

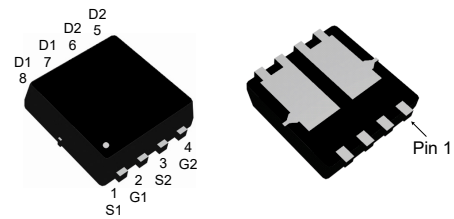
Features

- **Channel 1**
30V/60A
 $R_{DS(ON)} = 5m\Omega (typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 7m\Omega (typ.) @ V_{GS} = 4.5V$
- **Channel 2**
30V/60A
 $R_{DS(ON)} = 5m\Omega (typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 7m\Omega (typ.) @ V_{GS} = 4.5V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

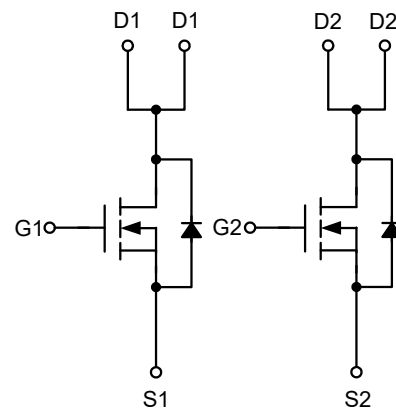
Applications

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

Pin Description



DFN3.3x3.3G-8_EP2



N-Channel MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Channel 1	Channel 2	Unit
Common Ratings					
V _{DSS}	Drain-Source Voltage		30	30	V
V _{GSS}	Gate-Source Voltage		±20	±20	
T _J	Maximum Junction Temperature		150		°C
T _{STG}	Storage Temperature Range		-55 to 150		
I _S	Diode Continuous Forward Current	T _C =25°C	60	60	A
I _D	Continuous Drain Current	T _C =25°C	60	60	A
		T _C =100°C	45	45	
I _{DM} ^a	Pulse Drain Current Tested	T _C =25°C	180	180	A
P _D	Maximum Power Dissipation	T _C =25°C	27.8	27.8	W
		T _C =100°C	11	11	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	4.5	4.5	°C/W
R _{θJA} ^b	Thermal Resistance-Junction to Ambient	t ≤ 10s	42	42	°C/W
		Steady State	80	80	
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	19	19	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	17	17	mJ

Note * : Maximum continuous current is limited by bonding wire.

Note a : Pulse width limited by maximum junction temperature.

Note b : Surface mounted on 1in^2 pad area.

Note c : UIS tested and pulse width limited by maximum junction temperature (initial temperature $T_J=25^{\circ}\text{C}$).

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Channel 1			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.2	1.6	2.2	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =9A	-	5	6.8	mΩ
		V _{GS} =4.5V, I _{DS} =5.5A	-	7	10	
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =5.5A	-	11	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =4.5A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =9A, dI _{SD} /dt=100A/μs	-	22	-	ns
t _a	Charge Time		-	9	-	
t _b	Discharge Time		-	13	-	
Q _{rr}	Reverse Recovery Charge		-	9.2	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	2.4	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	801	1042	pF
C _{oss}	Output Capacitance		-	313	-	
C _{rss}	Reverse Transfer Capacitance		-	32	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	11	20	ns
t _r	Turn-on Rise Time		-	9	17	
t _{d(OFF)}	Turn-off Delay Time		-	23	42	
t _f	Turn-off Fall Time		-	18	33	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =9A	-	11.4	16	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =9A	-	5.6	-	
Q _{gth}	Threshold Gate Charge		-	1.3	-	
Q _{gs}	Gate-Source Charge		-	1.9	-	
Q _{gd}	Gate-Drain Charge		-	1.5	-	

Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note e : Guaranteed by design, not subject to production testing.

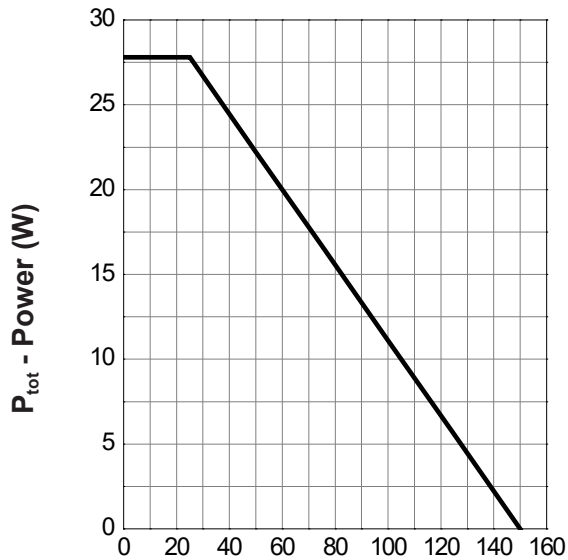
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

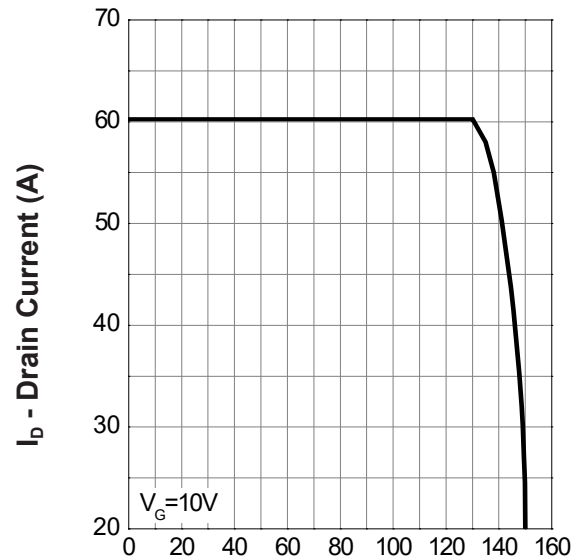
Symbol	Parameter	Test Conditions	Channel 2			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.2	1.6	2.2	V
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R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =9A	-	5	6.8	mΩ
		V _{GS} =4.5V, I _{DS} =5.5A	-	7	10	
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =5.5A	-	11	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =4.5A, V _{GS} =0V	-	0.75	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =9A, dI _{SD} /dt=100A/μs	-	22	-	ns
t _a	Charge Time		-	9	-	
t _b	Discharge Time		-	13	-	
Q _{rr}	Reverse Recovery Charge		-	9.2	-	nC
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R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	2.4	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	801	1042	pF
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Q _{gth}	Threshold Gate Charge		-	1.3	-	
Q _{gs}	Gate-Source Charge		-	1.9	-	
Q _{gd}	Gate-Drain Charge		-	1.5	-	

