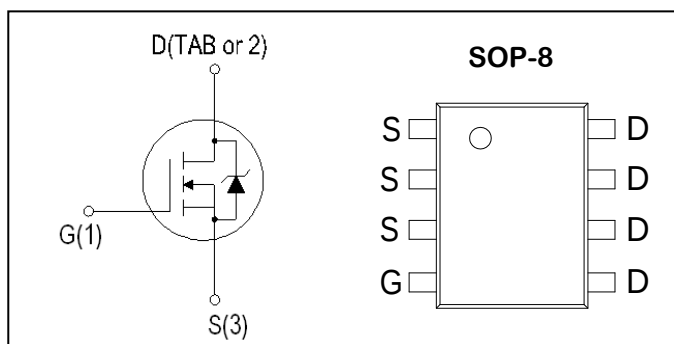


N-Channel Enhancement Mode Field Effect Transistor**PRODUCT SUMMARY**

V_{DSS}	I_D	$R_{DS(ON)} (m\Omega)$
20V	28A	4.0m Ω

**Absolute Maximum Ratings** ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter		Ratings	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		20	V
V _{GSS}	Gate-Source Voltage		± 12	
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	28	A
Mounted on Large Heat Sink				
I _{DM}	300μs Pulse Drain Current Tested ⁽²⁾	T _C =25°C	112	A
I _D	Continuous Drain Current ⁽¹⁾	T _C =25°C	28	A
		T _C =100°C	22.5	A
P _D	Maximum Power Dissipation	T _C =25°C	3.1	W

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
R_{thJC}	Thermal resistance junction-case max ⁽¹⁾	6.9	$^\circ\text{C/W}$
R_{thJA}	Thermal resistance junction-ambient max ⁽¹⁾	50	$^\circ\text{C/W}$

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

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
On/off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250uA	20	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 20V, V _{GS} =0V	--	--	1	uA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250uA	0.45	0.68	1.0	V
I _{GSS}	Gate Leakage Current	V _{GS} = ± 12V, V _{DS} =0V	--	--	± 100	nA
R _{DS(ON)}	Drain-SourceOn-stateResistance ⁽²⁾	V _{GS} = 2.5V, I _{DS} =15A	--	3.5	4.5	mΩ
		V _{GS} = 4.5V, I _{DS} =20A	--	3.1	4	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} = 10V, Frequency=1.0MHz	--	2500	--	pF
C _{oss}	Output Capacitance		--	580	--	
C _{rss}	Reverse Transfer Capacitance		--	315	--	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time ⁽¹⁾	V _{DD} =10V, I _D = 20A, V _{GS} = 4.5V, R _{GEN} =3 Ω	--	11	--	ns
t _r	Turn-on Rise Time ⁽¹⁾		--	32	--	
t _{d(OFF)}	Turn-off Delay Time ⁽¹⁾		--	32	--	
t _f	Turn-off Fall Time ⁽¹⁾		--	25	--	
Q _g	Total Gate Charge ⁽¹⁾	V _{DS} =10V, V _{GS} = 4.5V, I _{DS} =20A	--	24	--	nC
Q _{gs}	Gate-Source Charge ⁽¹⁾		--	8.2	--	
Q _{gd}	Gate-Drain Charge ⁽¹⁾		--	15.6	--	
Diode Characteristics						
V _{SD}	Diode Forward Voltage ⁽²⁾	I _{SD} = 10A, V _{GS} = 0	--	--	1.2	V

NOTES:

