DESCRIPTION

The AM0904 is available in DFN8(5x6) package.

ORDERING INFORMATION

Package Type	Part Number	
DFN8(5x6) SPQ: 4,000pcs/Reel	J8	AM0904J8R
		AM0904J8VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

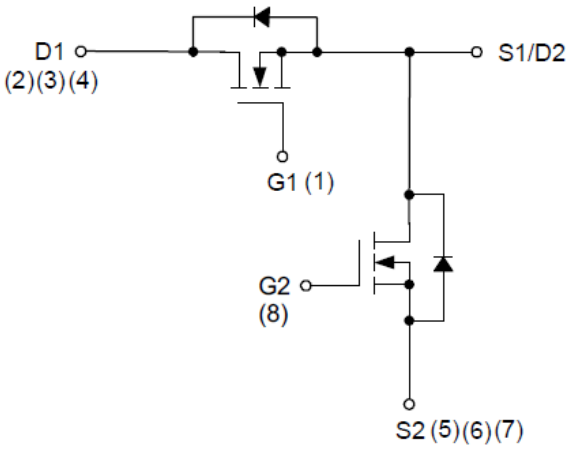
FEATURES

- Channel 1
  30V/48A,
  $R_{DS(ON)}$ = 7mΩ (max.) @ V_{GS} = 10V
  $R_{DS(ON)}$ = 10mΩ (max.) @ V_{GS} = 4.5V
- Channel 2
  30V/50A,
  $R_{DS(ON)}$ = 4mΩ (max.) @ V_{GS} =10V
  $R_{DS(ON)}$ = 5.9mΩ (max.) @ V_{GS} =4.5V
- 100% UIS + R_g Tested
- Reliable and Rugged
- Available in DFN8(5x6) package

APPLICATIONS

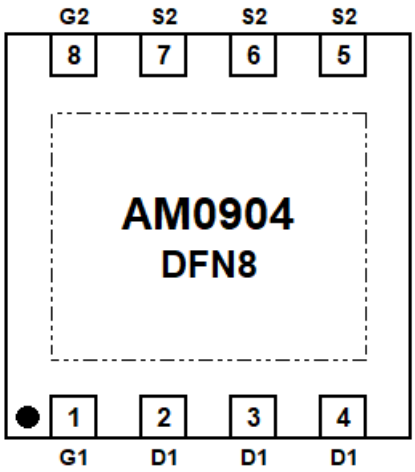
- Power Management in Desktop Computer or DC/DC Converters.

PIN DESCRIPTION



N-Channel MOSFET

PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	G1	Gate 1
2	D1	Drain 1
3	D1	Drain 1
4	D1	Drain 1
5	S2	Source 2
6	S2	Source 2
7	S2	Source 2
8	G2	Gate 2

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise noted

Parameter		Channel1	Channel 2	Units
V_{DSS}, Drain-Source Voltage		30		V
V_{GSS}, Gate-Source Voltage		±20		V
T_J, Maximum Junction Temperature		150		°C
T_{STG}, Storage Temperature Range		-55 ~ 150		°C
I_S, Diode Continuous Forward Current		5	20	A
I_{DM}[NOTE2], Pulse Drain Current Tested	T_C=25°C	120	150	A
I_D[NOTE1], Continuous Drain Current	T_C=25°C	48	50	A
	T_C=100°C	30	31.8	
P_D, Maximum Power Dissipation	T_C=25°C	25	41	W
	T_C=100°C	10	16	
$R_{\theta JC}$, Thermal Resistance-Junction to Case	Steady State	5	3	°C/W
I_{DM}, Pulse Drain Current Tested	T_A=25°C	48	80	A
I_D, Continuous Drain Current	T_A=25°C	12	20	A
	T_A=70°C	9.5	16	
P_D, Maximum Power Dissipation	T_A=25°C	1.6	2.7	W
	T_A=70°C	1	1.7	
$R_{\theta JA}$, Thermal Resistance-Junction to Ambient	t ≤ 10s	40	20	°C/W
	Steady State	80	45	W
I_{AS}[NOTE3], Avalanche Current, Single pulse	L=0.5mH	14	16.8	A
E_{AS}[NOTE3], Avalanche Energy, Single pulse	L=0.5mH	50	70.56	mJ

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: Package is limited to 50A.

