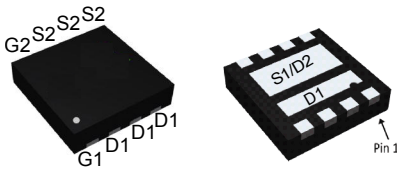
Features

- **Channel 1**
  30V/18A,
  $R_{DS(ON)}$ = 7 mΩ (typ.) @ V_{GS} = 10V
  $R_{DS(ON)}$ = 10mΩ (typ.) @ V_{GS} = 4.5V
- **Channel 2**
  30V/18A,
  $R_{DS(ON)}$ = 7 mΩ (typ.) @ V_{GS} = 10V
  $R_{DS(ON)}$ = 10mΩ (typ.) @ V_{GS} = 4.5V
- 100% UIS Tested
- Reliable and Rugged
- Lead Free Available (RoHS Compliant)

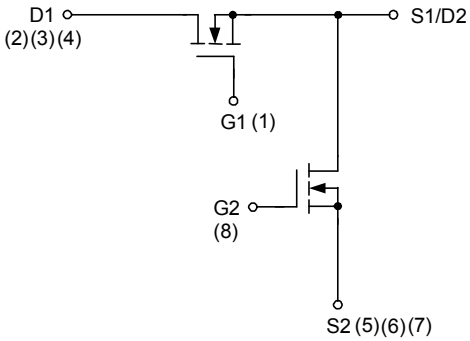
Applications

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

Pin Description



TDFN3x3-8_EP2



N-Channel MOSFET

Absolute Maximum Ratings (T_A = 25°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	18	18	A
I_D [a]	Continuous Drain Current	T_C=25°C	18	18	A
I_{DM} [b]	Pulse Drain Current Tested	T_C=25°C	54	54	A
P_D	Maximum Power Dissipation	T_C=25°C	20	20	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	6	6	°C/W
I_D [c]	Continuous Drain Current	T_A=25°C	8.4	9.1	A
		T_A=70°C	6.7	7.3	
I_{DM}	Pulse Drain Current Tested	T_A=25°C	33.5	36	A
P_D [c]	Maximum Power Dissipation	T_A=25°C	1.14	1.3	W
		T_A=70°C	0.7	0.8	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	t ≤ 10s	66	60	°C/W
		Steady State [c]	110	100	
I_{AS} [d]	Avalanche Current, Single pulse	L=0.1mH	15	15	A
		L=0.5mH	9	9	
E_{AS} [d]	Avalanche Energy, Single pulse	L=0.1mH	11.25	11.25	mJ
		L=0.5mH	20.3	20.3	

Note a,* : Max. continuous current is limited by bonding wire.
Note b : Pulse width is limited by max. junction temperature.
Note c : $R_{\theta JA}$ steady state t=999s.
Note d : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_j=25°C).

Electrical Characteristics (T_A = 25°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	1.4	1.8	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [e]	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=10A	-	7	10	mΩ
		V_{GS}=4.5V, I_{DS}=8A	-	10	15	
Diode Characteristics						
V_{SD} [e]	Diode Forward Voltage	I_{SD}=5A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_{DS}=10A, dI_{SD}/dt=100A/μs	-	20.5	-	ns
Q_{rr}	Reverse Recovery Charge		-	7.2	-	nC
Dynamic Characteristics [f]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	1.35	2.5	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	455	600	pF
C_{oss}	Output Capacitance		-	318	-	
C_{rss}	Reverse Transfer Capacitance		-	22	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	8.5	16	ns
t_r	Turn-on Rise Time		-	10	18	
$t_{d(OFF)}$	Turn-off Delay Time		-	14	26	
t_f	Turn-off Fall Time		-	10.6	19	
Gate Charge Characteristics [f]						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=10A	-	8	12	nC
Q_{gs}	Gate-Source Charge		-	1.6	-	
Q_{gd}	Gate-Drain Charge		-	1.2	-	

Note e：Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note f：Guaranteed by design, not subject to production testing.

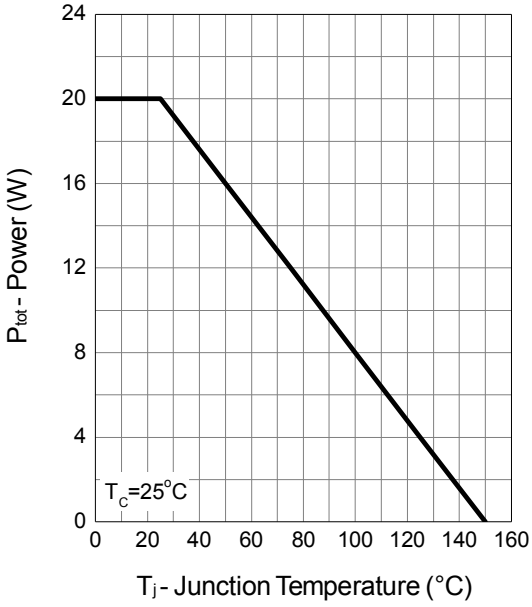
Electrical Characteristics (T_A = 25°C unless otherwise noted)

