

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ✓ Advanced trench cell design
- ✓ Low Thermal Resistance

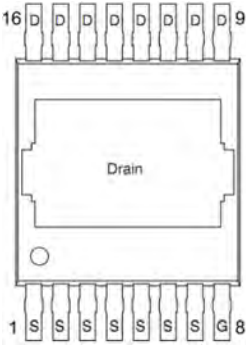
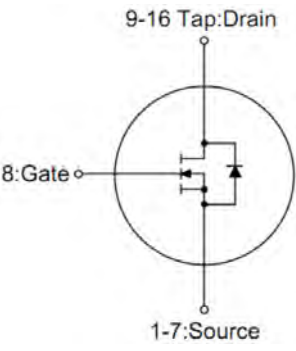
1.2 Applications

- ✓ Motor drivers
- ✓ DC - DC Converter

1.3 Quick reference

- ✓ $BV \geq 200\text{ V}$
- ✓ $P_{tot} \leq 375\text{ W}$
- ✓ $I_D \leq 165\text{ A}$
- ✓ $R_{DS(ON)} \leq 6.5\text{ m}\Omega @ V_{GS} = 10\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
8	Gate(G)	 Top View TOLT	
1,2,3,4,5,6,7	Source(S)		
9,10,11,12,13,14,15,16	Drain(D)		
Tap	Drain(D)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	200	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current (DC)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	165	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	118	A
$I_{DM}^{*,**}$	Drain Current (Pulsed)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	660	A
P_{tot}^*	Total Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	375	W
T_{stg}	Storage Temperature		- 55	175	$^{\circ}\text{C}$
T_J	Junction Temperature		-	175	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	165	A
E_{AS}^*	Single Pulsed Avalanche Energy	$V_{DD} = 50\text{ V}, L = 1\text{ mH}$	-	3612	mJ
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	36	$^{\circ}\text{C} / \text{W}$
$R_{\theta JC}^*$	Thermal Resistance- Junction to Case		-	0.4	

Notes :

* Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$

** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

4. Marking Information

Product Name	Marking
UP06N20LT	06N20 AYWW01 XXXXXX AYWW01: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP06N20LT	TOLT	-	-	2000	-

6. Electrical Characteristics (T_A = 25 °C Unless Otherwise Noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = 250 μA	200	-	-	V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	Reference to 25°C , I _{DS} = 5 mA	-	0.133	-	V/°C
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	3	-	5	V
I _{DSS}	Drain Leakage Current	V _{DS} = 160 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = 10 V, I _{DS} = 30 A	-	5.5	6.5	m Ω
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 30 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} = 30 A, V _{GS} = 0 V dI _{SD} /dt = 100 A/μs	-	181	-	nS
Q _{rr}	Reverse Recovery Charge		-	1215	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 100 V Frequency = 1 MHz	-	15305	-	pF
C _{oss}	Output Capacitance		-	970	-	
C _{rss}	Reverse Transfer Capacitance		-	90	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 100 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 3.3 Ω, I _{DS} = 30 A	-	40	-	nS
t _r	Turn-on Rise Time		-	113	-	
t _{d(off)}	Turn-off Delay Time		-	135	-	
t _f	Turn-off Fall Time		-	118	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = 100 V, V _{GS} = 10 V, I _{DS} = 30 A	-	314	-	nC
Q _{gs}	Gate-Source Charge		-	107	-	
Q _{gd}	Gate-Drain Charge		-	38	-	

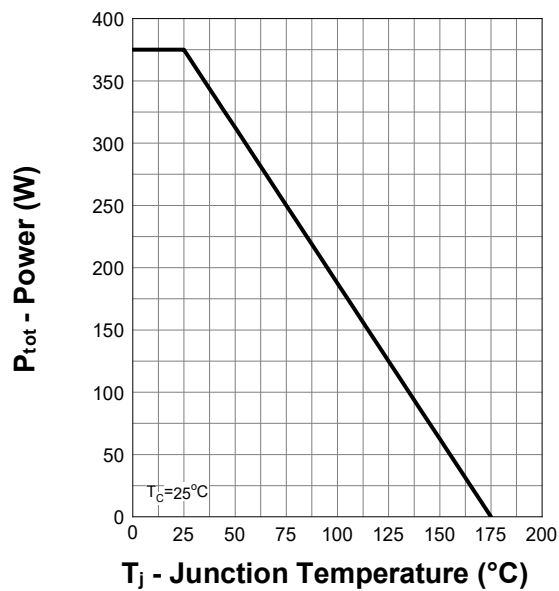
Notes :