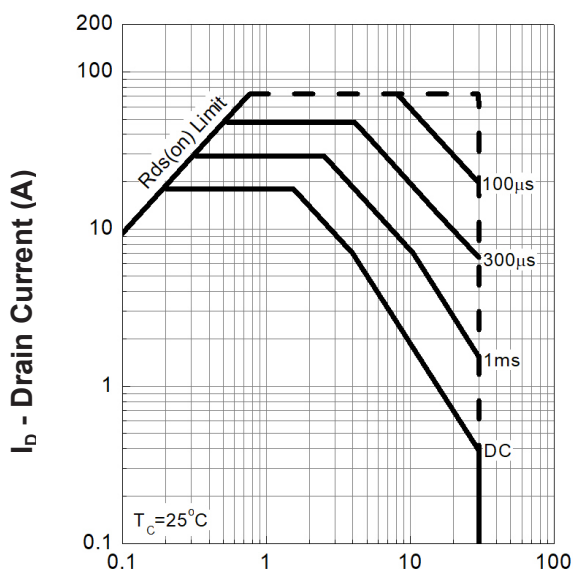
Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

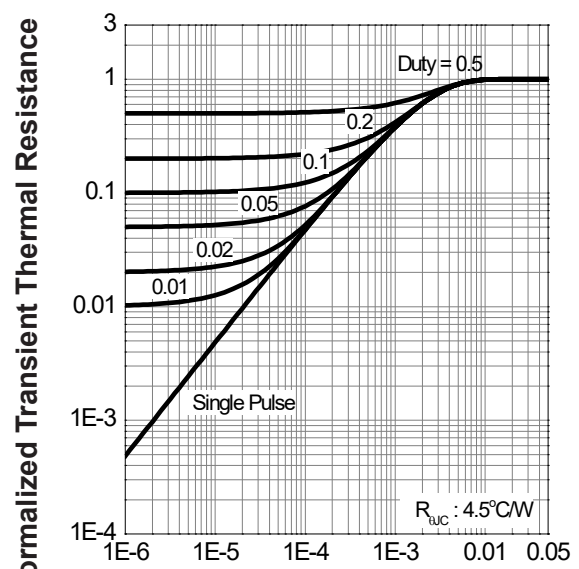
Note e : Guaranteed by design, not subject to production testing.

Channel 1 Typical Operating Characteristics

Power Dissipation

 T_c - Case Temperature (°C)

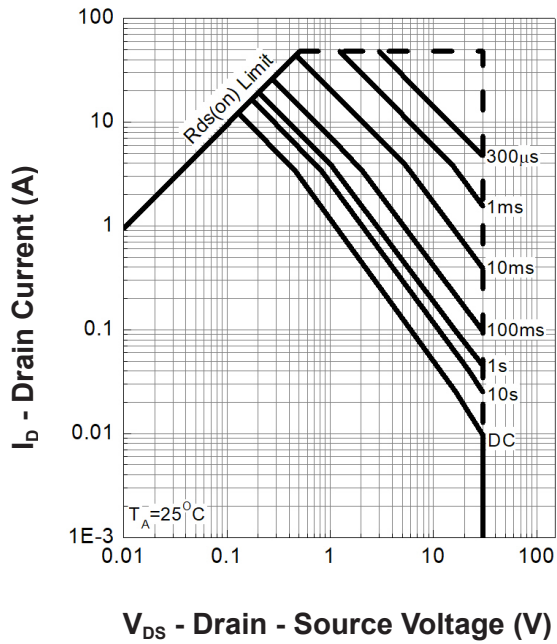
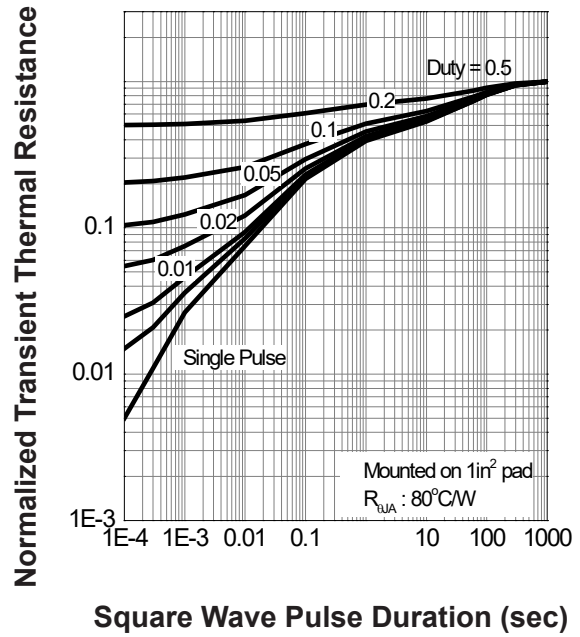
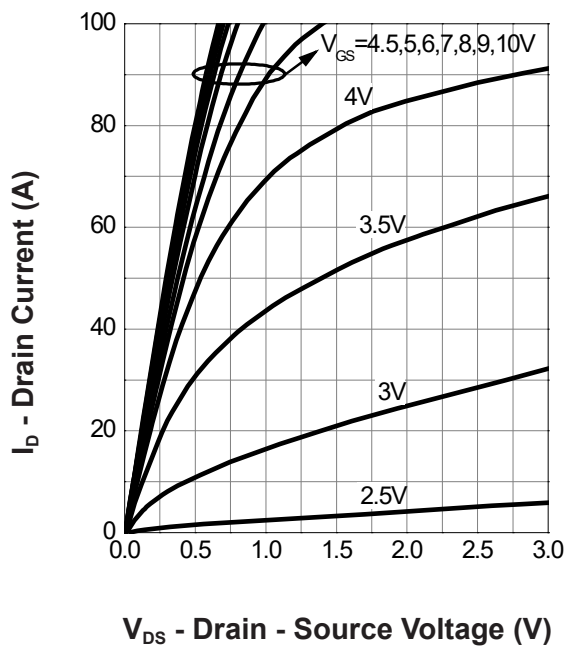
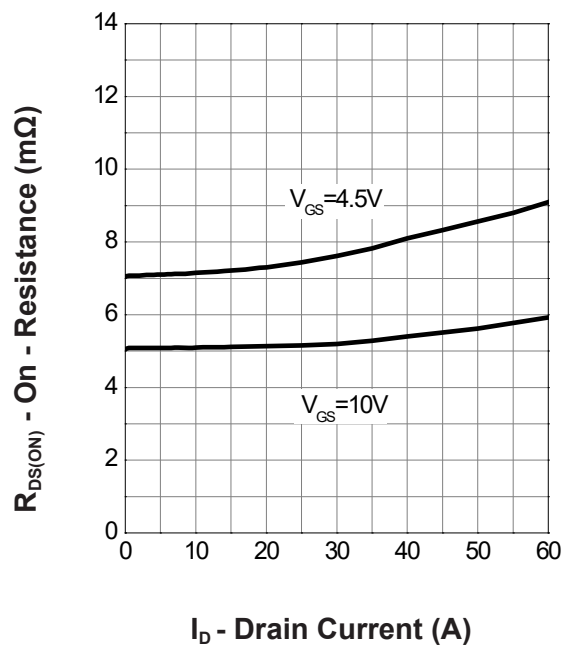
Drain Current

