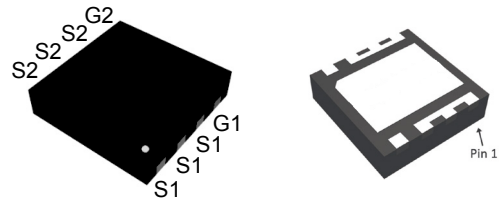


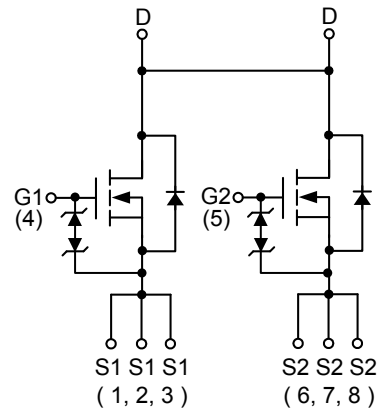
Features

- 20V/30A
 - $R_{DS(ON)}=5m\Omega(\text{typ.})@V_{GS}=4.5V$
 - $R_{DS(ON)}=6m\Omega(\text{typ.})@V_{GS}=2.5V$
- 100% UIS + R_g Tested
- ESD Protection
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description



TDFN3x3



N-Channel MOSFET

Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.
- One Cell Li-ion Battery Pack.

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

Symbol	Parameter		Rating	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		± 12	
T_J	Maximum Junction Temperature		150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		-55 to 150	
I_S	Diode Continuous Forward Current	$T_A=25^\circ\text{C}$	30	A
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$	30	A
		$T_A=70^\circ\text{C}$	24	
I_{DM}^b	Pulsed Drain Current	$T_A=25^\circ\text{C}$	60	
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$	1.9	W
		$T_A=70^\circ\text{C}$	1.2	
$R_{\theta JA}^a$	Thermal Resistance-Junction to Ambient	$t \leq 10\text{s}$	35	$^\circ\text{C/W}$
		Steady state	65	
I_{AS}^c	Avalanche Current, Single pulse	$L=0.1\text{mH}$	21	A
E_{AS}^c	Avalanche Energy, Single pulse	$L=0.1\text{mH}$	22	mJ

Note a : Surface mounted on 1in^2 pad area, steady state $t = 999\text{s}$.

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

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)

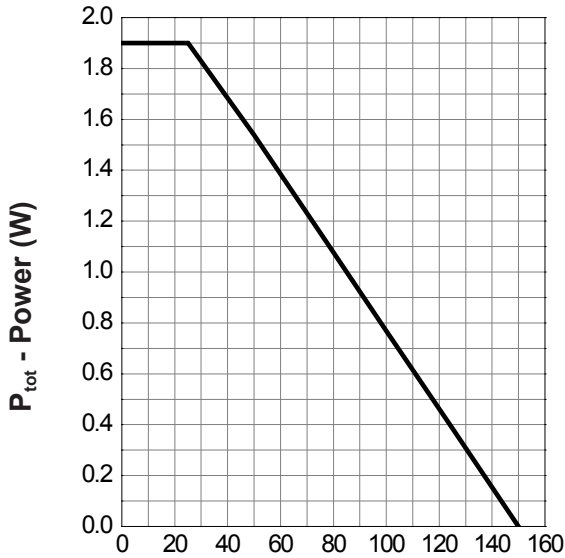
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=16V, V_{GS}=0V$ $T_J=85^\circ\text{C}$	-	-	1	μA
			-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	0.5	0.75	1.0	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 10	μA
$R_{DS(ON)}^d$	Drain-Source On-state Resistance	$V_{GS}=4.5V, I_{DS}=3A$	-	5	8	m Ω
		$V_{GS}=2.5V, I_{DS}=3A$	-	6	9	
Gfs	Forward Transconductance	$V_{DS}=5V, I_{DS}=3A$	-	18.5	-	S
Diode Characteristics						
V_{SD}^d	Diode Forward Voltage	$I_{SD}=1A, V_{GS}=0V$	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	$I_{SD}=3A, di_{SD}/dt=100A/\mu s$	-	300	-	ns
t_a	Charge Time		-	110	-	
t_b	Discharge Time		-	190	-	
Q_{rr}	Reverse Recovery Charge		-	930	-	
Dynamic Characteristics ^e						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	9	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=10V,$ Frequency=1.0MHz	-	1580	2054	pF
C_{oss}	Output Capacitance		-	260	-	
C_{riss}	Reverse Transfer Capacitance		-	170	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=10V, R_L=10\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	-	10.6	20	ns
t_r	Turn-on Rise Time		-	16.3	30	
$t_{d(OFF)}$	Turn-off Delay Time		-	850	1530	
t_f	Turn-off Fall Time		-	355	639	
Gate Charge Characteristics ^e						
Q_g	Total Gate Charge	$V_{DS}=10V, V_{GS}=10V,$ $I_{DS}=3A$	-	35	49	nC
Q_g	Total Gate Charge		-	17	23.8	
Q_{gth}	Threshold Gate Charge	$V_{DS}=10V, V_{GS}=4.5V,$ $I_{DS}=3A$	-	1.3	-	
Q_{gs}	Gate-Source Charge		-	2.4	-	
Q_{gd}	Gate-Drain Charge		-	4.2	-	