NOTE2: Pulse width limited by max. junction temperature.

NOTE3: UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).

CHANNEL 1 ELECTRICAL CHARACTERISTICS

T_A = 25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	1.5	1.8	2.5	V
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Drain-Source On-state Resistance	$R_{DS(ON)}$ NOTE4	V_{GS}=10V, I_{DS}=15A	-	5.8	7	mΩ
		T_J=125°C	-	8.4	-	
		V_{GS}=4.5V, I_{DS}=10A	-	7.7	10	
Forward Transconductance	gfs	V_{DS}=5V, I_{DS}=15A	-	29	-	S
Diode Characteristics						
Diode Forward Voltage	V_{SD}NOTE4	I_{SD}=2A, V_{GS}=0V	-	0.75	1.1	V
Reverse Recovery Time	t_{rr}	I_{DS}=15A, dI_{SD}/dt=100A/μs	-	12	-	ns
Charge Time	t_a		-	6	-	
Discharge Time	t_b		-	6	-	
Reverse Recovery Charge	Q_{rr}		-	2.9	-	nC
Dynamic CharacteristicsNOTE5						
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1MHz	-	0.7	1.5	Ω
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, Frequency=1.0MHz	-	1180	1534	pF
Output Capacitance	C_{oss}		-	180	-	
Reverse Transfer Capacitance	C_{rss}		-	110	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	9	14	ns
Turn-On Rise Time	t_r		-	8	13	
Turn-Off Delay Time	$t_{d(off)}$		-	25	40	
Turn-Off Fall Time	t_f		-	8	14	
Gate Charge CharacteristicsNOTE5						
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=4.5V, I_{DS}=15A	-	10	14	nC
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=10V, I_{DS}=15A	-	20	-	
Threshold Gate Charge	Q_{gth}		-	2.2	-	
Gate-Source Charge	Q_{gs}		-	4	-	
Gate-Drain Charge	Q_{gd}		-	3.8	-	

NOTE4: Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

NOTE5: Guaranteed by design, not subject to production testing.

CHANNEL 2 ELECTRICAL CHARACTERISTICS

T_J = 25°C, unless otherwise specified

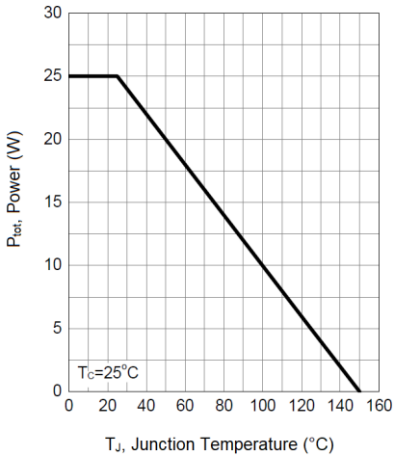
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	1.4	1.8	2.5	V
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Drain-Source On-state Resistance	$R_{DS(ON)}$ NOTE4	V_{GS}=10V, I_{DS}=30A	-	3.3	4	mΩ
		T_J=125°C	-	4.9	-	
		V_{GS}=4.5V, I_{DS}=15A	-	4.5	5.9	
Forward Transconductance	gfs	V_{DS}=5V, I_{DS}=10A	-	23	-	S
Diode Characteristics						
Diode Forward Voltage	V_{SD}NOTE4	I_{SD}=1A, V_{GS}=0V	-	0.8	1.1	V
Reverse Recovery Time	t_{rr}	I_{DS}=30A, dI_{SD}/dt=100A/μs	-	37	-	ns
Charge Time	t_a		-	21	-	
Discharge Time	t_b		-	16	-	
Reverse Recovery Charge	Q_{rr}		-	23	-	nC
Dynamic CharacteristicsNOTE5						
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1MHz	-	1.3	2.6	Ω
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, Frequency=1.0MHz	-	1280	1664	pF
Output Capacitance	C_{oss}		-	800	-	
Reverse Transfer Capacitance	C_{rss}		-	64	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	14.3	26	ns
Turn-On Rise Time	t_r		-	10	18	
Turn-Off Delay Time	$t_{d(off)}$		-	30	54	
Turn-Off Fall Time	t_f		-	32.6	59	
Gate Charge CharacteristicsNOTE5						
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=4.5V, I_{DS}=30A	-	9.1	-	nC
Total Gate Charge	Q_g	V_{DS}=15V, V_{GS}=10V, I_{DS}=30A	-	19.6	27.5	
Threshold Gate Charge	Q_{gth}		-	2.2	-	
Gate-Source Charge	Q_{gs}		-	3.5	-	
Gate-Drain Charge	Q_{gd}		-	2.4	-	