 T_c - Case Temperature (°C)

Safe Operation Area

 V_{DS} - Drain - Source Voltage (V)

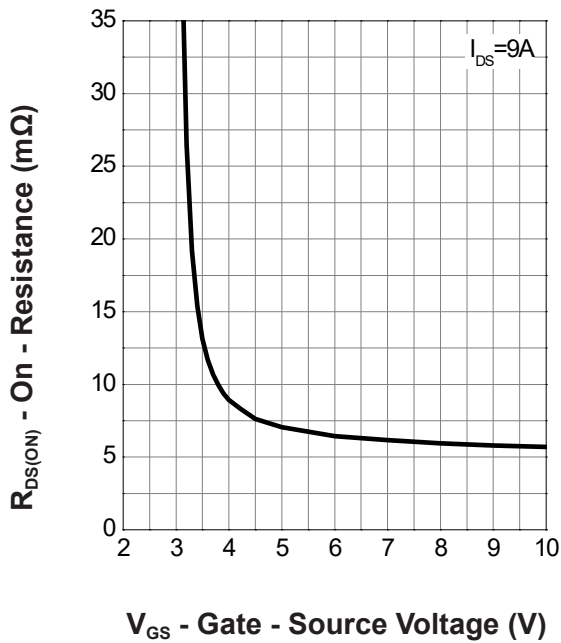
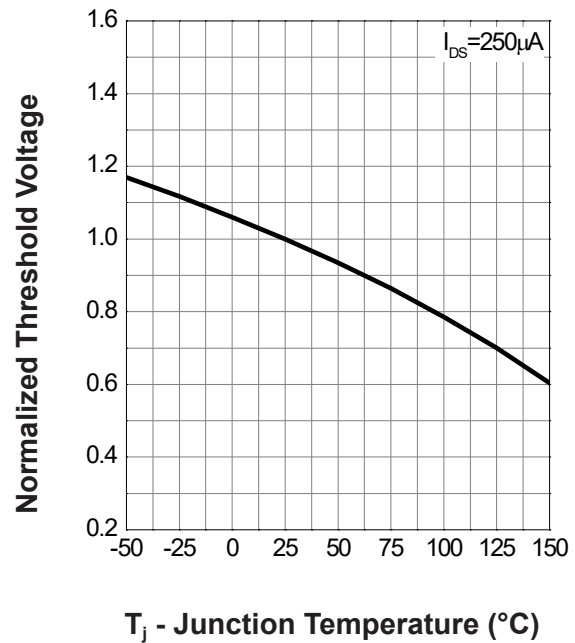
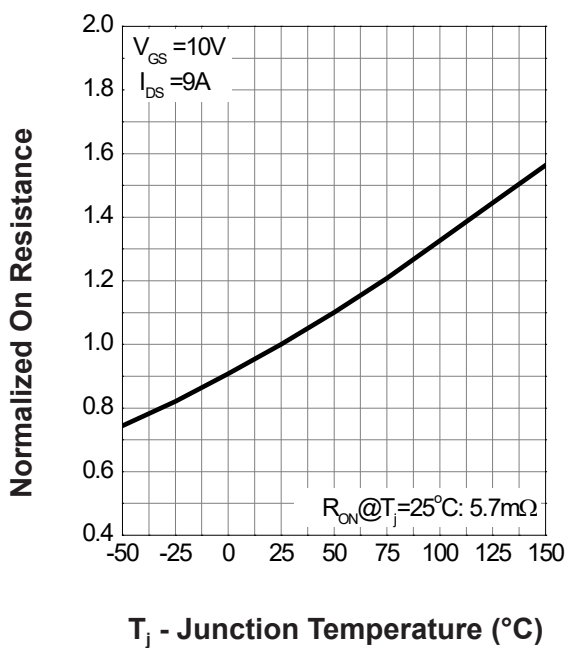
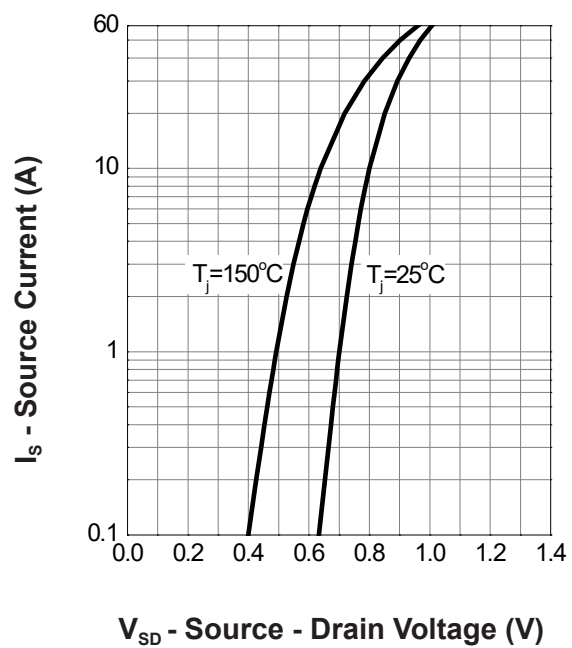
Thermal Transient Impedance