1. Independent of operating temperature.
2. Pulse Test : Pulse width ≤ 300 μs, Duty cycle ≤ 2%

Typical Performance Characteristics

Figure 1: On-Region Characteristics

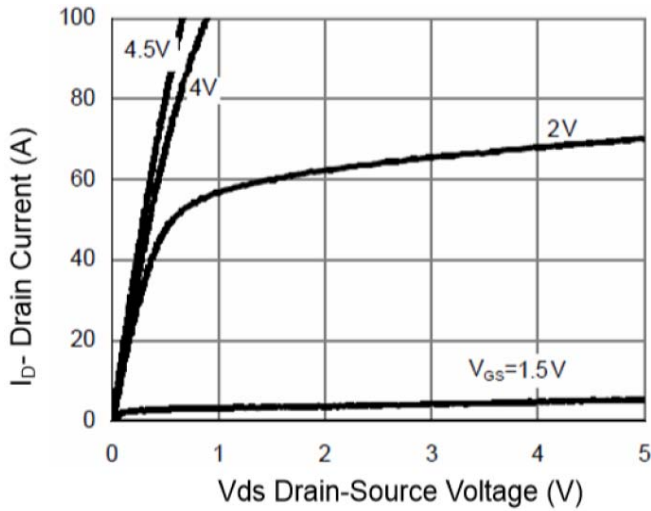


Figure 2: $R_{DS(on)}$ - Drain Current

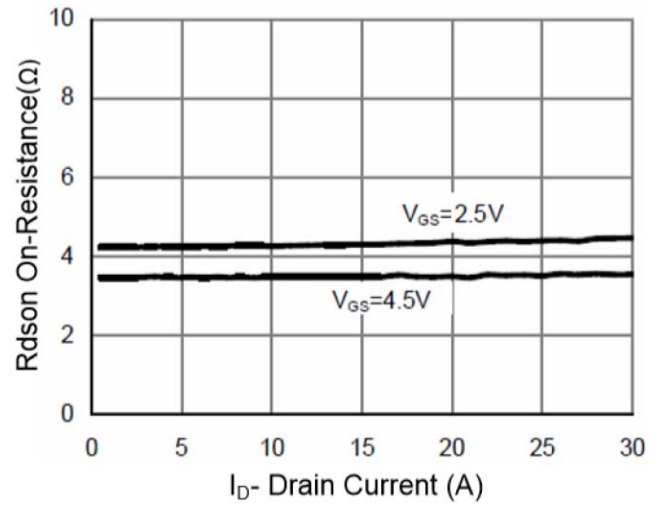