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

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

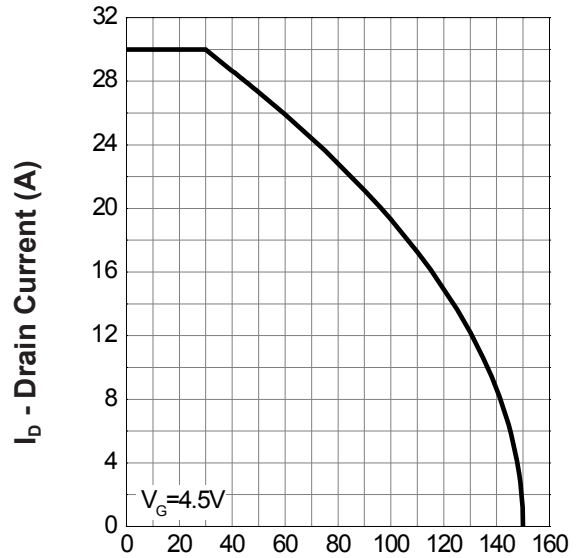
Typical Operating Characteristics

Power Dissipation



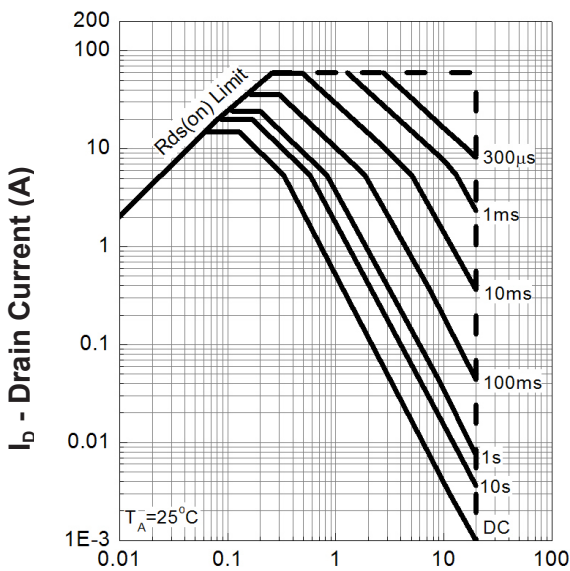
T_A - Ambient Temperature ($^{\circ}C$)

Drain Current



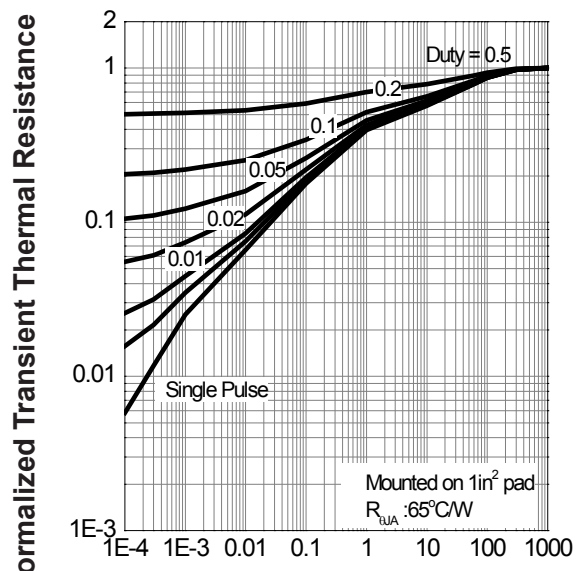
T_A - Ambient Temperature ($^{\circ}C$)