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	mA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=-250μA	1.3	1.8	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [e]	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=10A	-	7	10	mΩ
		V_{GS}=4.5V, I_{DS}=8A	-	10	15	
Diode Characteristics						
V_{SD} [e]	Diode Forward Voltage	I_{SD}=5A, V_{GS}=0V	-	0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_{DS}=10A, dI_{SD}/dt=100A/μs	-	20.5	-	ns
Q_{rr}	Reverse Recovery Charge		-	7.2	-	nC
Dynamic Characteristics [f]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	1.35	2.5	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	455	600	pF
C_{oss}	Output Capacitance		-	318	-	
C_{rss}	Reverse Transfer Capacitance		-	22	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	8.5	16	ns
t_r	Turn-on Rise Time		-	10	18	
$t_{d(OFF)}$	Turn-off Delay Time		-	14	26	
t_f	Turn-off Fall Time		-	10.6	19	
Gate Charge Characteristics [f]						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=10A	-	8	12	nC
Q_{gs}	Gate-Source Charge		-	1.6	-	
Q_{gd}	Gate-Drain Charge		-	1.2	-	

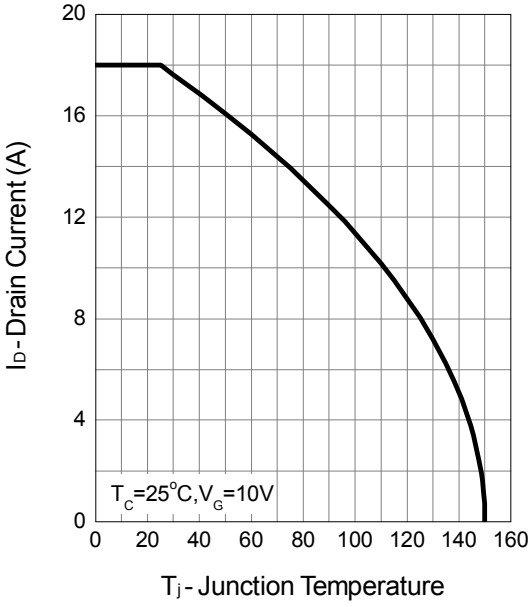
Note e：Pulse test; pulse width≤300μs, duty cycle≤2%.
Note f：Guaranteed by design, not subject to production testing.