a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%

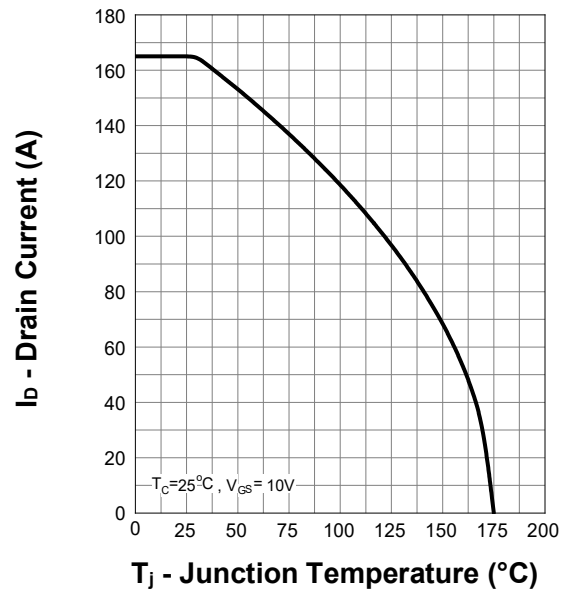
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

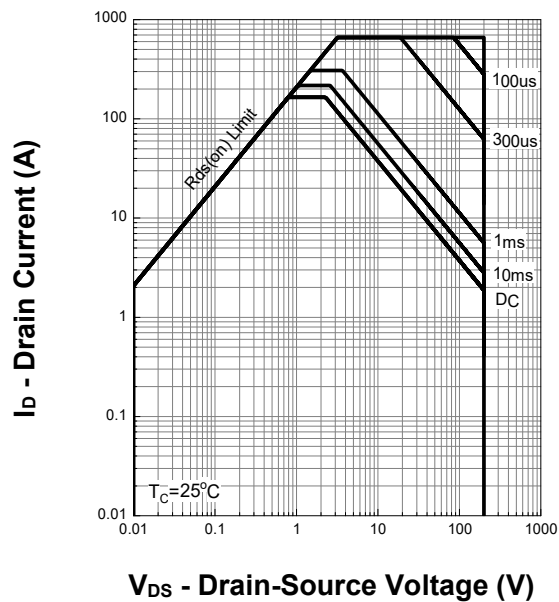
Power Capability