Safe Operation Area



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

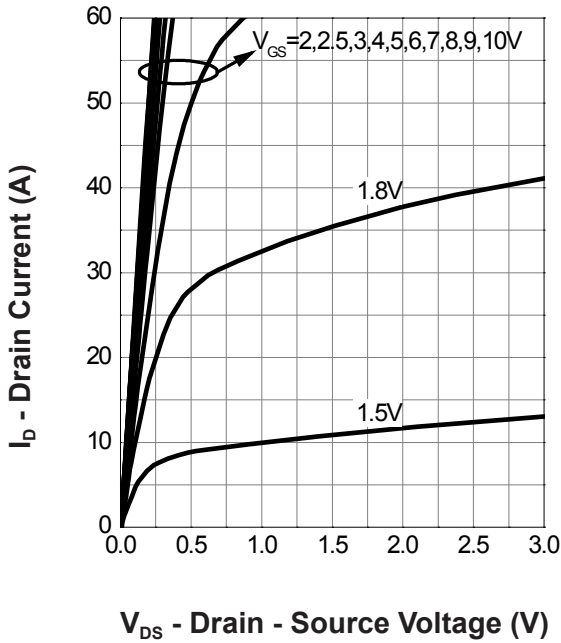
Thermal Transient Impedance



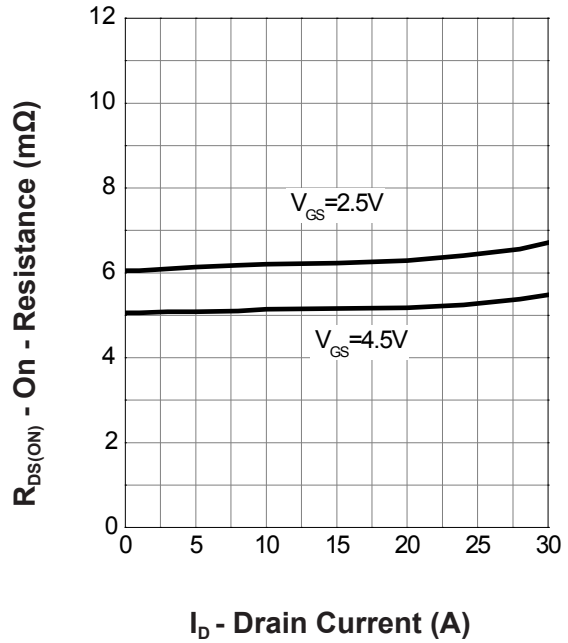
Square Wave Pulse Duration (sec)

Typical Operating Characteristics(Cont.)