Channel 1 Typical Operating Characteristics

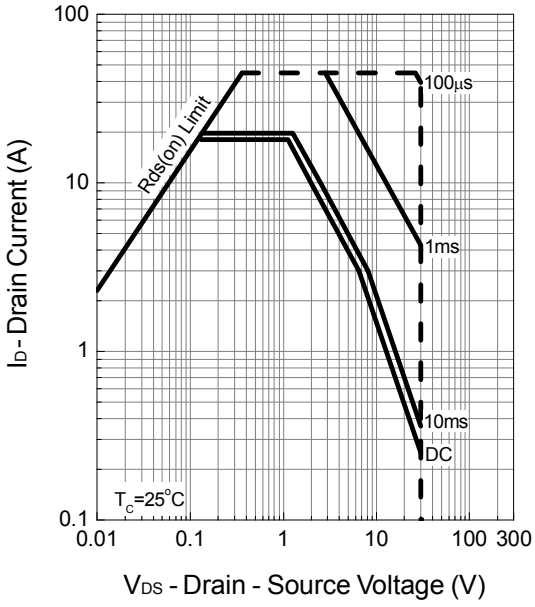
Power Dissipation



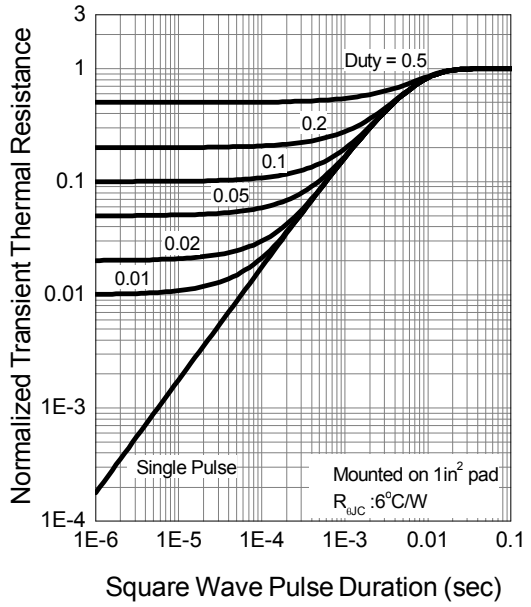
Drain Current



Safe Operation Area

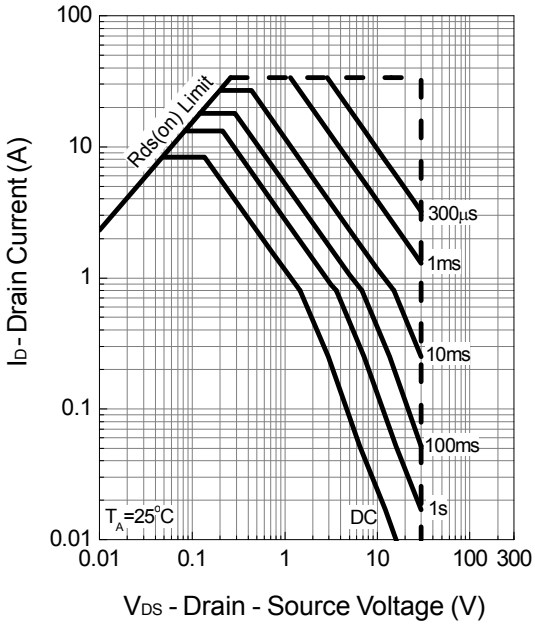


Thermal Transient Impedance

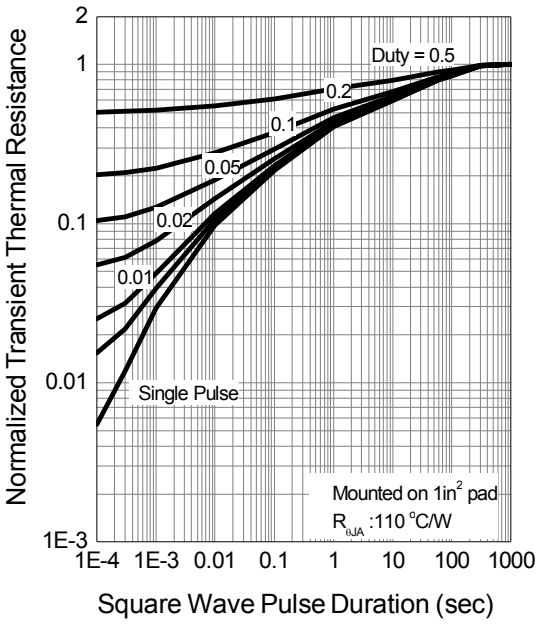


Channel 1 Typical Operating Characteristics (Cont.)

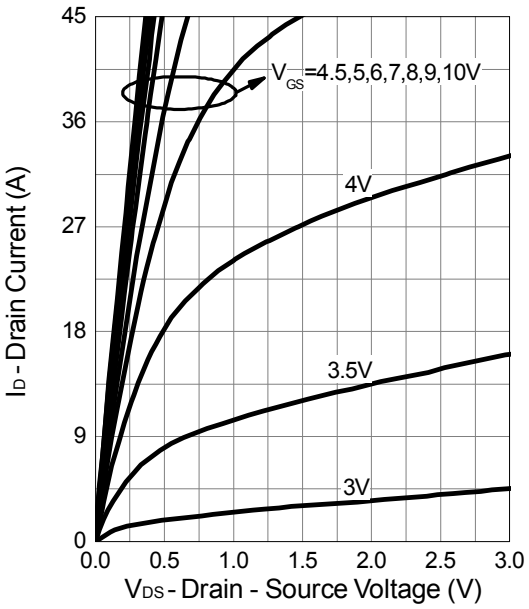
Safe Operation Area



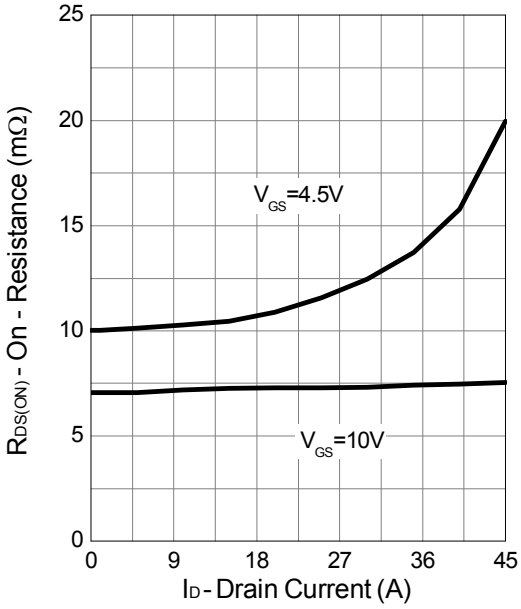
Thermal Transient Impedance



Output Characteristics

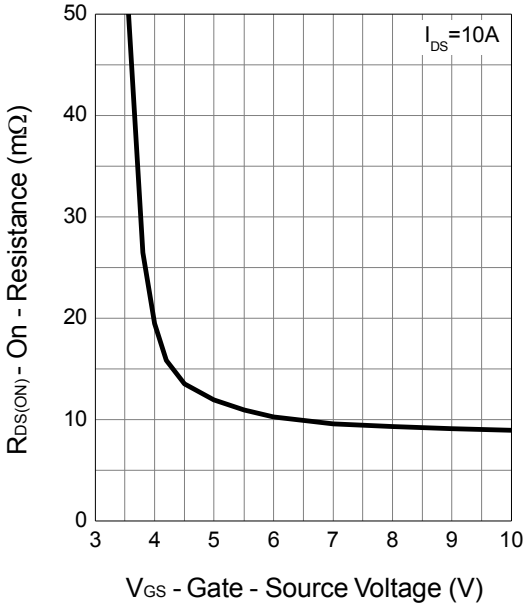


Drain-Source On Resistance

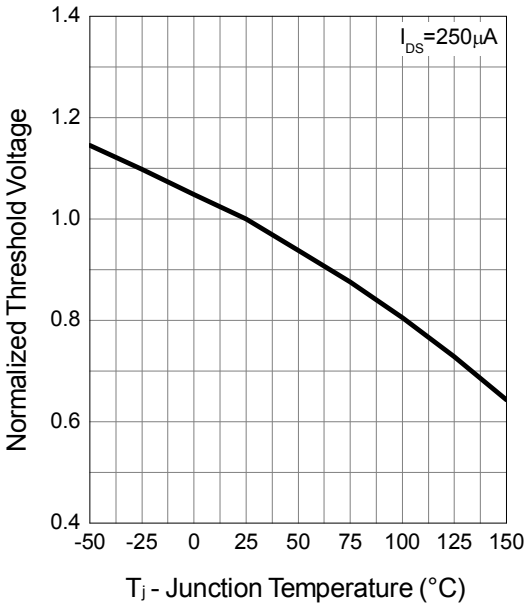


Channel 1 Typical Operating Characteristics (Cont.)