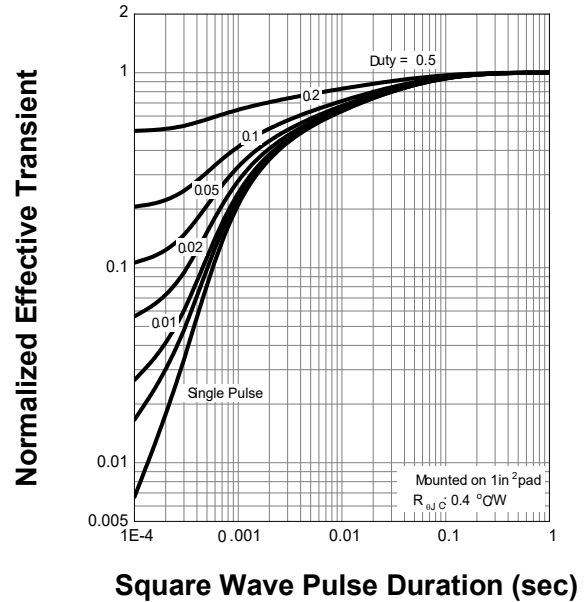
Current Capability



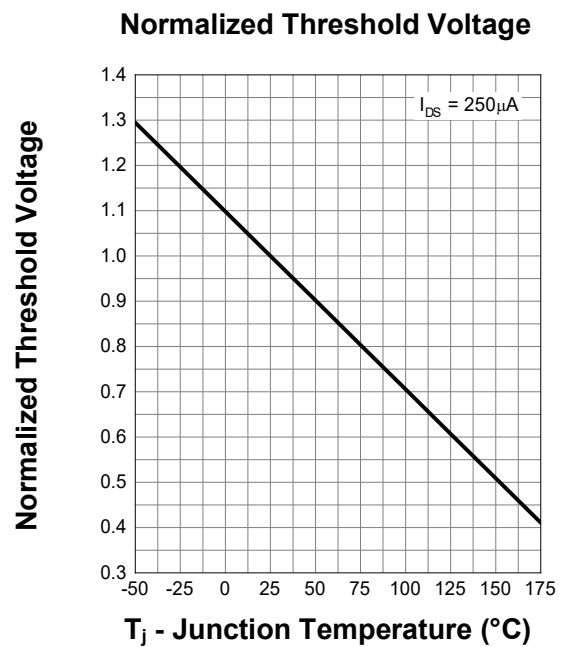
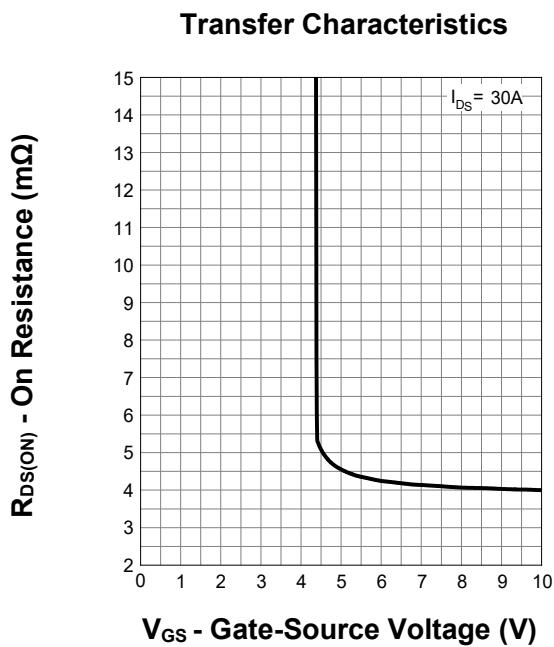
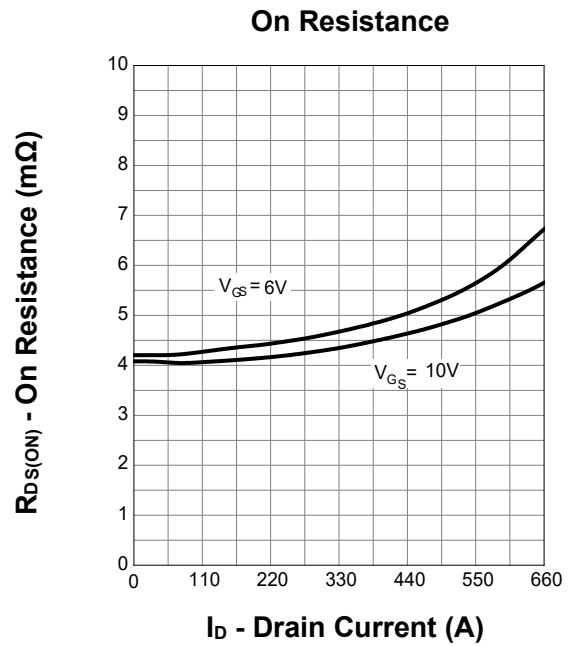
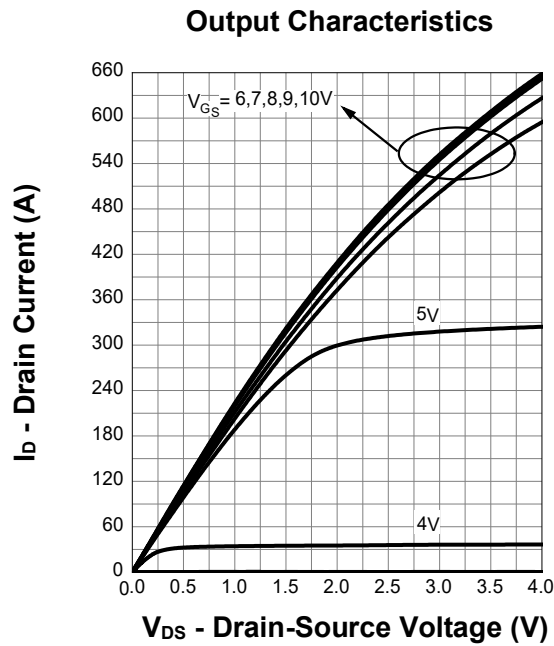
Safe Operating Area



