

N-Channel Enhancement Mode MOSFET

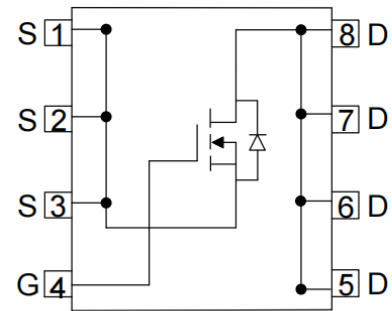
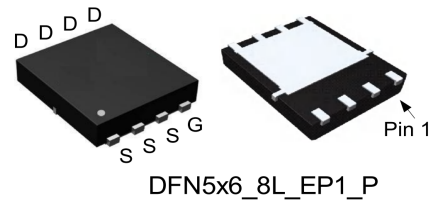
Features

- 30V/120A,
 $R_{DS(ON)} = 2.2m\Omega$ (Typ.) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 3m\Omega$ (Typ.) @ $V_{GS} = 4.5V$
- Reliable and Rugged
- Lower Q_g and Q_{gd} for high-speed switching
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- 100% UIS + R_g Tested
- Lead Free and Green Devices Available
(RoHS Compliant)

Applications

- Power Management in Desktop Computer or DC/DC Converters.
- Power Load Switch.
- Notebook Battery Management.

Pin Description



Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter		Rating	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 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	31	A
I _D	Continuous Drain Current	T _C =25°C	120	
		T _C =100°C	74	
P _D	Maximum Power Dissipation	T _C =25°C	56	W
		T _C =100°C	22	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	2.2	°C/W
I _S	Diode Continuous Forward Current	T _A =25°C	1.9	A
I _D ^a	Continuous Drain Current	T _A =25°C	22.8	
		T _A =70°C	18.2	
I _{DM} ^b	Pulsed Drain Current	T _A =25°C	92	
P _D ^a	Maximum Power Dissipation	T _A =25°C	2.08	W
		T _A =70°C	1.33	
R _{θJA}	Thermal Resistance-Junction to Ambient	t ≤ 10s	20	°C/W
		Steady State	60 ^a	
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	80	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	320	mJ

Note a : Surface Mounted on 1in² pad area, t ≤ 10sec. R_{θJA} steady state t=999s.

Note b : Pulse width is limited by max. junction temperature.