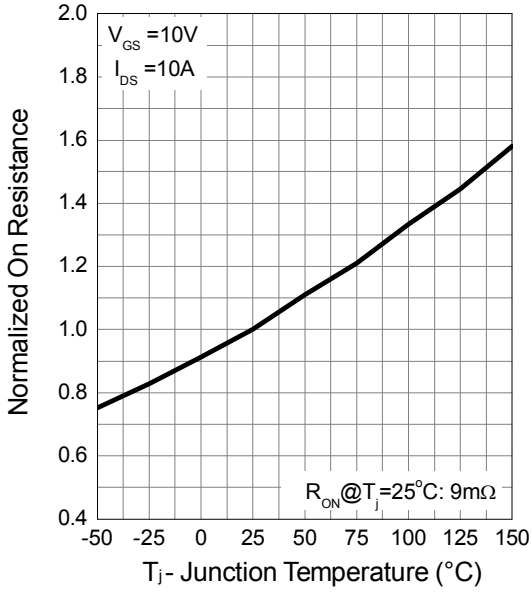
Gate-Source On Resistance



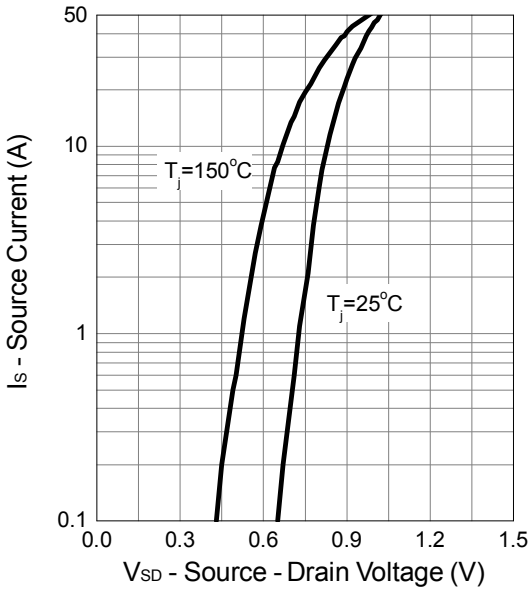
Gate Threshold Voltage



Drain-Source On Resistance

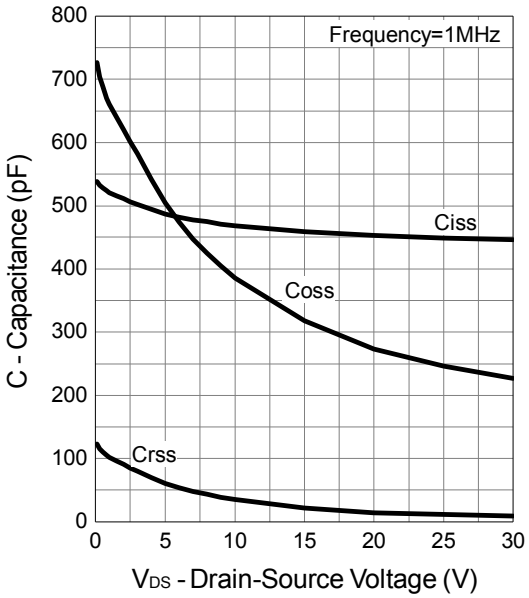


Source-Drain Diode Forward

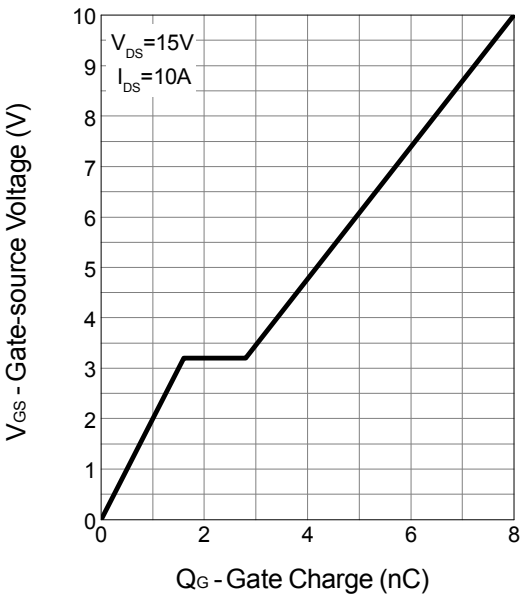


Channel 1 Typical Operating Characteristics (Cont.)