NOTE4: Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

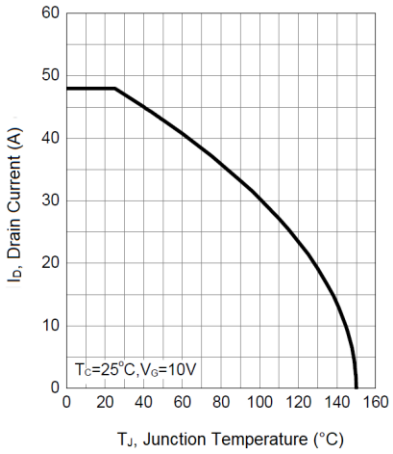
NOTE5: Guaranteed by design, not subject to production testing.

CANNEL 1 TYPICAL ELECTRICAL CHARACTERISTICS

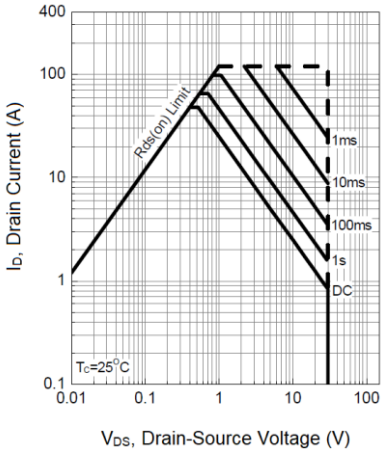
1. Power Dissipation



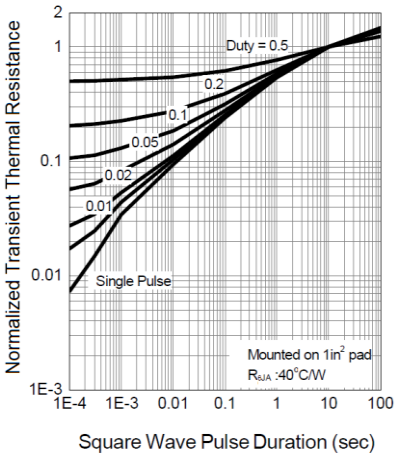
2. Drain Current



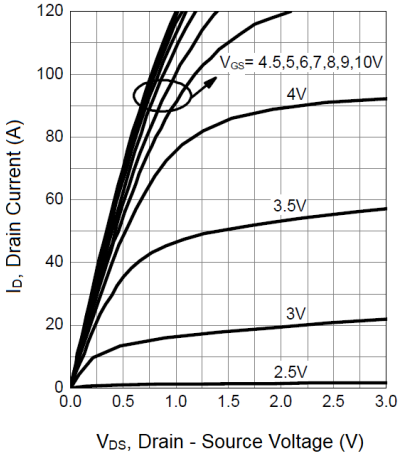
3. Safe Operation Area



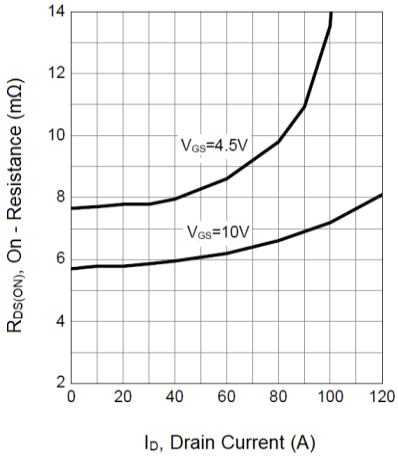
4. Thermal Transient Impedance