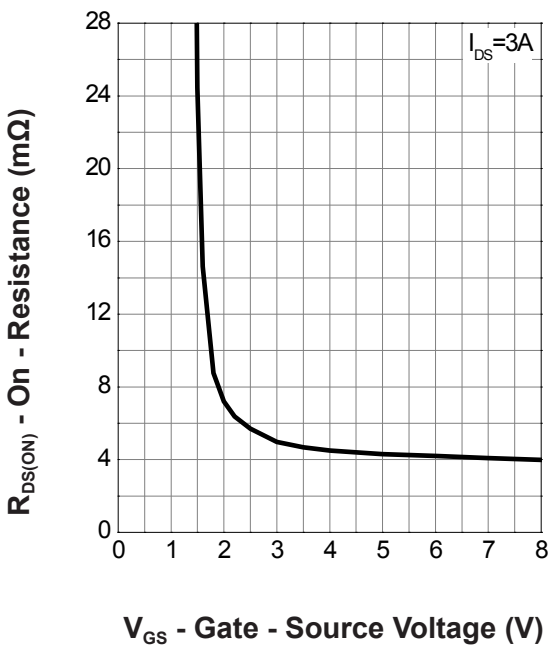
Output Characteristics



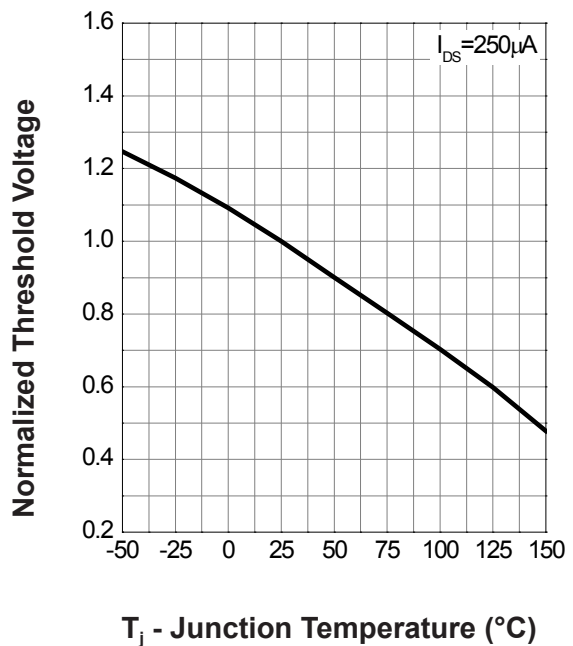
Drain-Source On Resistance

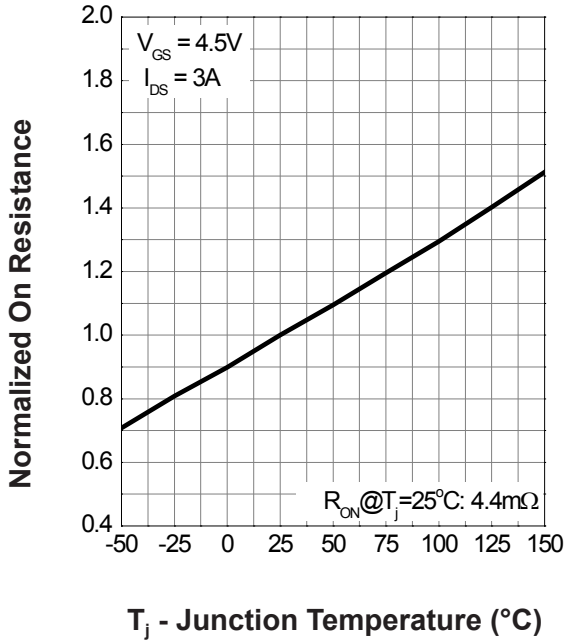
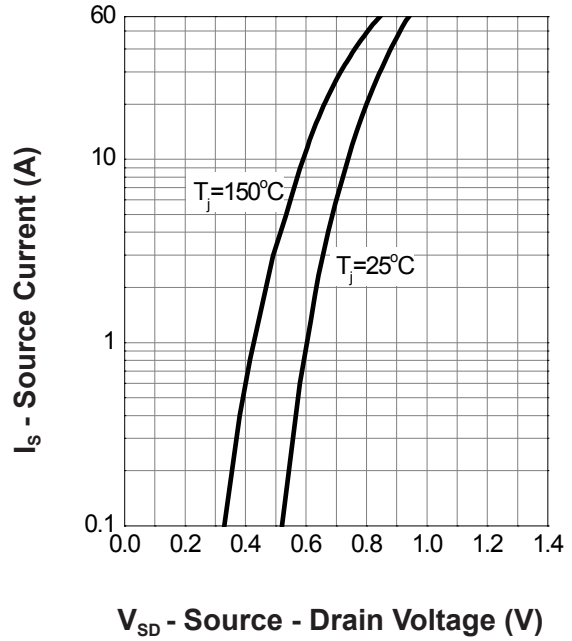
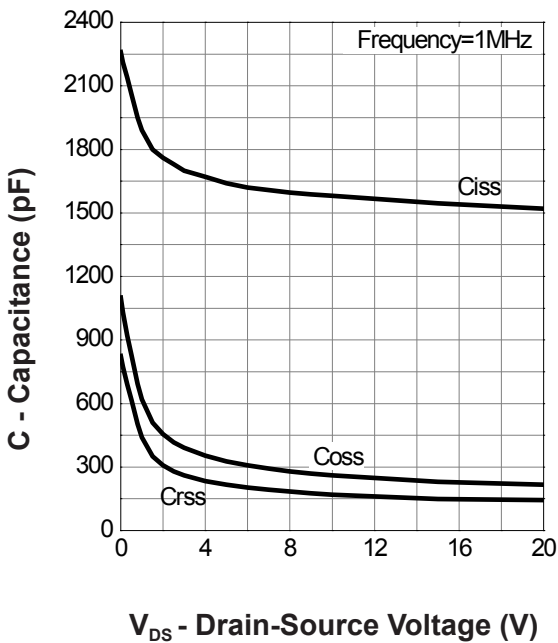
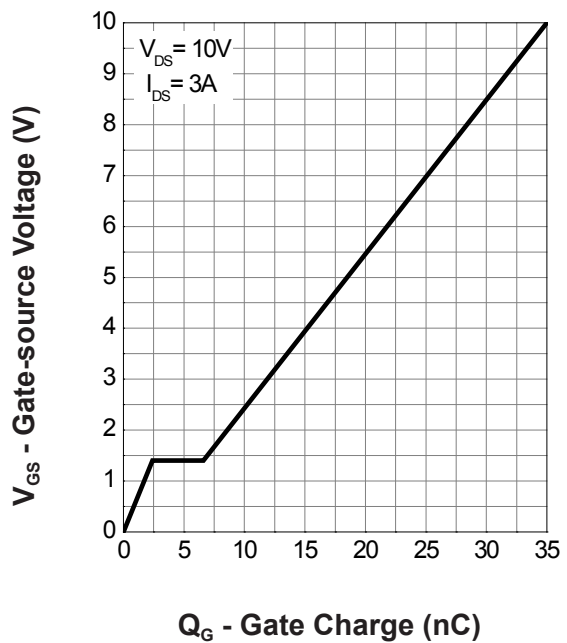