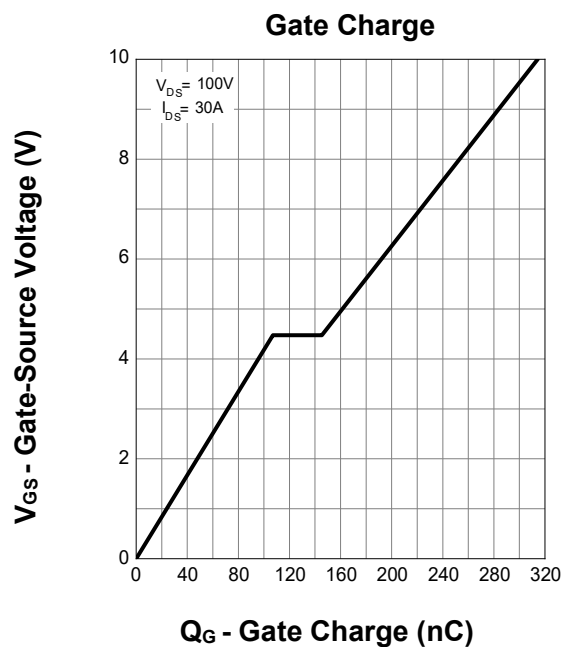
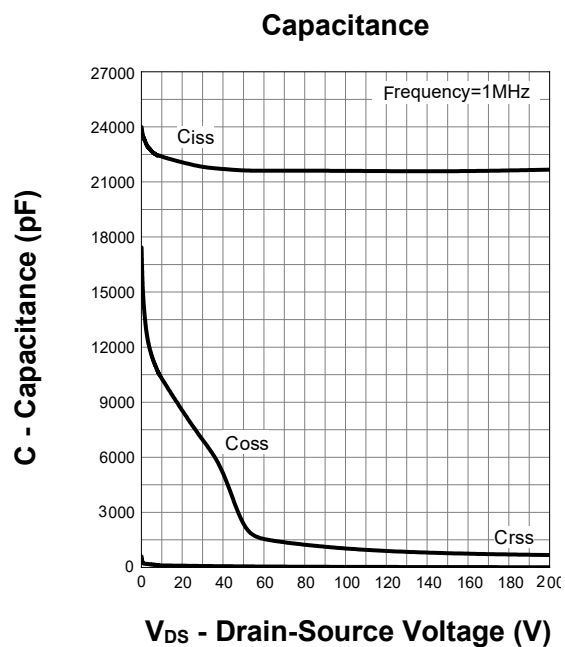
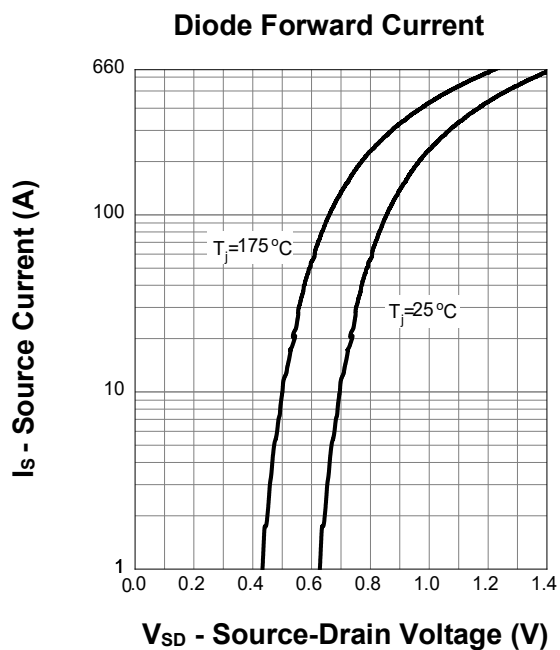
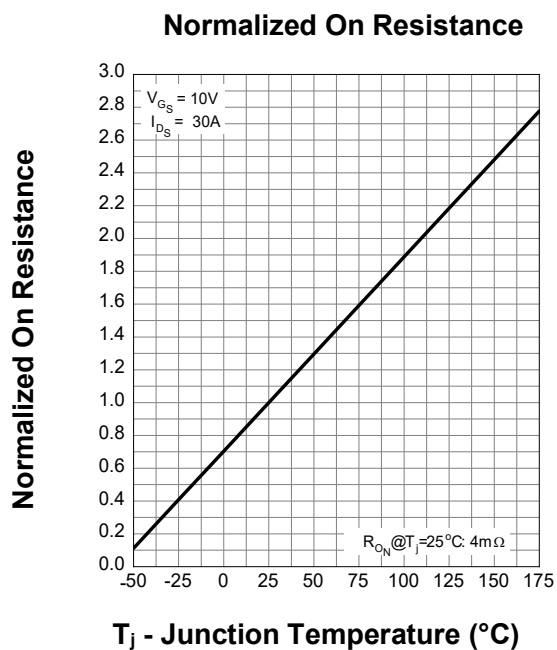
Transient Thermal Impedance