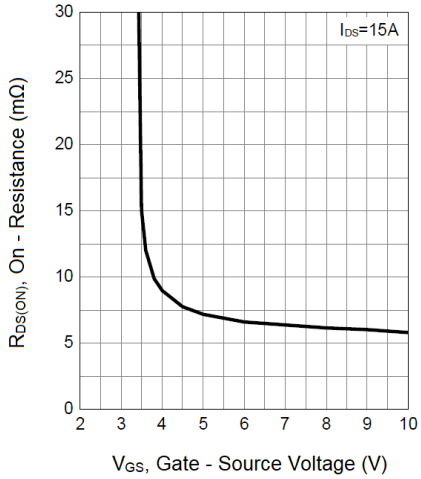
5. Output Characteristics



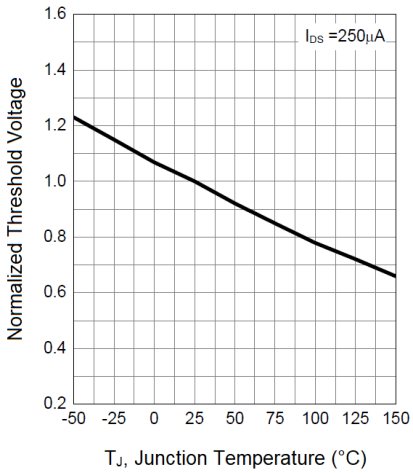
6. Drain-Source On Resistance



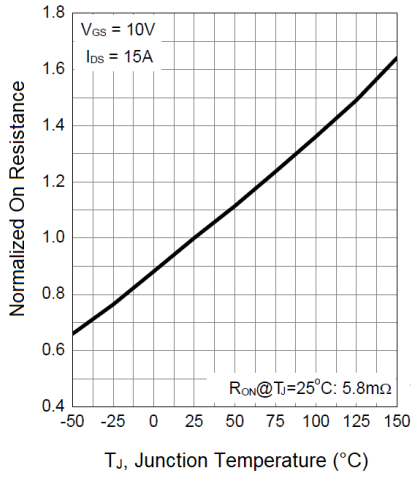
7. Gate-Source On Resistance



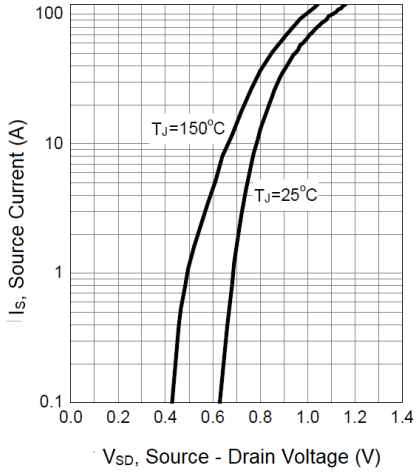
8. Gate Threshold Voltage



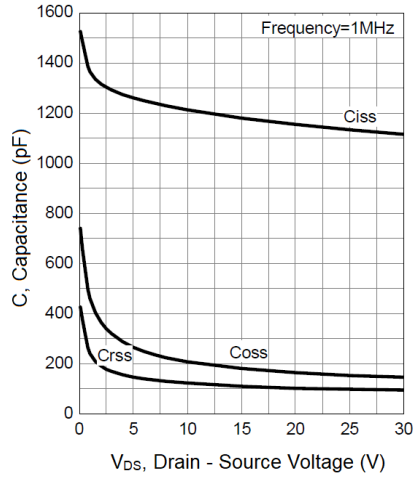
9. Drain-Source On Resistance



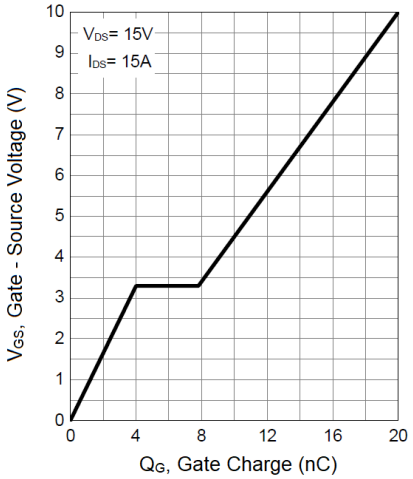
10. Source-Drain Diode Forward



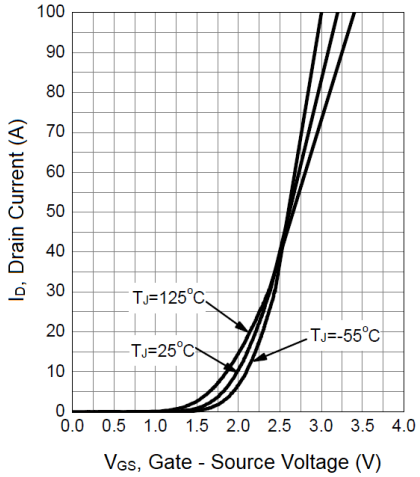