Gate-Source On Resistance

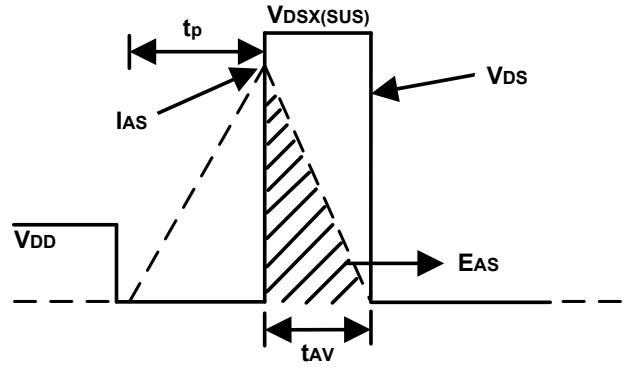
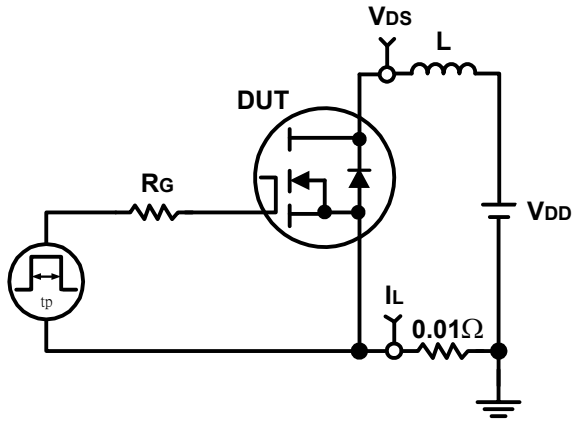


Gate Threshold Voltage

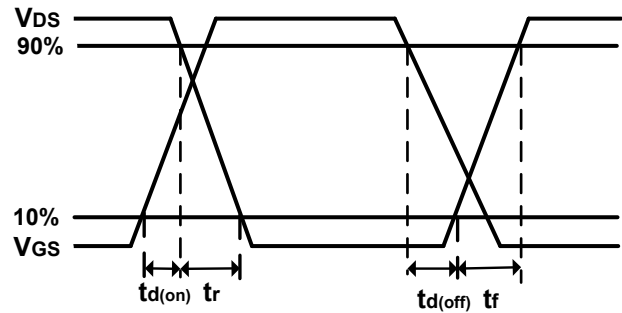
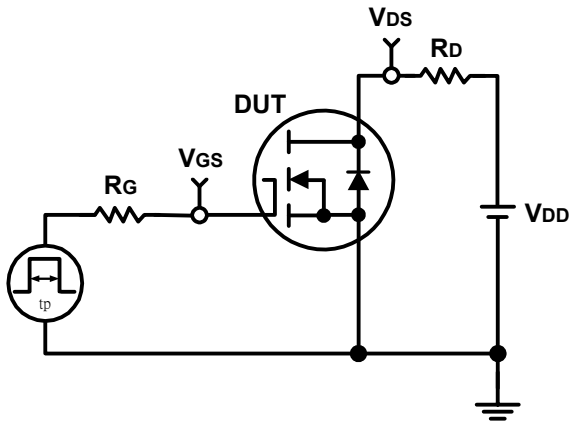