Square Wave Pulse Duration (sec)

Channel 1 Typical Operating Characteristics(Cont.)

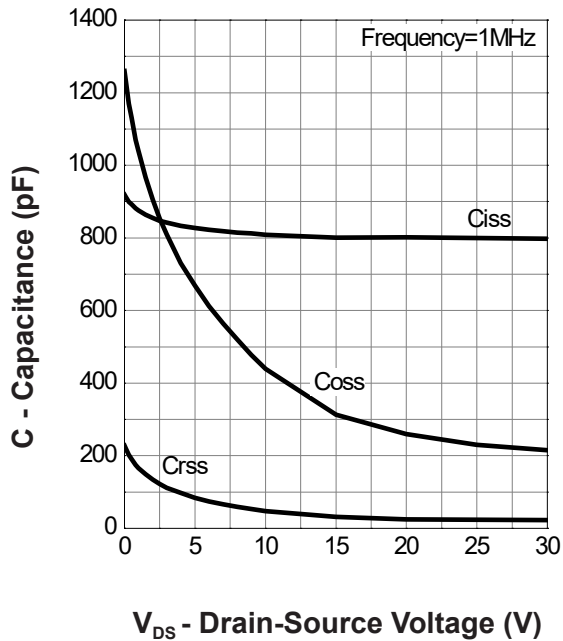
Safe Operation Area

Thermal Transient Impedance

Output Characteristics

Drain-Source On Resistance


Channel 1 Typical Operating Characteristics(Cont.)

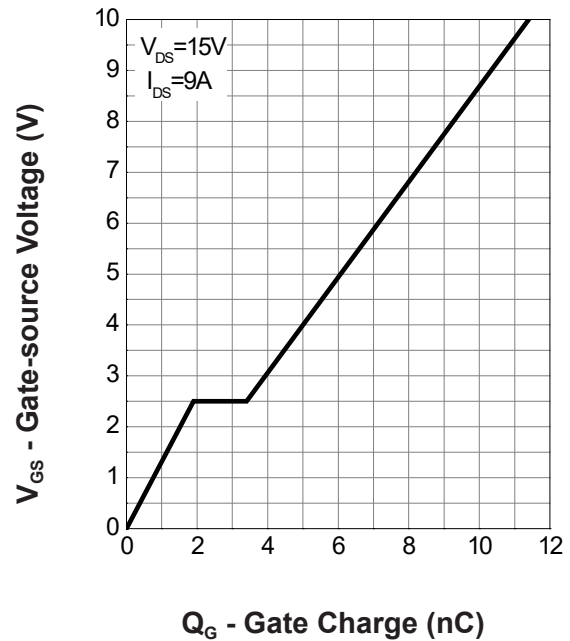
Gate-Source On Resistance

Gate Threshold Voltage

Drain-Source On Resistance

Source-Drain Diode Forward


Channel 1 Typical Operating Characteristics(Cont.)