11. Capacitance



12. Gate Charge

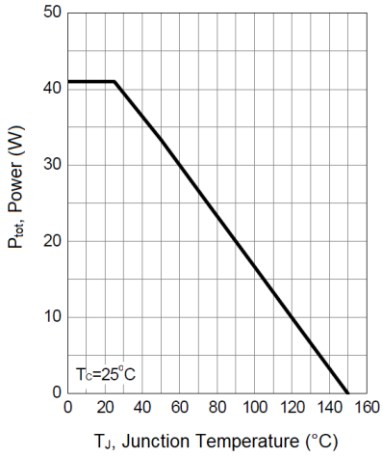


13. Transfer Characteristics

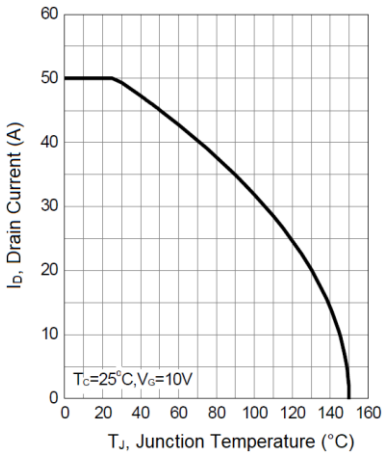


CHANNEL 2 TYPICAL ELECTRICAL CHARACTERISTICS

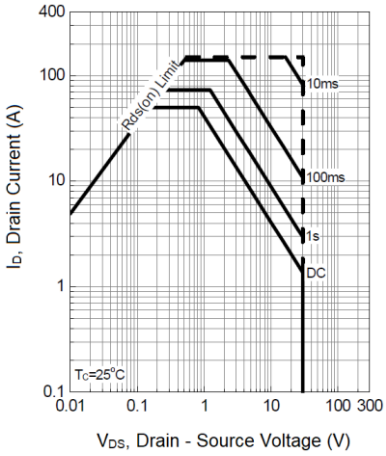
14. Power Dissipation



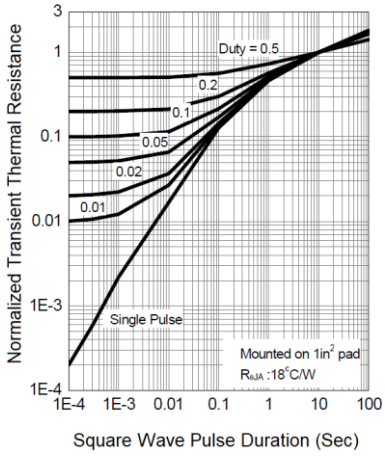
15. Drain Current



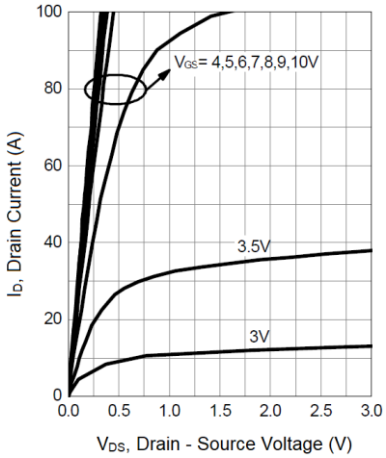
16. Safe Operation Area



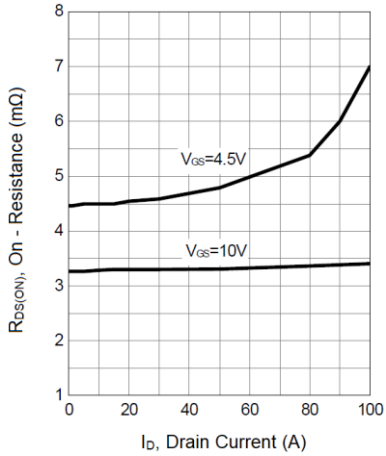
17. Thermal Transient Impedance