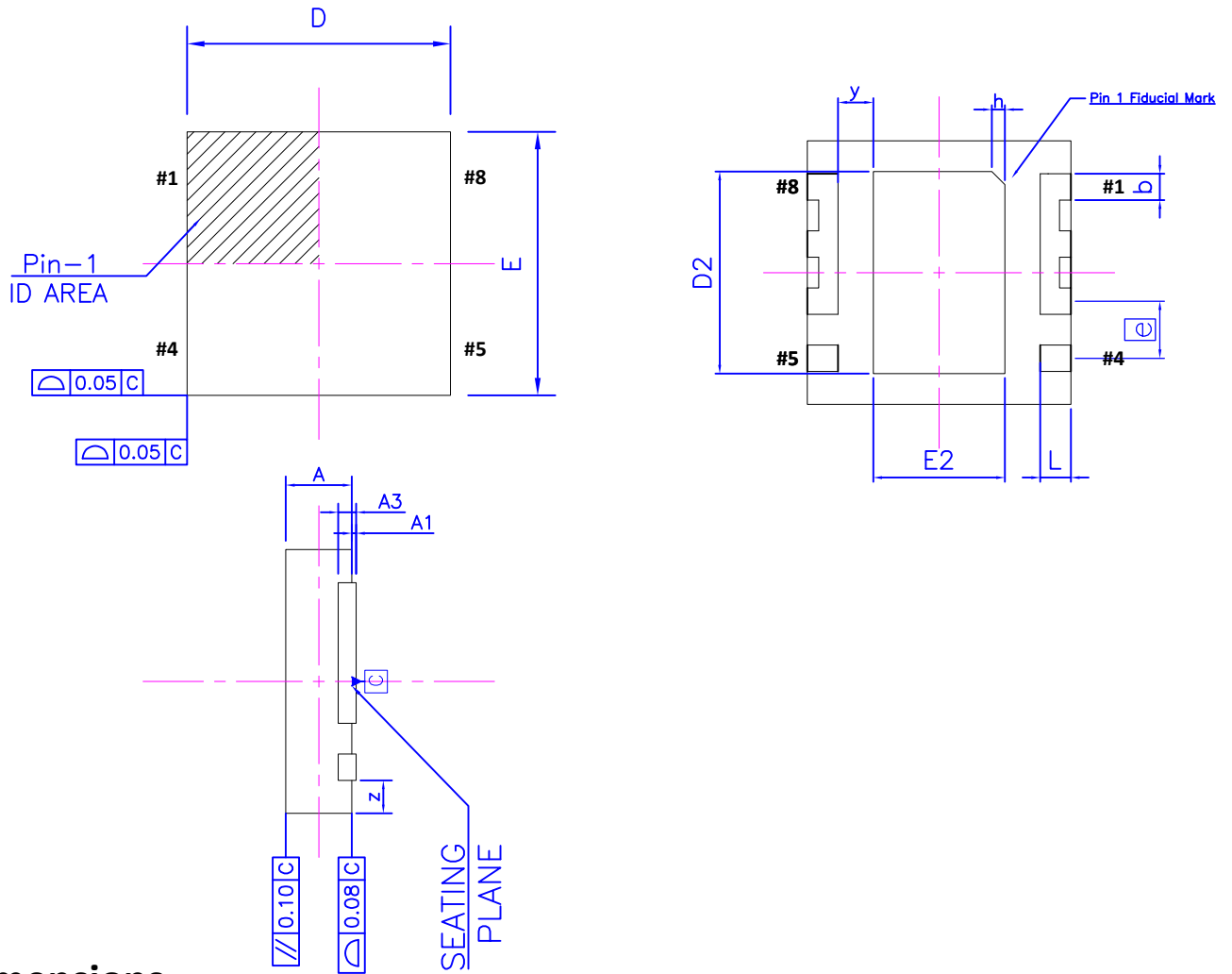
Typical Operating Characteristics(Cont.)
Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Package Information

Dimensions

Unit	D	E	D2	E2	A	A1	A3	b	e	h	L	y	z
mm	3.07 (3.00) 2.95	3.07 (3.00) 2.95	2.35 (2.30) 2.25	1.60 (1.50) 1.40	0.80 (0.75) 0.70	0.05 (0.02) 0.00	0.203 REF	0.35 (0.30) 0.25	0.65 BSC	0.15 REF	0.45 (0.35) 0.25	0.400 REF	0.375 REF