7. Typical Characteristics (cont.)

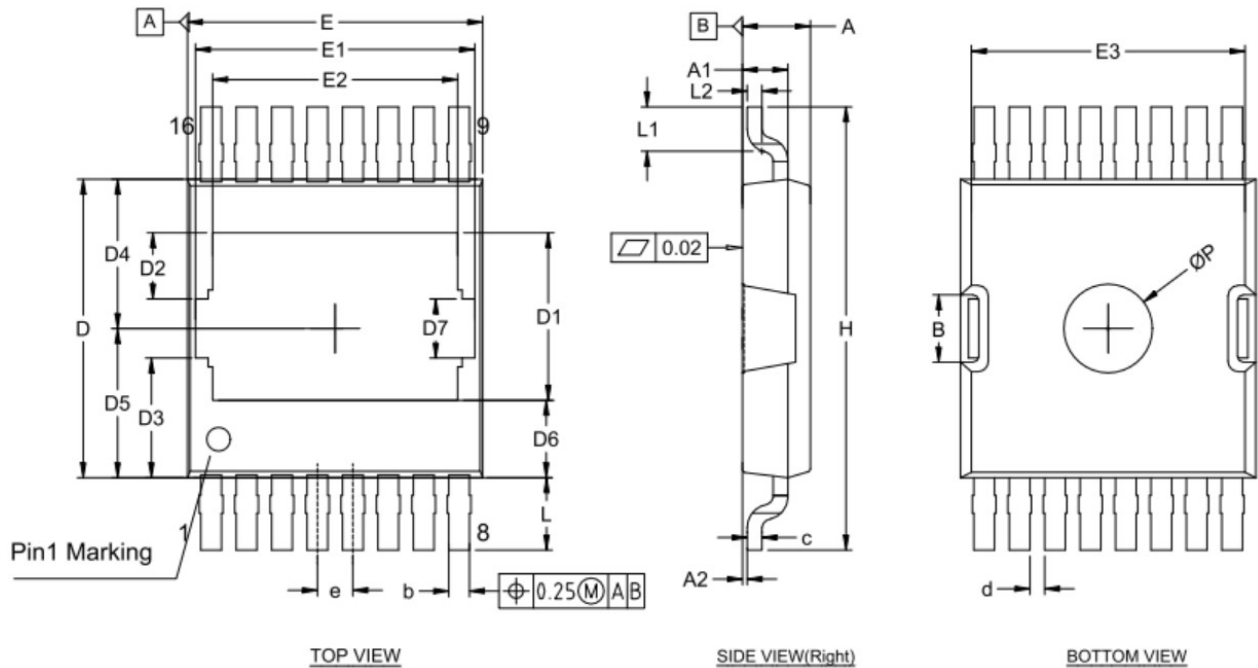


7. Typical Characteristics (cont.)



8. Package Dimensions

TOLT Package



Symbol	Dimensions In Millimeters		
	MIN.	NOM.	MAX.
A	2.250	2.300	2.350
A1	1.440	1.540	1.640
A2	0.010	-	0.160
b	0.600	0.700	0.800
c	0.400	0.500	0.600
d	0.400	0.500	0.600
e	1.200 BSC		
D	10.000	10.100	10.300
D1	5.470	5.670	5.870
D2	2.040	2.240	2.440
D3	4.050 REF.		
D4	5.050 REF.		
D5	5.050 REF.		
D6	2.620 REF.		
D7	2.000 REF.		

Symbol	Dimensions In Millimeters		
	MIN.	NOM.	MAX.
E	9.700	10.000	10.100
E1	9.460 REF.		
E2	8.100	8.300	8.500
E3	9.070	9.270	9.470
H	14.800	15.000	15.200
L	2.250	2.450	2.650
L1	1.350	1.500	1.650
L2	0.500 BSC		
Øp	2.900	3.000	3.100
B	0.812	2.280	1.212
θ	1°	3°	5°
θ 1	6°	7°	8°