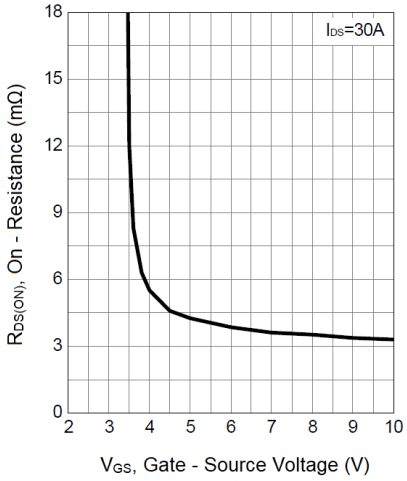
18. Output Characteristics



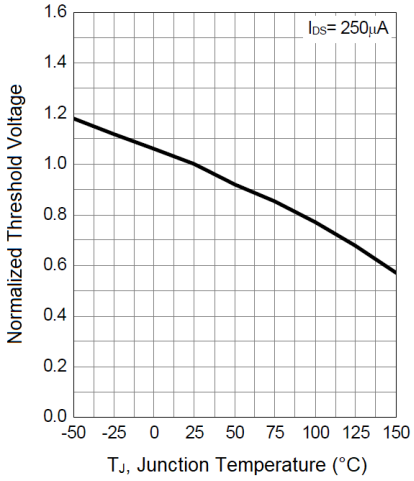
19. Drain-Source On Resistance



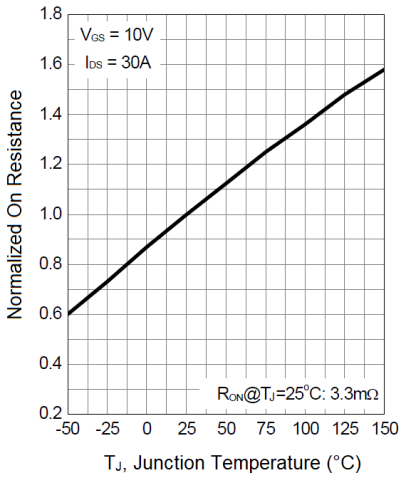
20. Gate-Source On Resistance



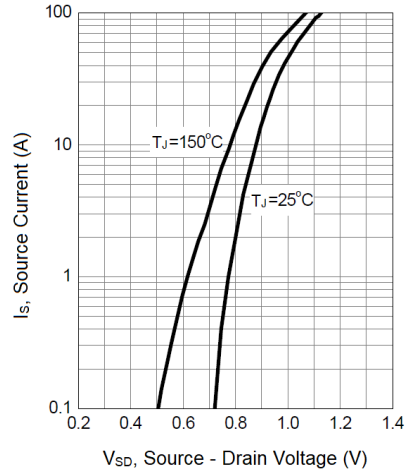
21. Gate Threshold Voltage



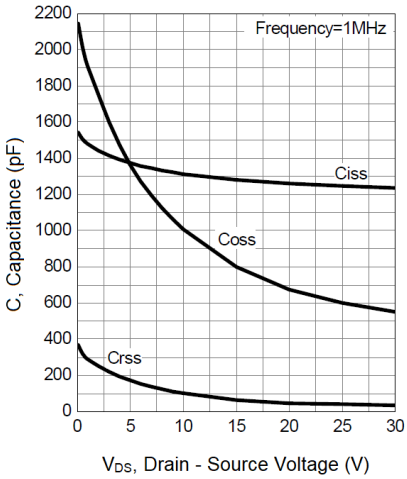
22. Drain-Source On Resistance



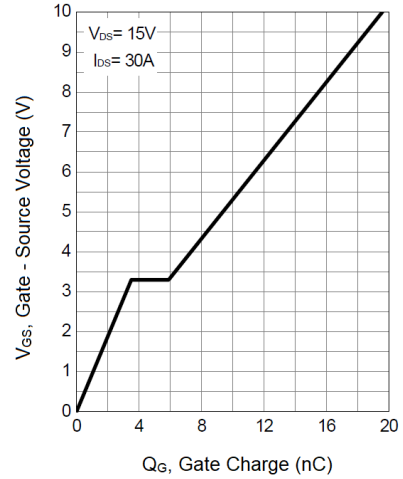
23. Source-Drain Diode Forward



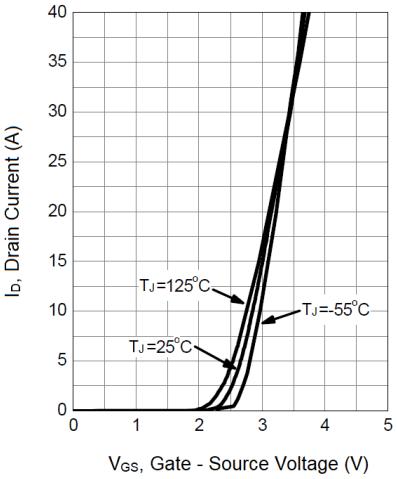