Capacitance

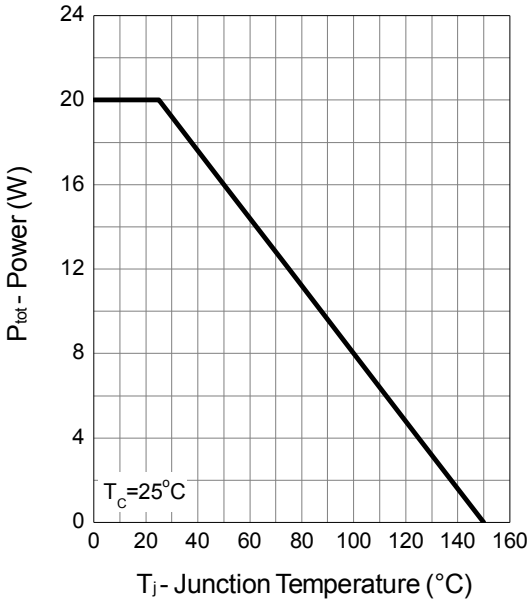


Gate Charge

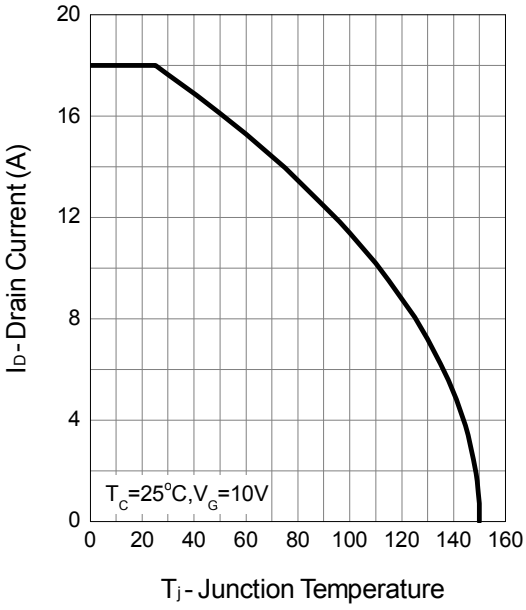


Channel 2 Typical Operating Characteristics

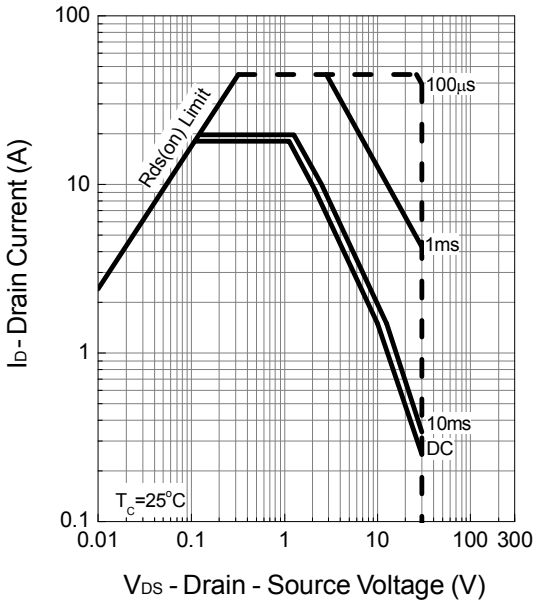
Power Dissipation



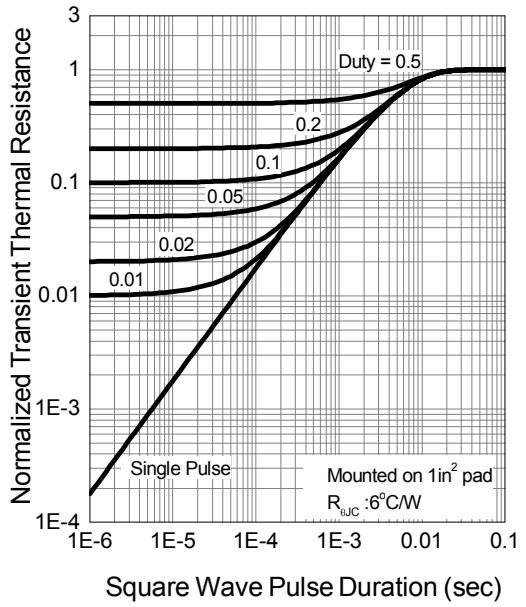
Drain Current



Safe Operation Area

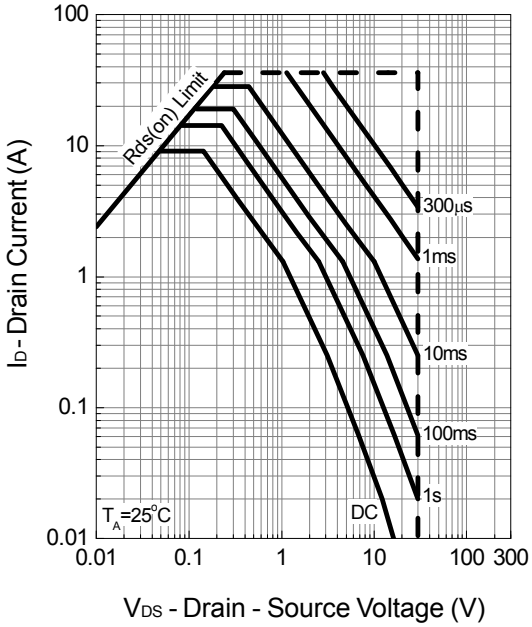


Thermal Transient Impedance

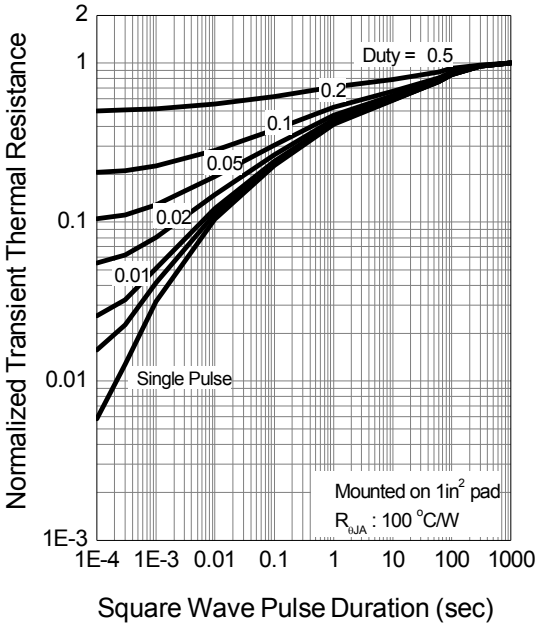


Channel 2 Typical Operating Characteristics (Cont.)

