N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Advanced trench cell design

1.2 Applications

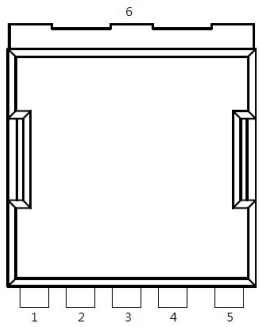
- ☑ LCD TV appliances
- ☑ LCDM appliances
- ☑ High power inverter system

1.3 Quick reference

- ☑ BV ≧ 100 V
- ☑ P_{tot} ≦ 365 W
- ☑ I_D ≦ 250 A
- ☑ $R_{DS(ON)}$ ≦ 2.2 mΩ @ V_{GS} = 10 V
- ☑ $R_{DS(ON)}$ ≦ 4.0 mΩ @ V_{GS} = 6 V

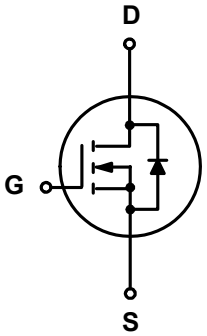
2. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3,4	Source(S)		
5	Gate(G)		
6	Drain(D)		



Top View

sTOLL



3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	100	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 20	V
I_D*	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 10 V	-	250	A
		T_C = 100 ℃, V_{GS} = 10 V	-	177	A
I_{DM}*,**	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 10 V	-	1000	A
P_{tot}	Drain power dissipation	T_C = 25 ℃	-	365	W
T_{stg}	Storage Temperature		- 55	175	℃
T_J	Junction Temperature		-	175	℃
I_S	Continuous-Source Current	T_C = 25 ℃	-	250	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD} = 50 V , L = 1.0 mH	-	1404	mJ
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	47	℃/W
$R_{\theta JC}$	Thermal Resistance- Junction to Case		-	0.41	

Notes：

* Surface Mounted on 1 in^2 pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

*** Limited by bonding wire

4. Marking Information

Product Name	Marking
US022N10ST	022N10 YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
US022N10ST	sTOLL			2000	

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

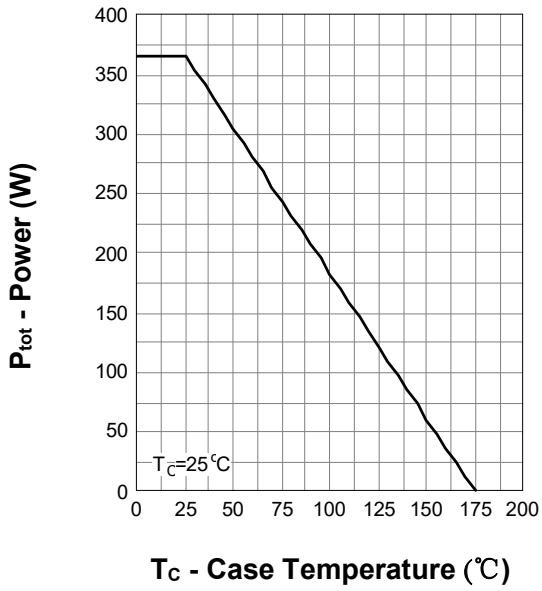
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 250 μA	100	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = 250 μA	2	-	4	V
I_{DSS}	Drain Leakage Current	V_{DS} = 80 V, V_{GS} = 0 V	-	-	1	μA
I_{GSS}	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} = 50 A	-	2.0	2.2	mΩ
		V_{GS} = 6 V, I_{DS} = 30 A	-	3.3	4.0	
Diode Characteristics						
V_{SD}[a]	Diode Forward Voltage	I_{SD} = 50 A, V_{GS} = 0 V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_{DS} = 50 A, V_{GS} = 0 V dI_{SD}/dt = 100 A/μs	-	97	-	nS
Q_{rr}	Reverse Recovery Charge		-	138	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 50 V Frequency = 1 MHz	-	6237	-	pF
C_{oss}	Output Capacitance		-	1064	-	
C_{rss}	Reverse Transfer Capacitance		-	15	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 50 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L = 1 Ω, I_{DS} = 50 A	-	28	-	nS
t_r	Turn-on Rise Time		-	69	-	
t_d(off)	Turn-off Delay Time		-	72	-	
t_f	Turn-off Fall Time		-	51	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS} = 50 V, V_{GS} = 10 V, I_{DS} = 50 A	-	118	-	nC
Q_{gs}	Gate-Source Charge		-	35	-	
Q_{gd}	Gate-Drain Charge		-	38	-	