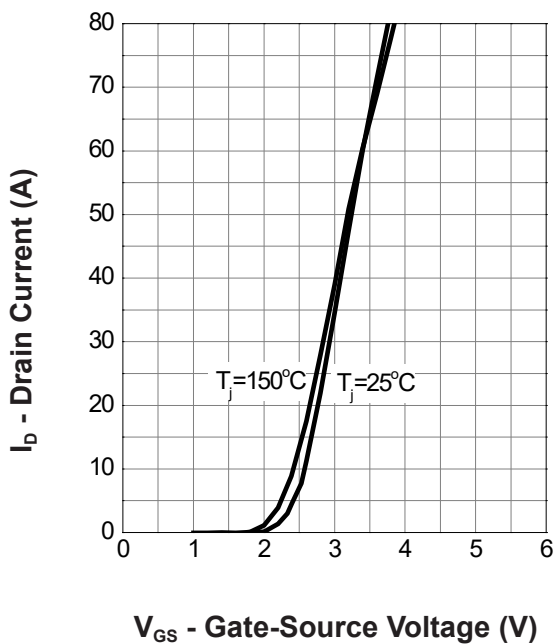
Capacitance



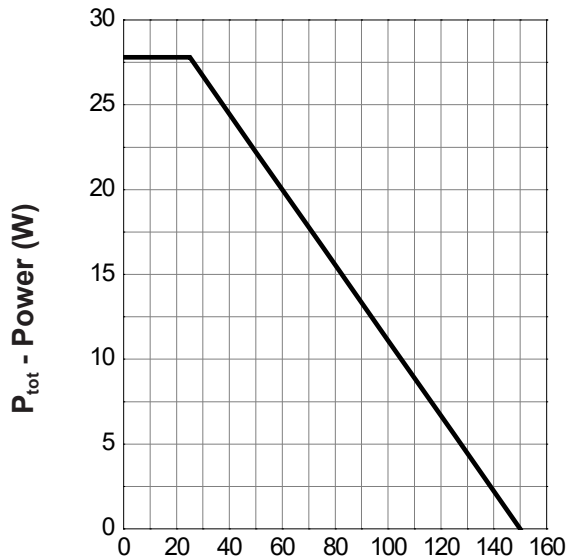
Gate Charge

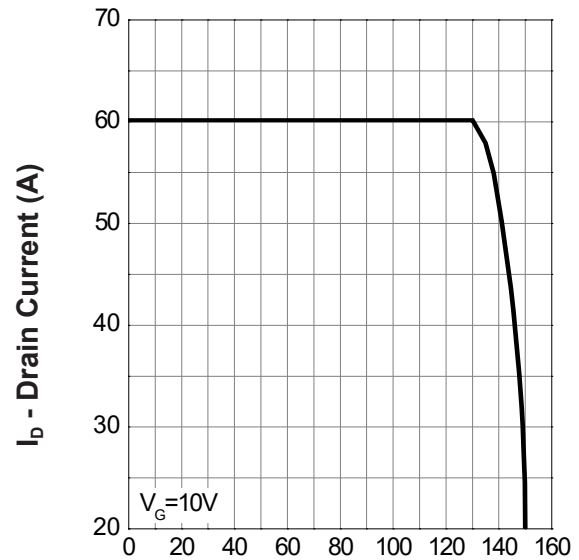


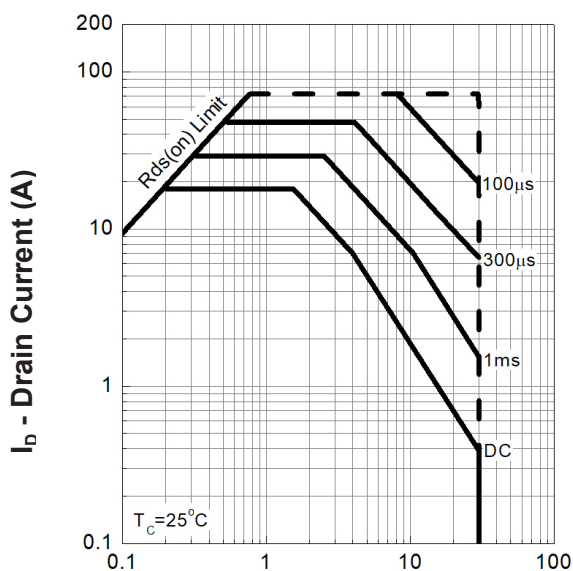
Transfer Characteristics

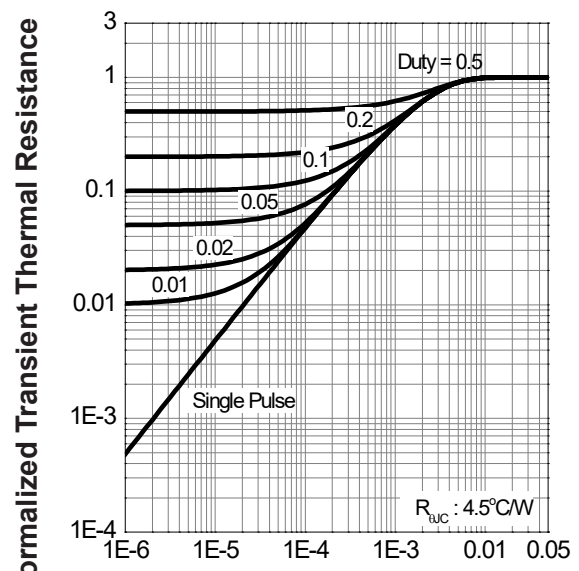


Channel 2 Typical Operating Characteristics

Power Dissipation

 T_c - Case Temperature (°C)

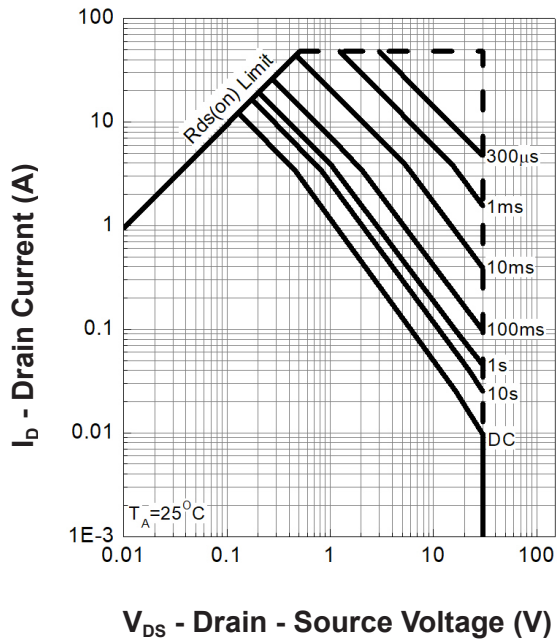
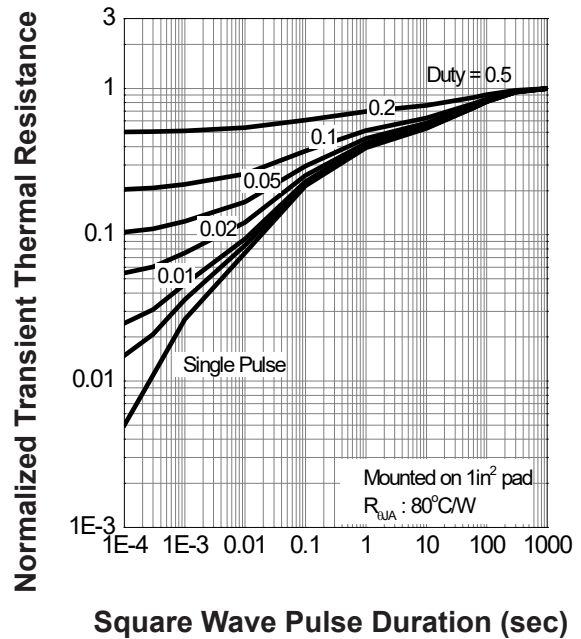
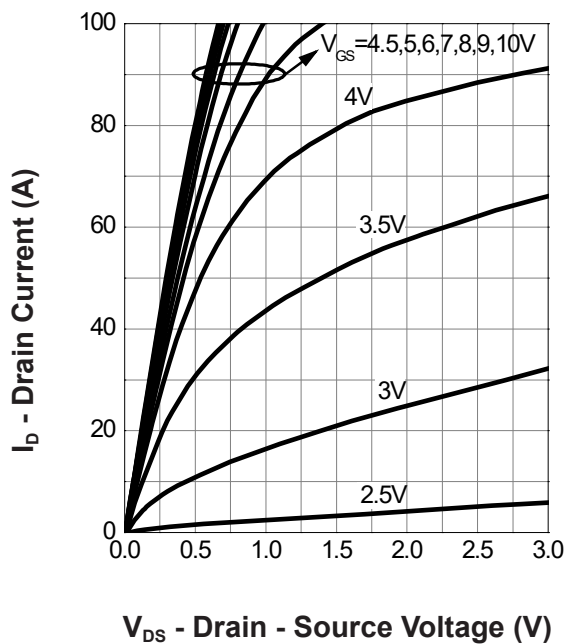
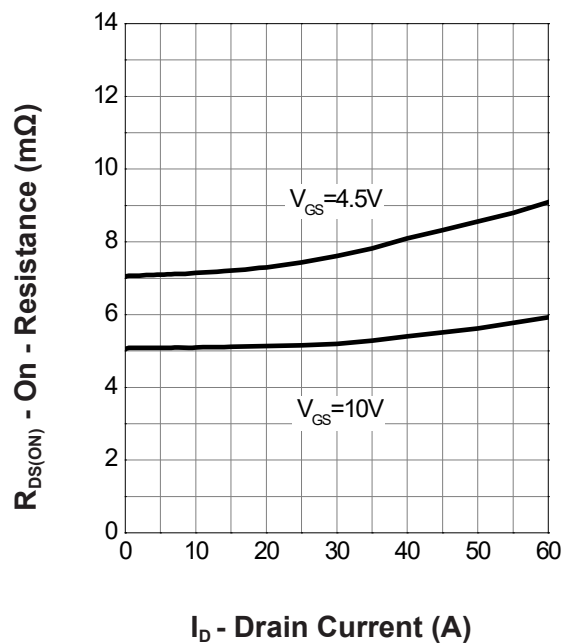
Drain Current