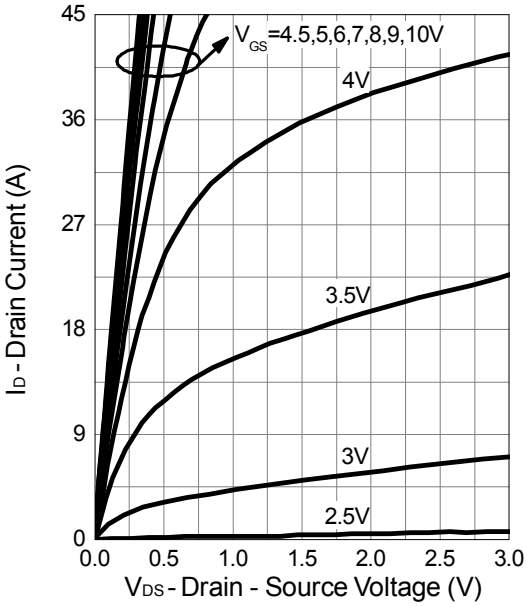
Safe Operation Area



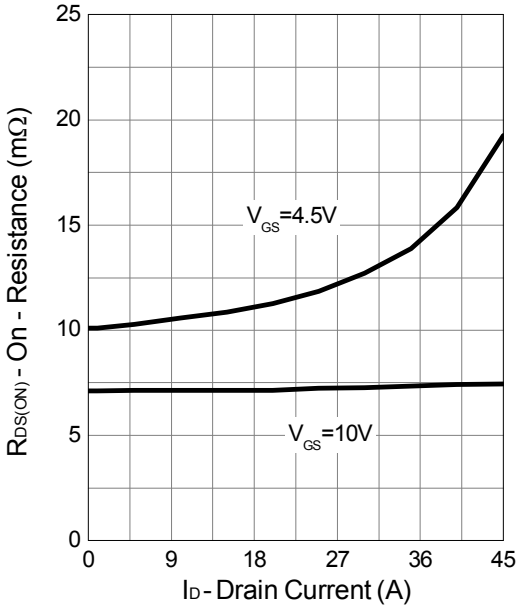
Thermal Transient Impedance



Output Characteristics

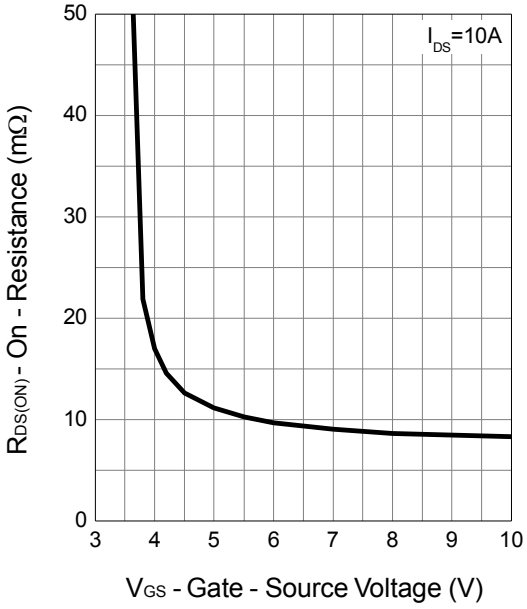


Drain-Source On Resistance

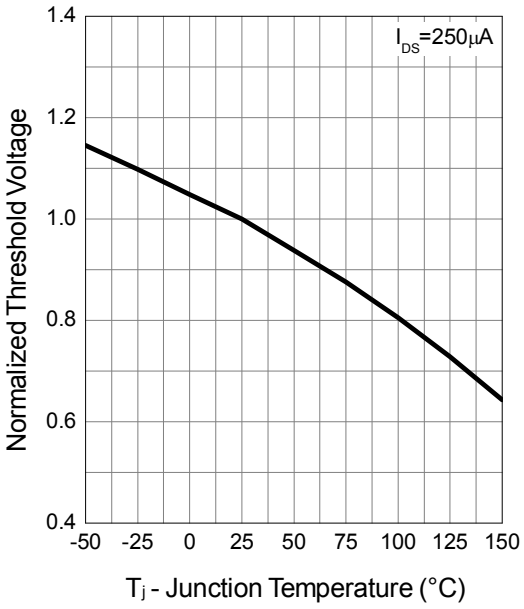


Channel 2 Typical Operating Characteristics (Cont.)

