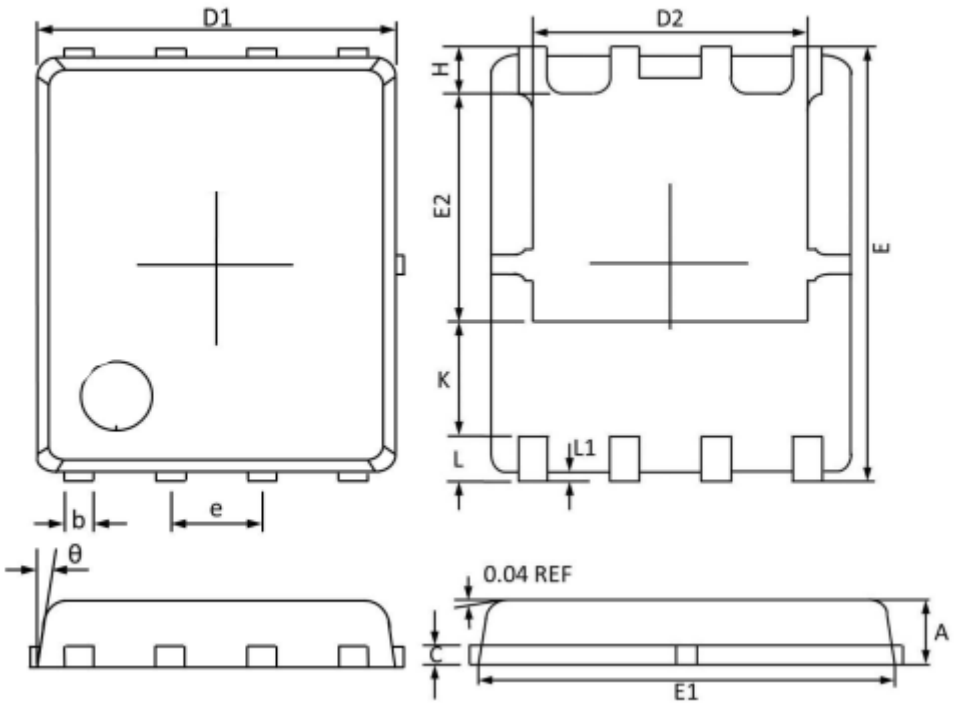


Switch Waveforms:



PACKAGE MECHANICAL DATA

PDFN（5X6） Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.800	1.100	0.031	0.043
b	0.330	0.510	0.013	0.020
c	0.200	0.300	0.008	0.012
D1	4.800	5.100	0.189	0.201
D2	3.610	4.100	0.142	0.161
E	5.900	6.200	0.232	0.244
E1	5.700	5.900	0.224	0.232
E2	3.350	3.780	0.132	0.149
H	0.410	0.700	0.016	0.028
K	1.100	1.500	0.043	0.059
e	1.270 TYP.		0.050 TYP.	
L	0.510	0.710	0.020	0.028
L1	0.060	0.200	0.002	0.008
θ	0°	12°	0°	12°