Figure 3: Transfer Characteristics

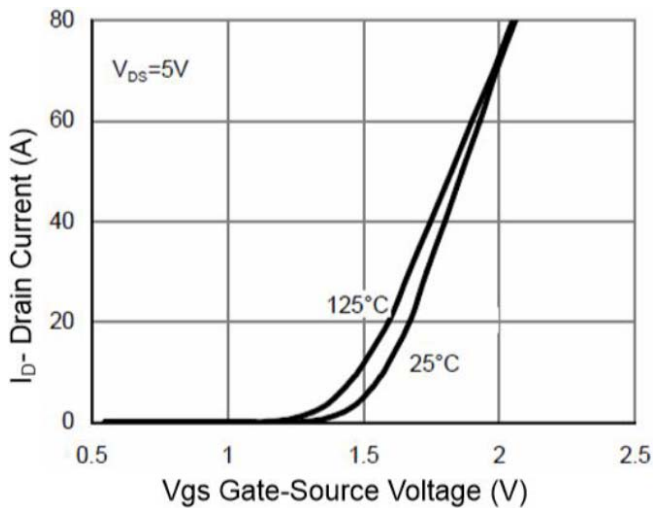


Figure 4: Source-Drain Diode Forward

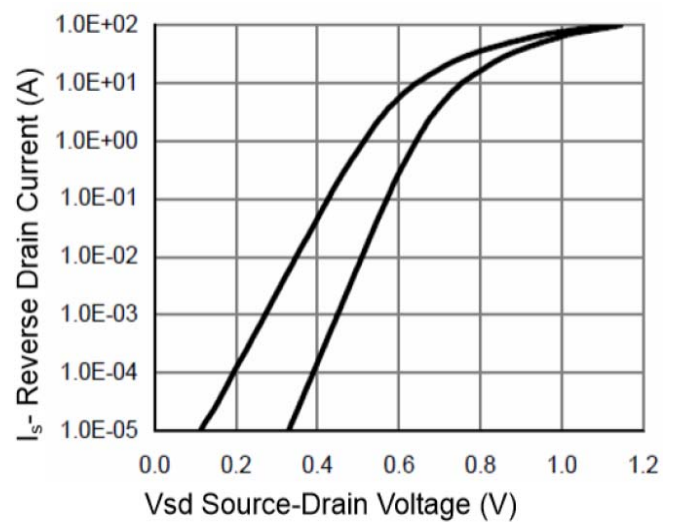


Figure 5: Normalized $R_{DS(on)}$ vs. T_J

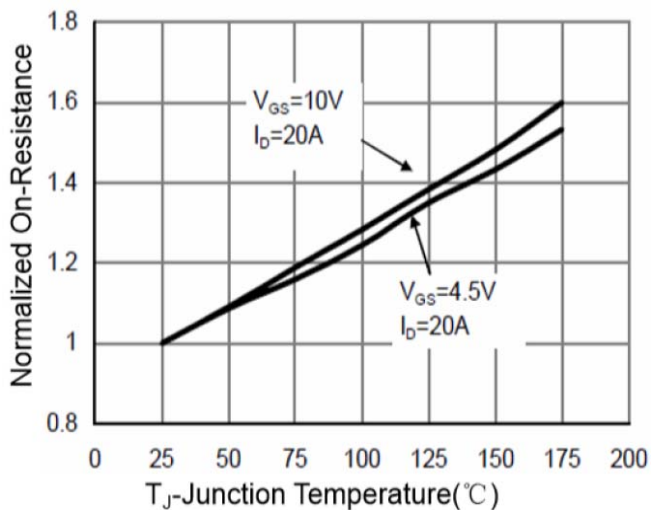


Figure 6: Gate Charge Characteristics