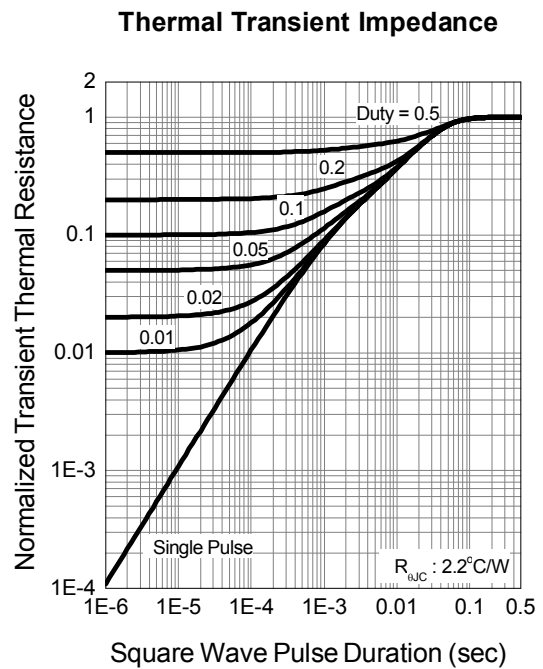
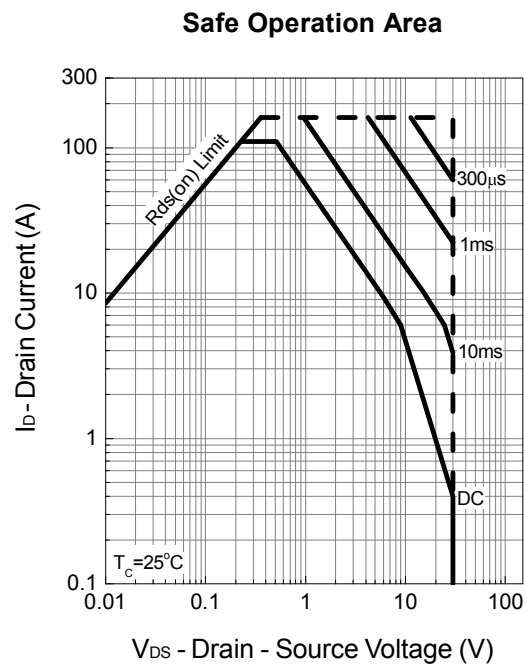
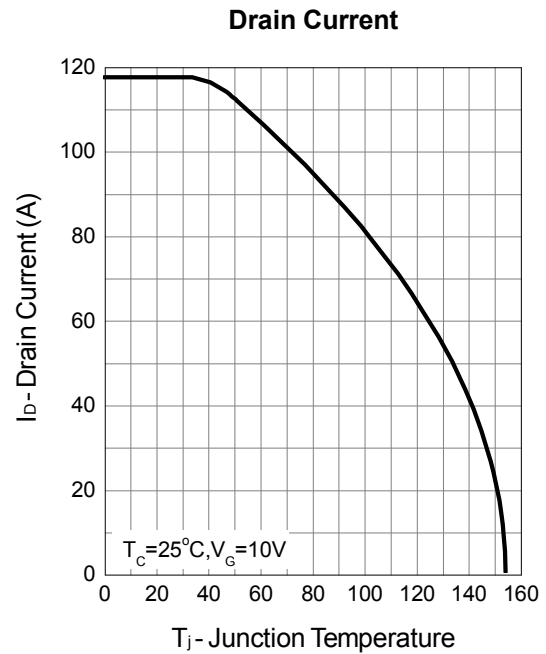
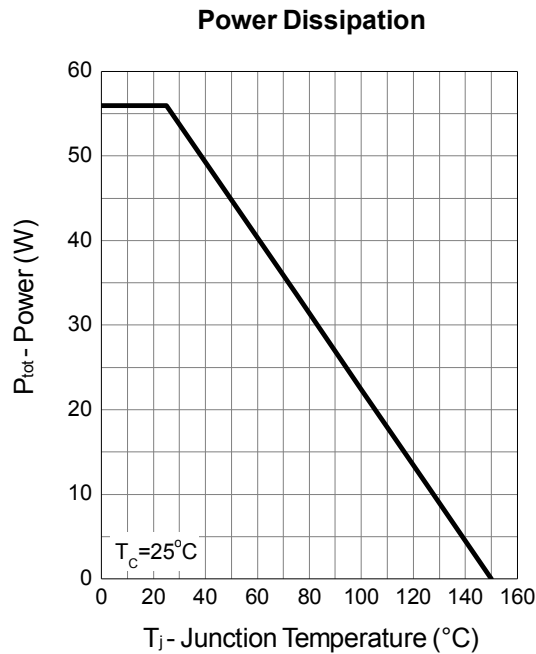
Note c : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	30	-	-	V
BV _{DSS(t)}	Drain-Source Breakdown Voltage (transient)	V _{GS} =0V, I _{D(aval)} =36A T _{case} =25°C, t _{transient} =100ns	34	-	-	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	1.7	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±12	μA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =20A	-	2.2	3	mΩ
		T _J =125°C	-	2.5	-	
		V _{GS} =4.5V, I _{DS} =15A	-	3	4	
G _{fs}	Forward Transconductance	V _{DS} =5V, I _{DS} =15A	-	30	-	S
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =5A, dI _{SD} /dt=100A/μs	-	39	-	ns
t _a	Charge Time		-	23	-	
t _b	Discharge Time		-	16	-	
Q _{rr}	Reverse Recovery Charge		-	33	-	nC
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	0.9	2.1	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz	-	1860	2400	pF
C _{oss}	Output Capacitance		-	1220	1586	
C _{rss}	Reverse Transfer Capacitance		-	92	120	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	15	-	ns
t _r	Turn-on Rise Time		-	8	-	
t _{d(OFF)}	Turn-off Delay Time		-	38	-	
t _f	Turn-off Fall Time		-	54	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _{DS} =20A	-	30	45	nC
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =20A	-	14	-	
Q _{gth}	Threshold Gate Charge		-	3	-	
Q _{gs}	Gate-Source Charge		-	5.3	-	
Q _{gd}	Gate-Drain Charge		-	3.6	-	