 T_c - Case Temperature (°C)

Safe Operation Area

 V_{DS} - Drain - Source Voltage (V)

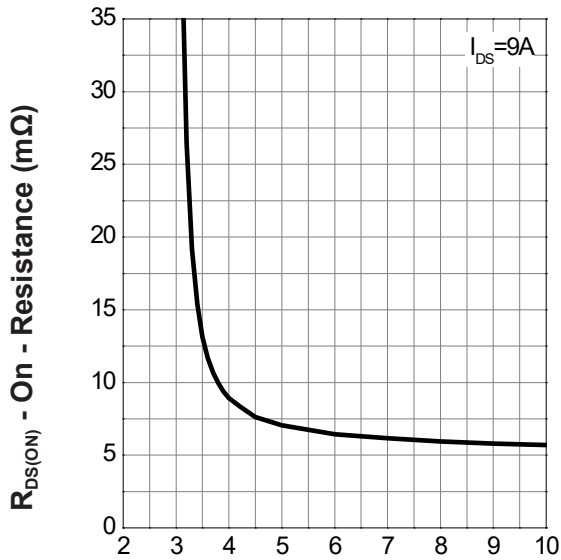
Thermal Transient Impedance


Square Wave Pulse Duration (sec)

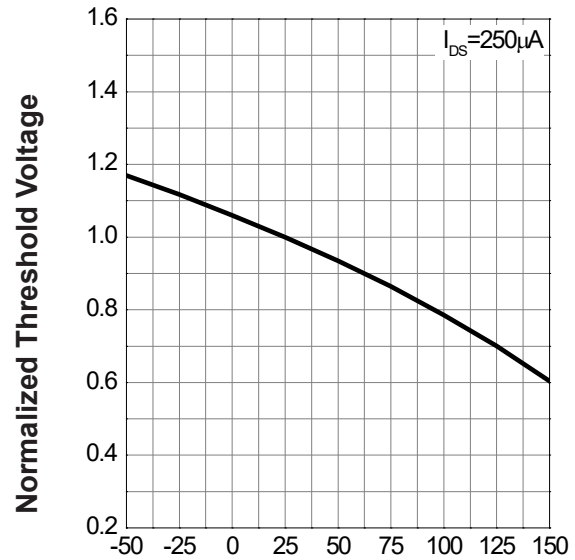
Channel 2 Typical Operating Characteristics(Cont.)

Safe Operation Area

Thermal Transient Impedance

Output Characteristics

Drain-Source On Resistance


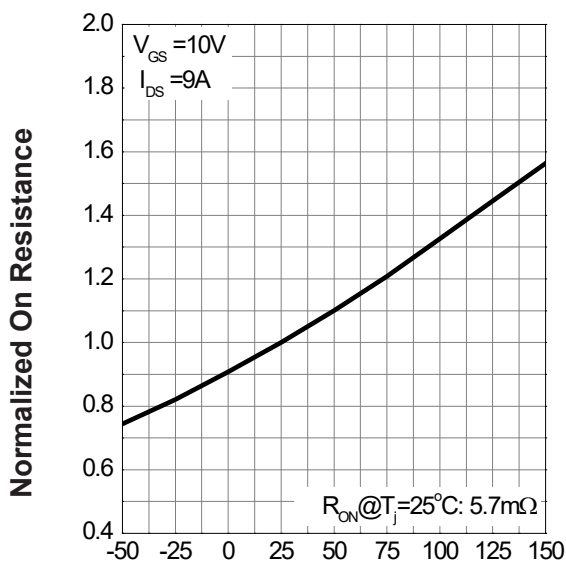
Channel 2 Typical Operating Characteristics(Cont.)