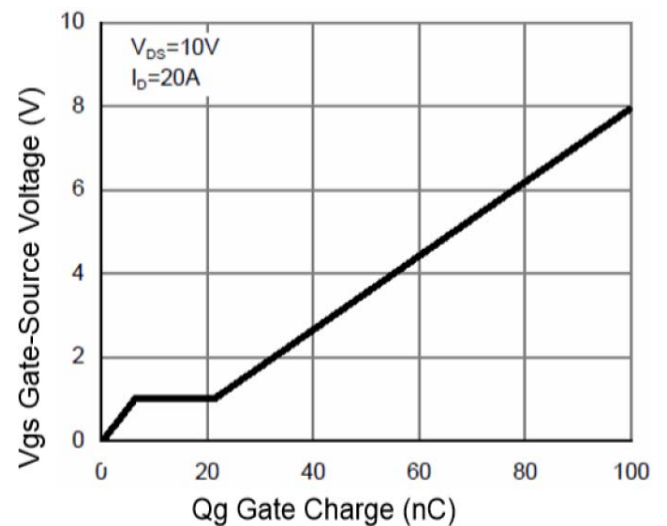


Figure 7: Capacitance

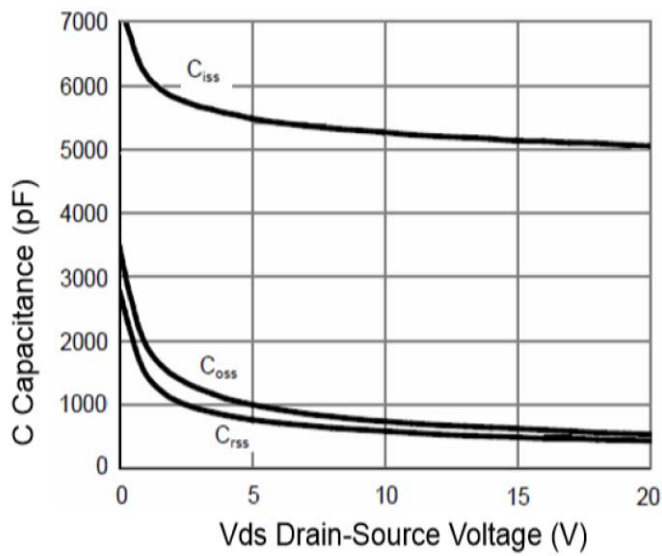


Figure 8: Safe Operating Area

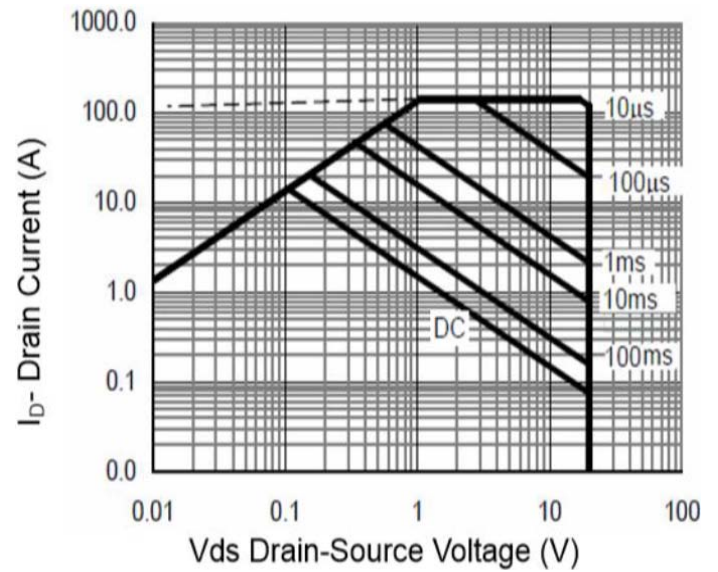
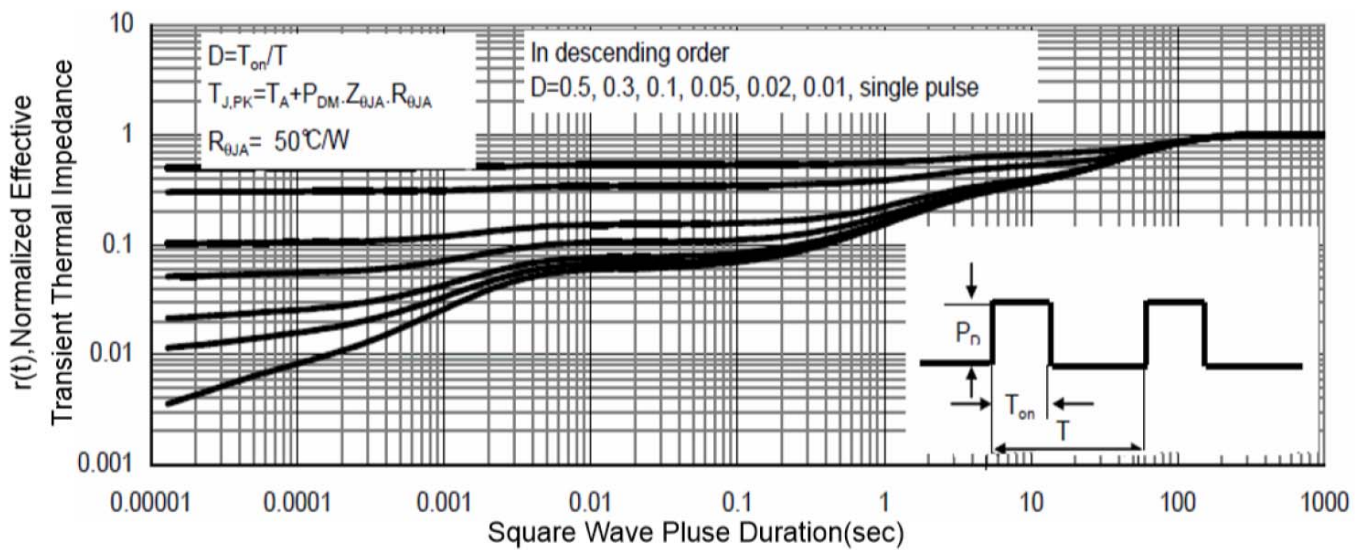
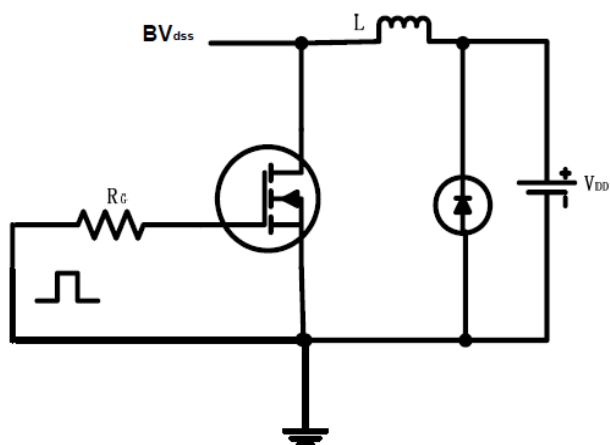