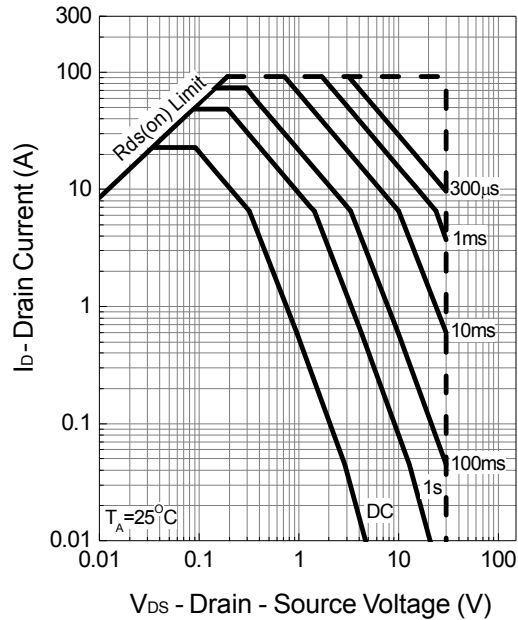
Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Typical Operating Characteristics

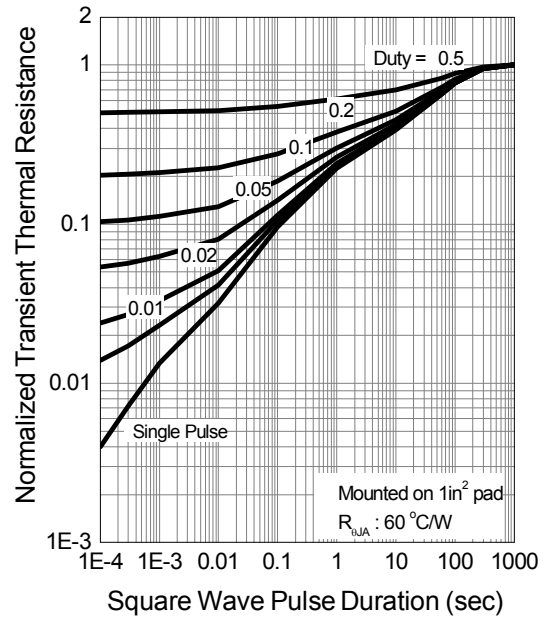


Typical Operating Characteristics (Cont.)