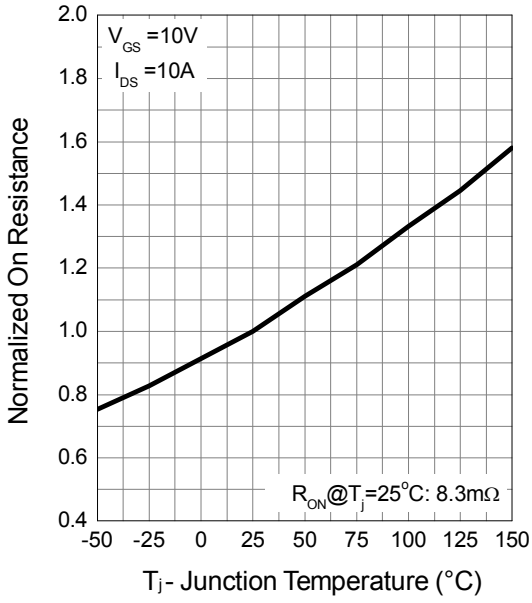
Gate-Source On Resistance



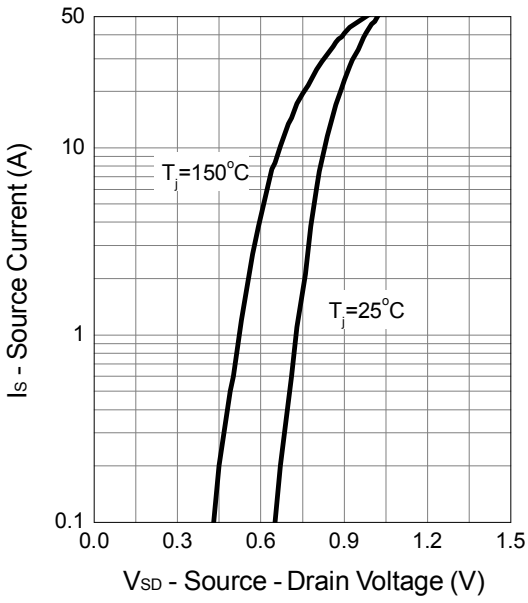
Gate Threshold Voltage



Drain-Source On Resistance

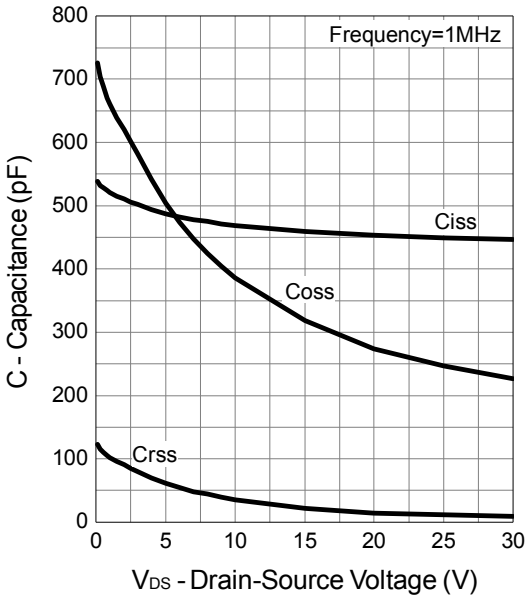


Source-Drain Diode Forward

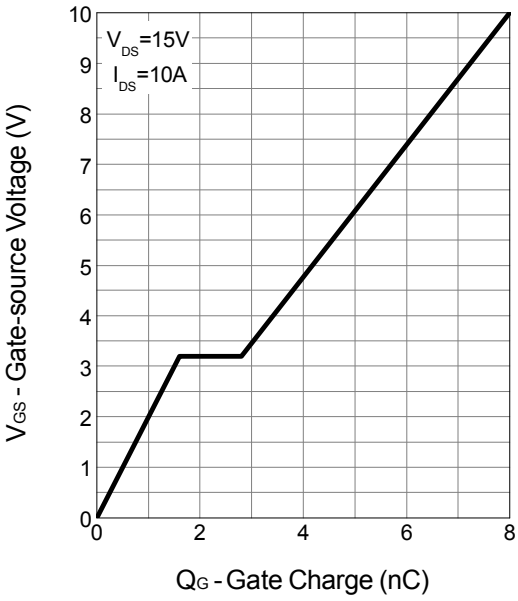


Channel 2 Typical Operating Characteristics (Cont.)