Figure 9: Normalized Maximum Transient Thermal Impedance

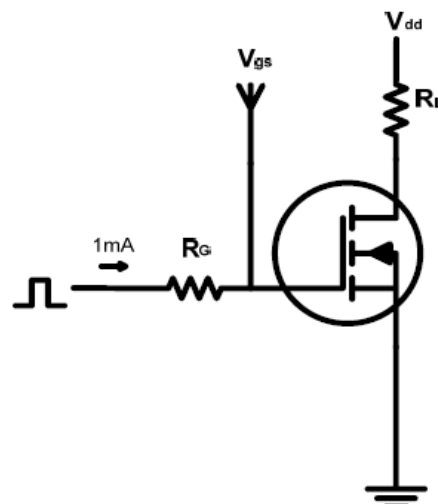


Test circuits and Waveforms

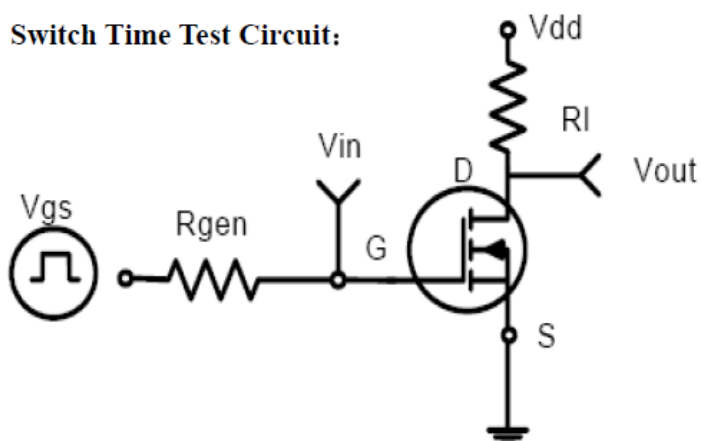
EAS test circuits:



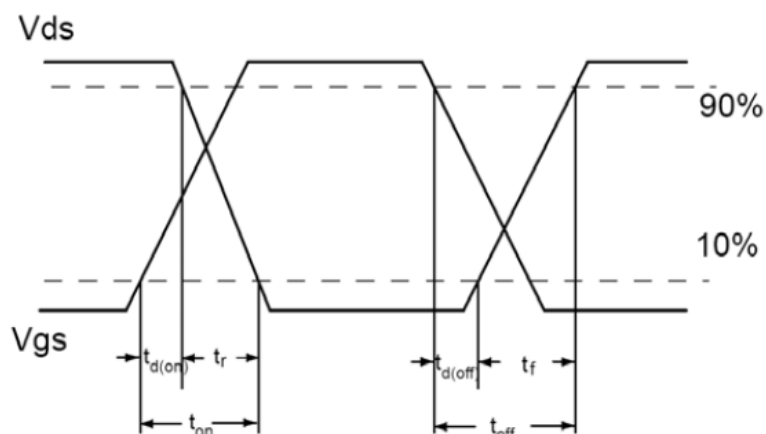
Gate charge test circuit:



Switch Time Test Circuit:

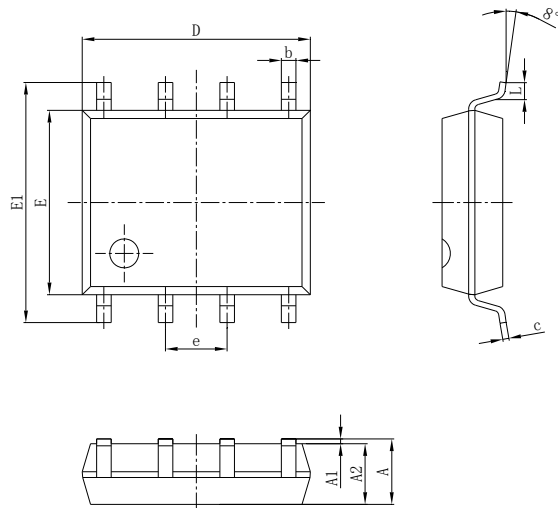


Switch Waveforms:



PACKAGE MECHANICAL DATA

SOP-8 Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E1	5.800	6.200	0.228	0.244
E	3.800	4.000	0.150	0.157
e	1.270TYP		0.050TYP	
e1	4.500	4.700	0.177	0.185
L	0.400	1.270	0.016	0.050

Ordering information

Part number	Package	Marking	Packing	Quantity
ADN2004A	SOP-8	N2004AS	Tape&reel	4000pcs