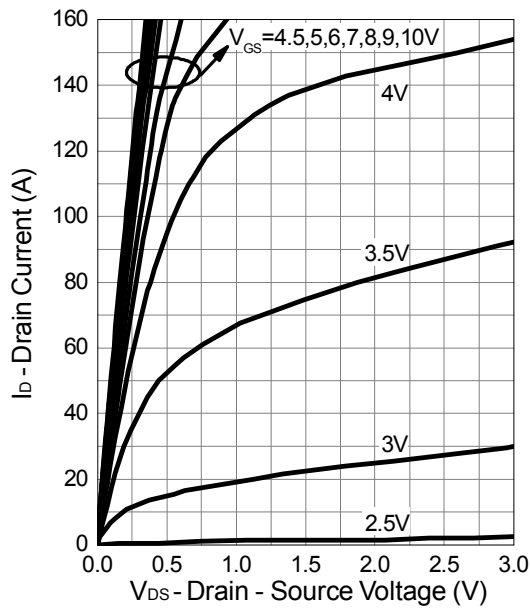
Safe Operation Area



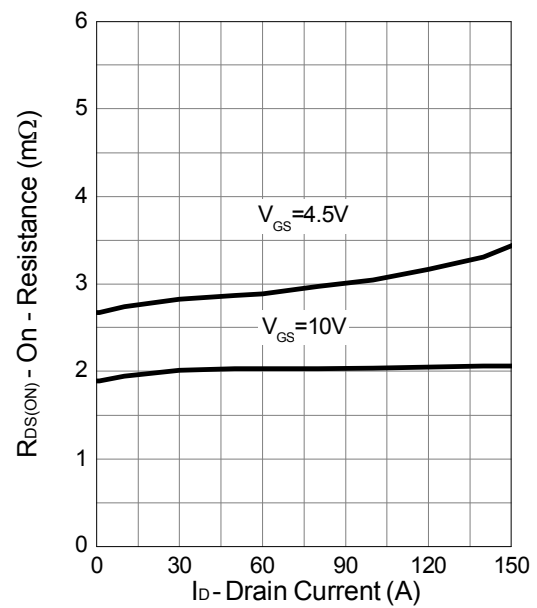
Thermal Transient Impedance



Output Characteristics

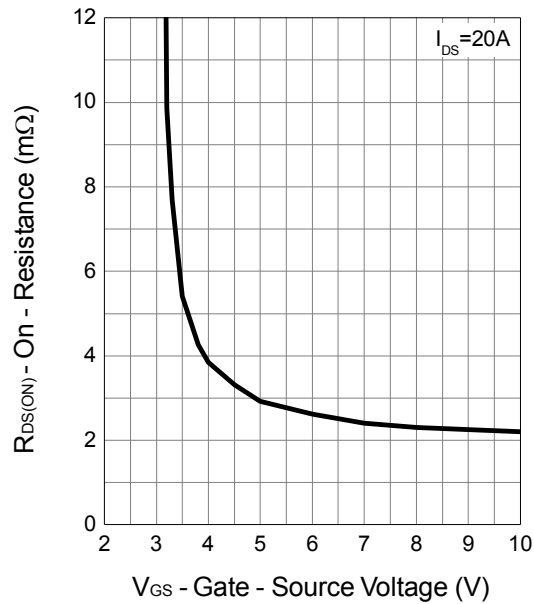


Drain-Source On Resistance

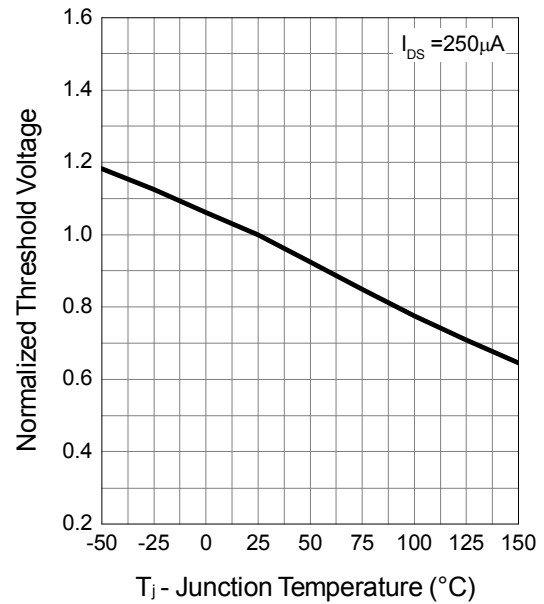


Typical Operating Characteristics (Cont.)