Gate-Source On Resistance


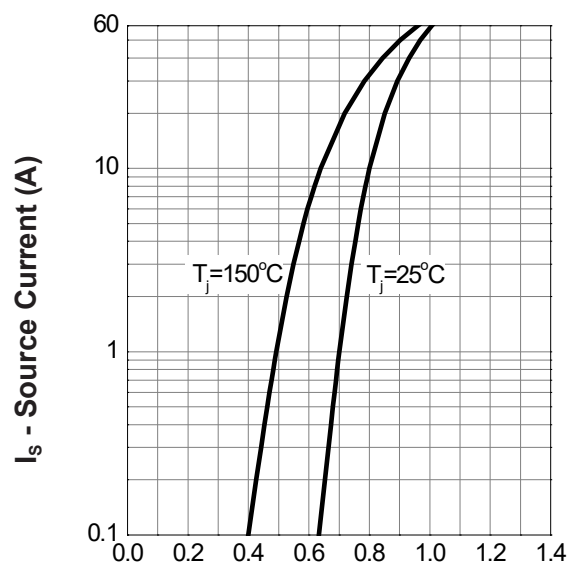
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage


T_j - Junction Temperature ($^{\circ}C$)

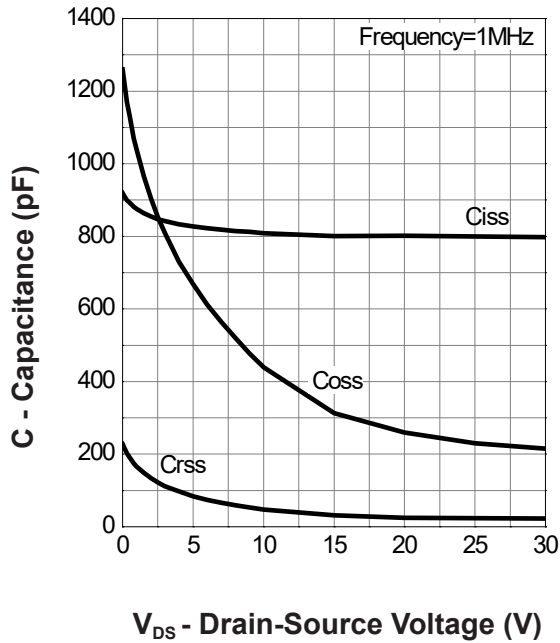
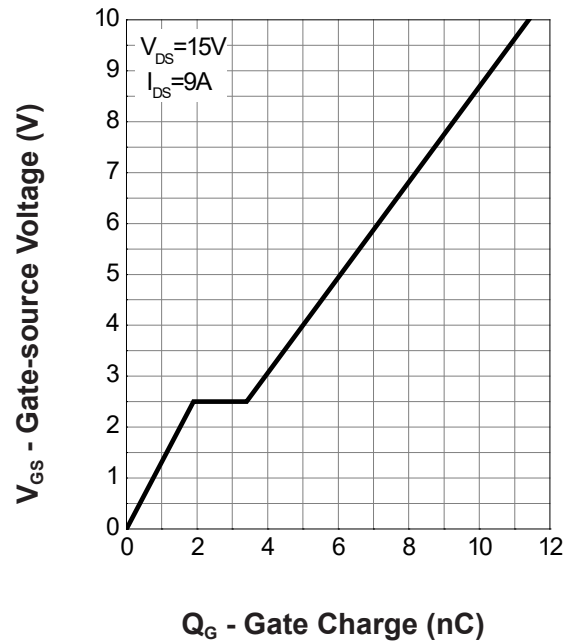
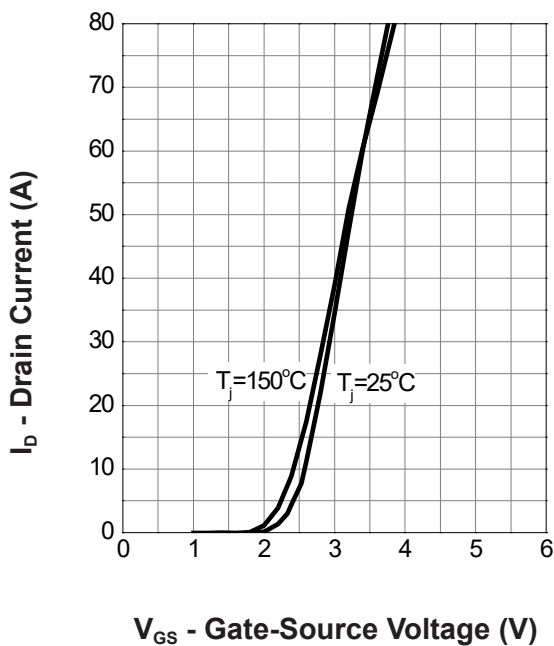
Drain-Source On Resistance


T_j - Junction Temperature ($^{\circ}C$)

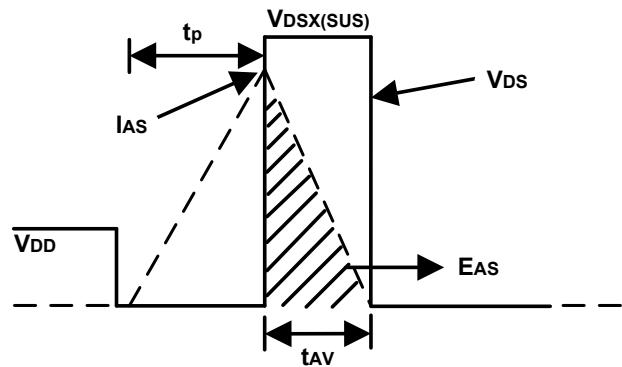
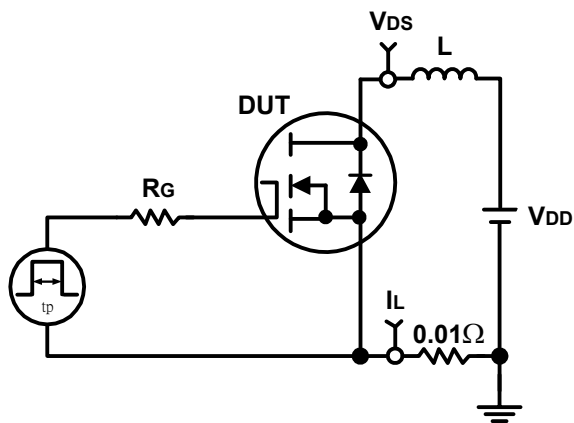
Source-Drain Diode Forward