Capacitance

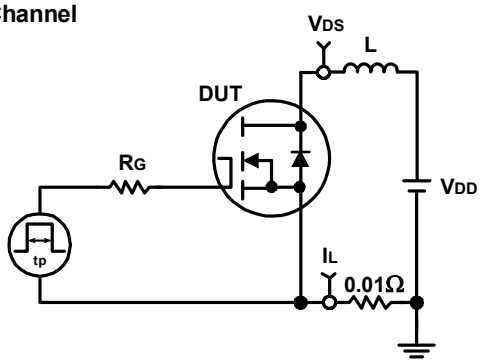


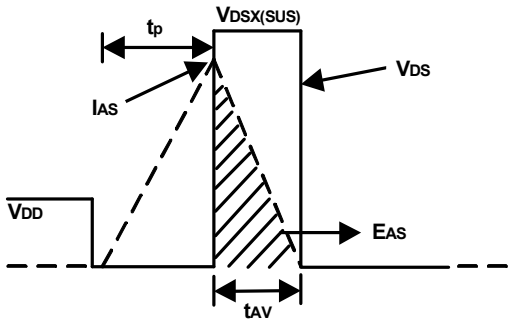
Gate Charge



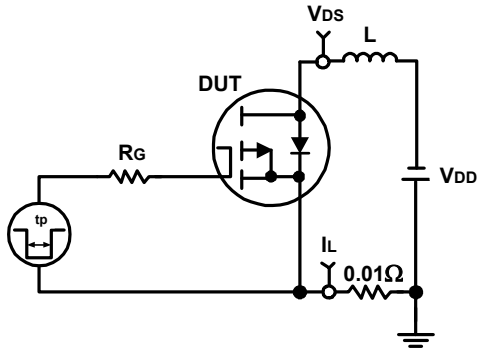
Avalanche Test Circuit and Waveforms

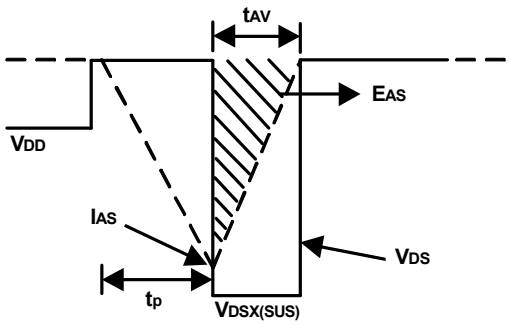
N Channel





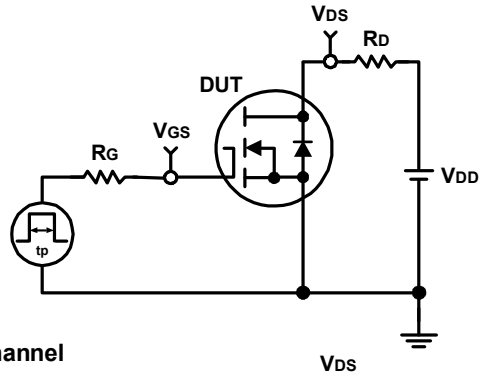
P Channel

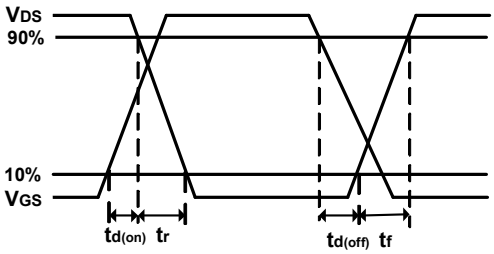




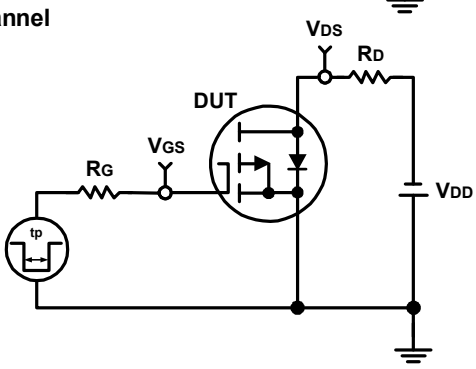
Switching Time Test Circuit and Waveforms

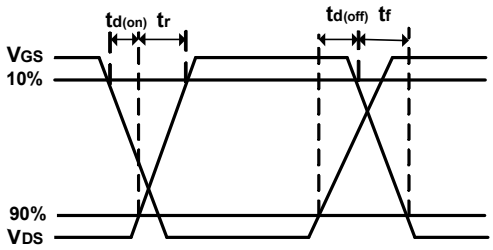
N Channel



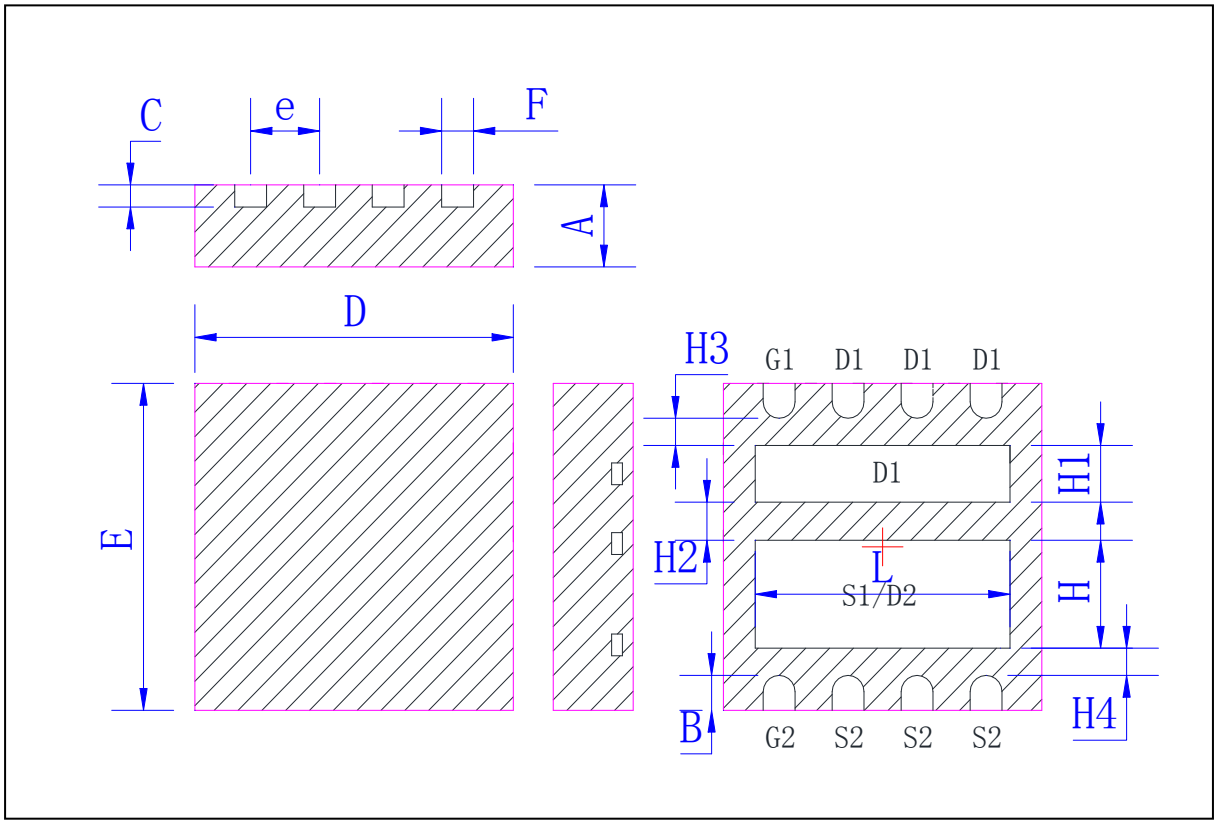


P Channel





TDFN3*3-8_EP2 OUTLINE



Symbol	Min	Typ	Max
A	0.70	0.75	0.80
B	0.27	0.32	0.37
C	0.153	0.203	0.253
D	2.90	3.00	3.10
E	2.90	3.00	3.10
e	0.60	0.65	0.70
F	0.25	0.30	0.35
H	0.89	0.99	1.09
H1	0.42	0.52	0.62
H2	0.25	0.35	0.45
H3	0.15	0.25	0.35
H4	0.15	0.25	0.35
L	2.30	2.40	2.50