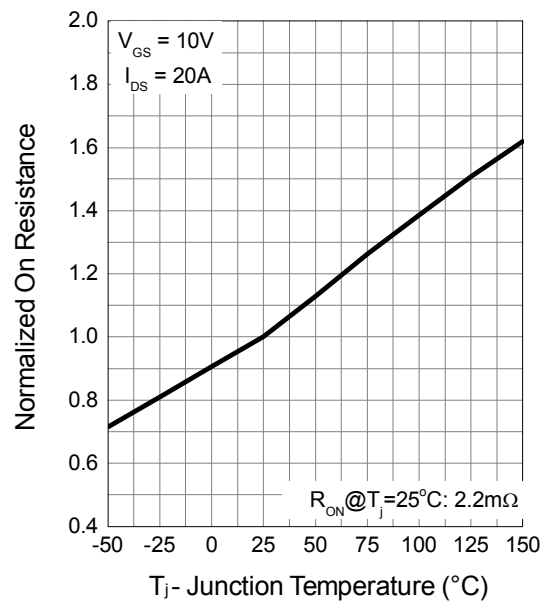
Gate-Source On Resistance



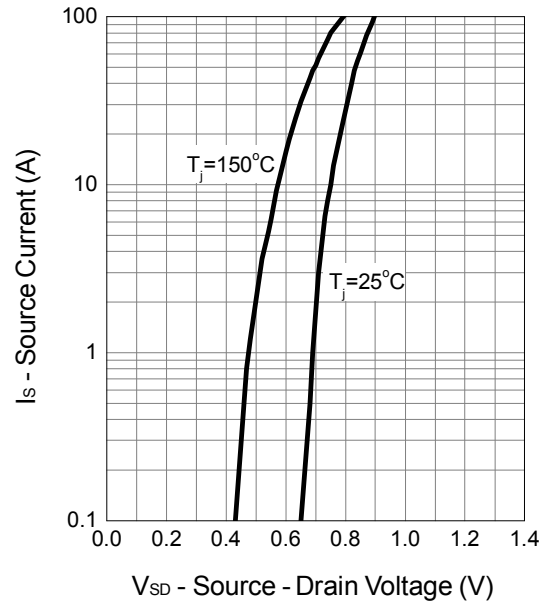
Gate Threshold Voltage



Drain-Source On Resistance

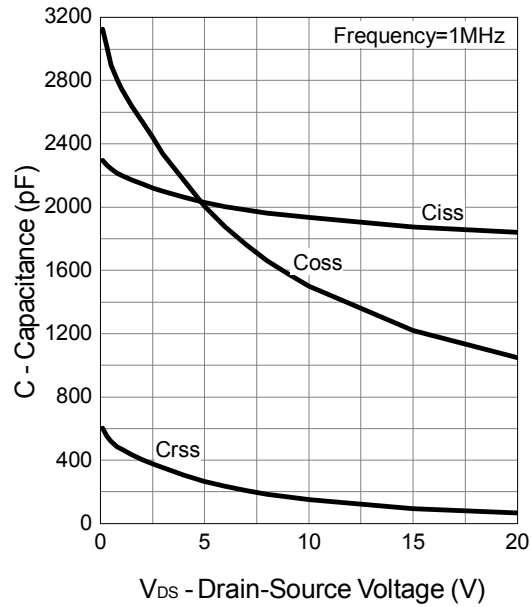


Source-Drain Diode Forward

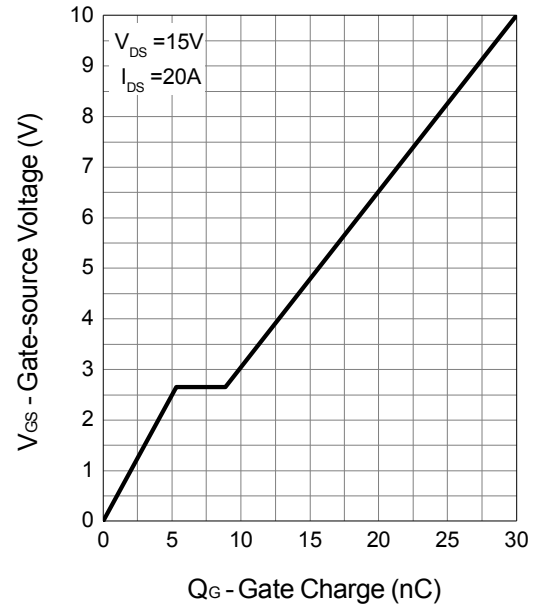


Typical Operating Characteristics (Cont.)

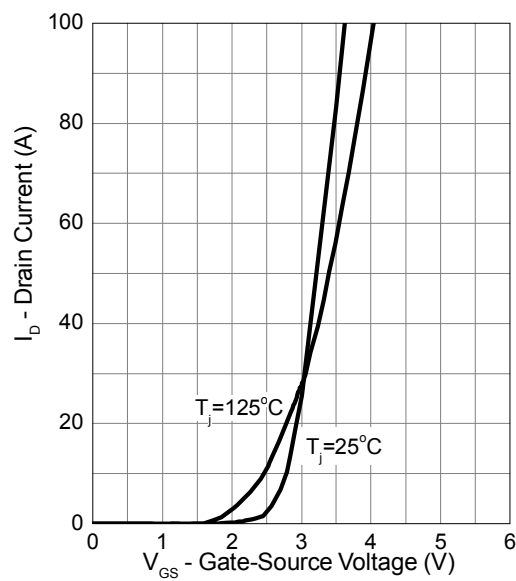
Capacitance



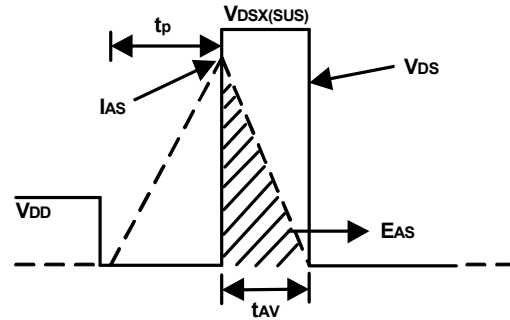
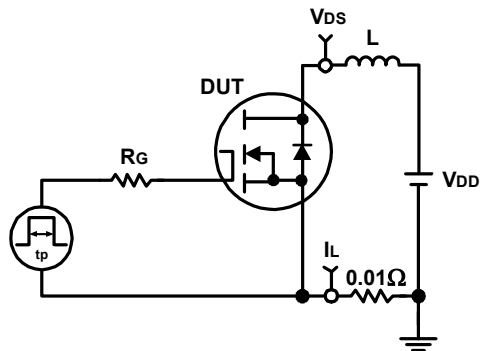
Gate Charge