24. Capacitance



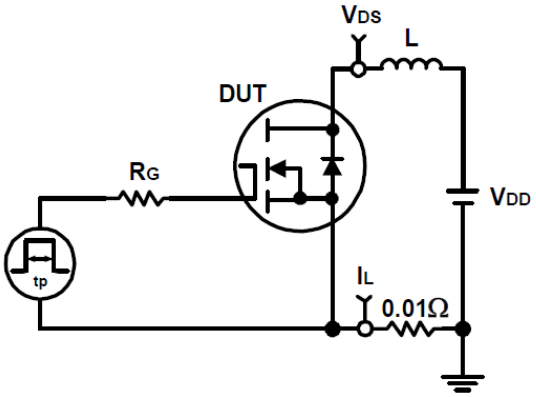
25. Gate Charge

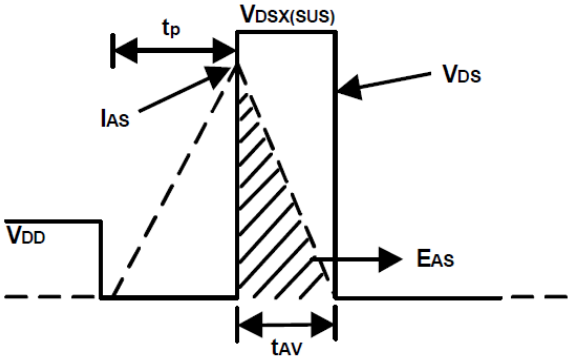


26. Transfer Characteristics

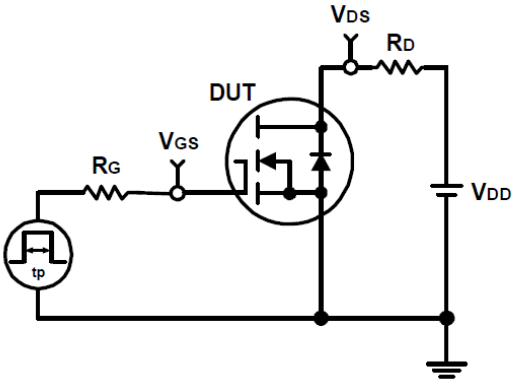


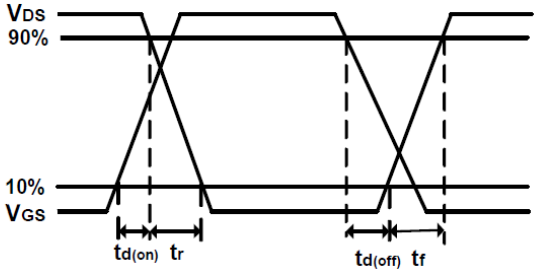
Avalanche Test Circuit and Waveforms





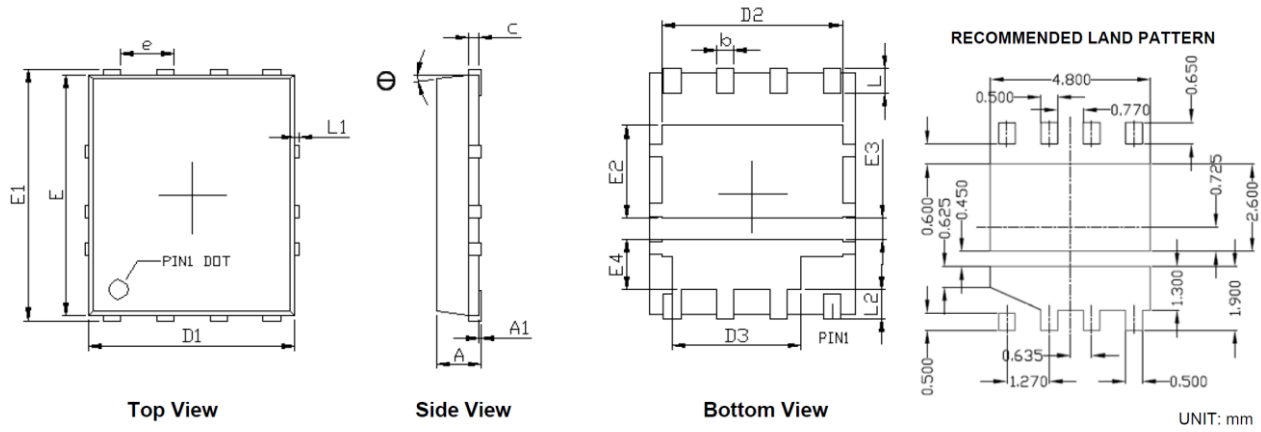
Switching Time Test Circuit and Waveforms





PACKAGE INFORMATION

Dimension in DFN8(5x6) Package (Unit: mm)



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.85	1.10	0.033	0.043
A1	0.00	0.05	0.000	0.002
b	0.33	0.51	0.013	0.020
c	0.15	0.30	0.006	0.012
D1	4.80	5.20	0.189	0.205
D2	3.61	4.70	0.142	0.185
D3	2.55	3.22	0.100	0.127
E	5.55	5.80	0.219	0.228
E1	5.90	6.10	0.232	0.240
E2	2.02	2.50	0.080	0.098
E3	0.40	0.60	0.016	0.024
E4	1.10	1.42	0.043	0.056
e	1.27 BSC		0.050 BSC	
L	0.35	0.71	0.014	0.028
L1	0.00	0.10	0.000	0.004
L2	0.48	0.81	0.019	0.032
θ	0°	12°	0°	12°

IMPORTANT NOTICE

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