V_{SD} - Source - Drain Voltage (V)

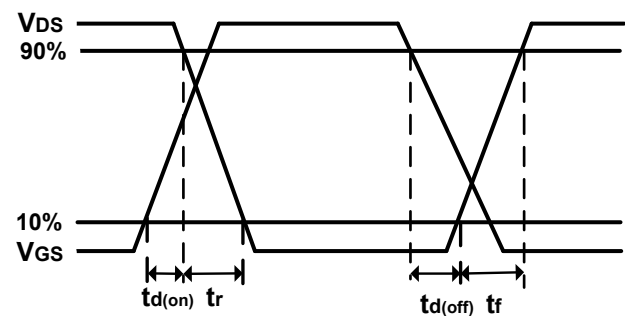
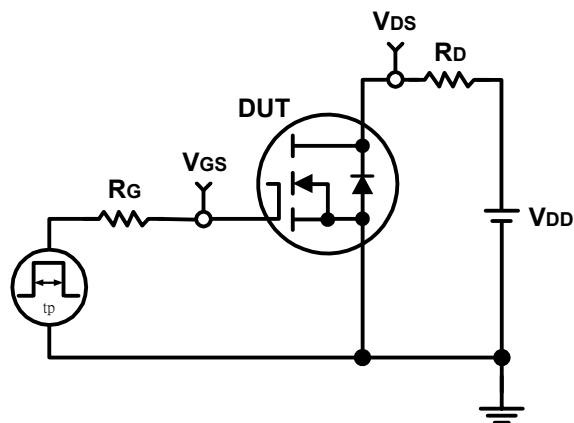
Channel 2 Typical Operating Characteristics(Cont.)

Capacitance

Gate Charge

Transfer Characteristics


Avalanche Test Circuit and Waveforms

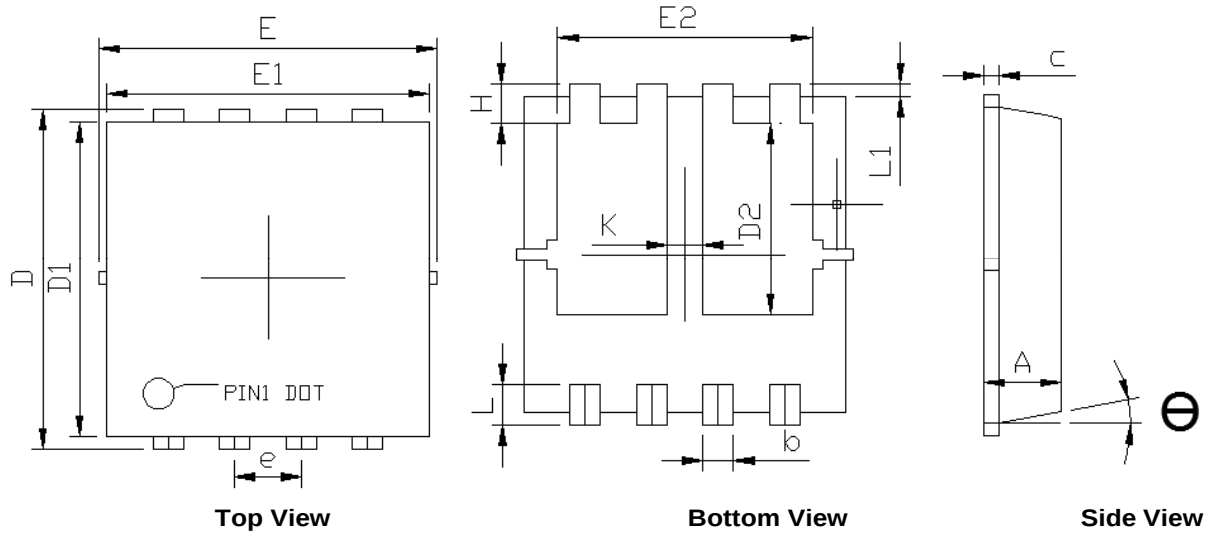


Switching Time Test Circuit and Waveforms



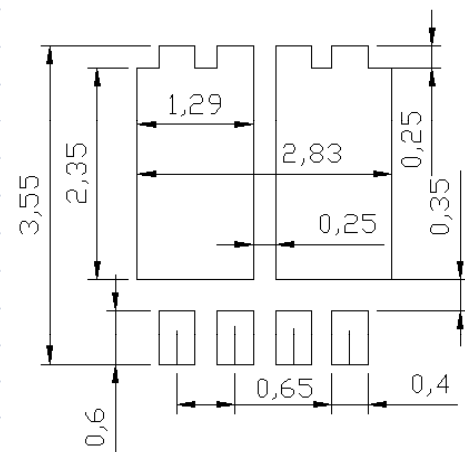
Package Information

DFN3.3x3.3-8L_EP2_P



SYMBOLS	DFN3.3x3.3G-8_EP2_P			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	0.80	0.028	0.031
b	0.25	0.35	0.010	0.014
c	0.10	0.25	0.004	0.010
D	3.25	3.45	0.128	0.136
D1	3.00	3.20	0.118	0.126
D2	1.78	1.98	0.070	0.078
E	3.20	3.40	0.126	0.134
E1	3.00	3.20	0.118	0.126
E2	2.39	2.59	0.094	0.102
e	0.65BSC		0.026 BSC	
H	0.30	0.50	0.012	0.020
L	0.30	0.50	0.012	0.020
L1	0.13 REF		0.005 REF	
K	0.30	-	0.012	-
θ	-	12°	-	12°

RECOMMENDED LAND PATTERN



UNIT: mm