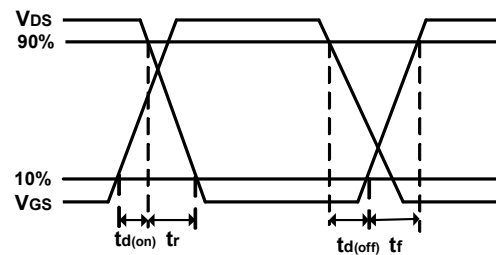
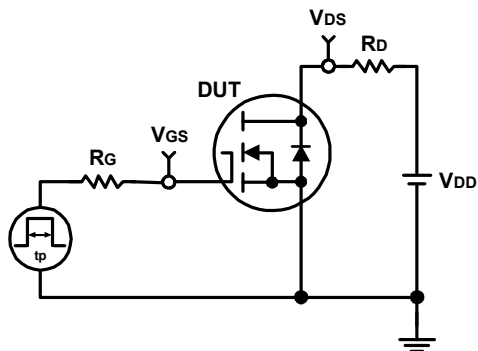
Transfer Characteristics



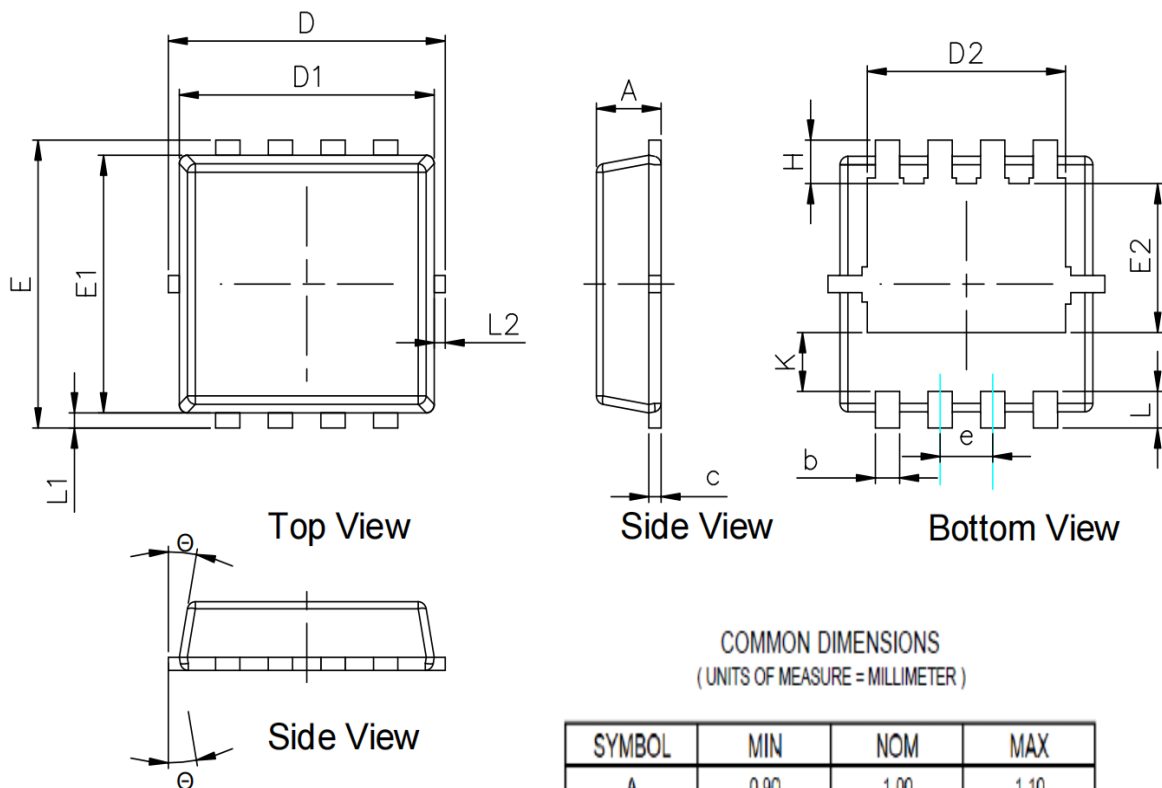
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package Outlines



COMMON DIMENSIONS
(UNITS OF MEASURE = MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	-	-	5.1
D1	4.85	4.90	4.95
D2	3.96	4.01	4.06
e	1.27 BSC		
E	5.95	6.00	6.05
E1	5.70	5.75	5.80
E2	3.425	3.475	3.525
H	0.60	0.65	0.70
K	1.29	-	-
L	0.60	0.65	0.70
L1	0.05	0.15	0.25
L2	-	-	0.12
θ	8°	10°	12°
P	1.05	1.10	1.15