Notes :

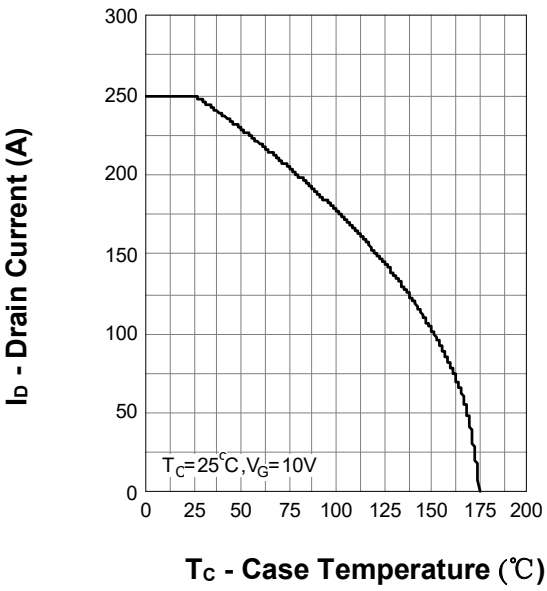
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

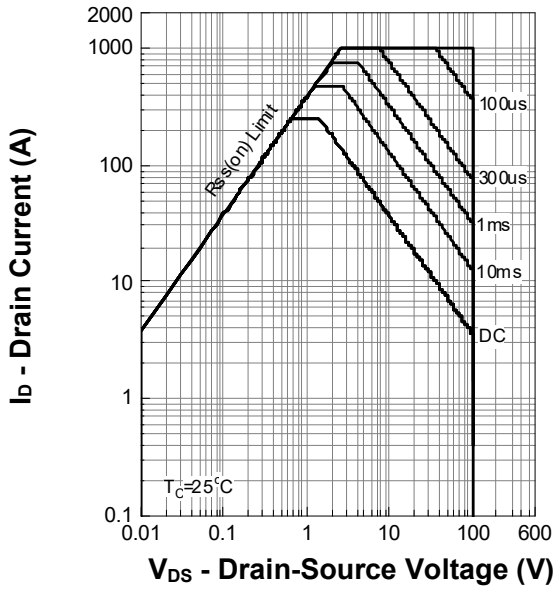
Power Capability



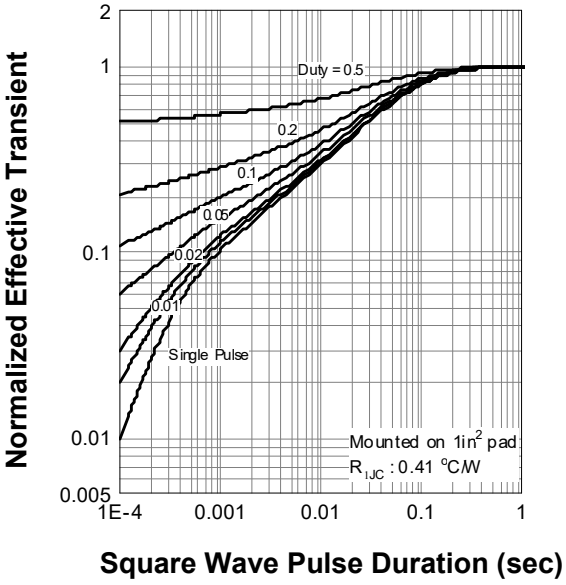
Current Capability



Safe Operation Area

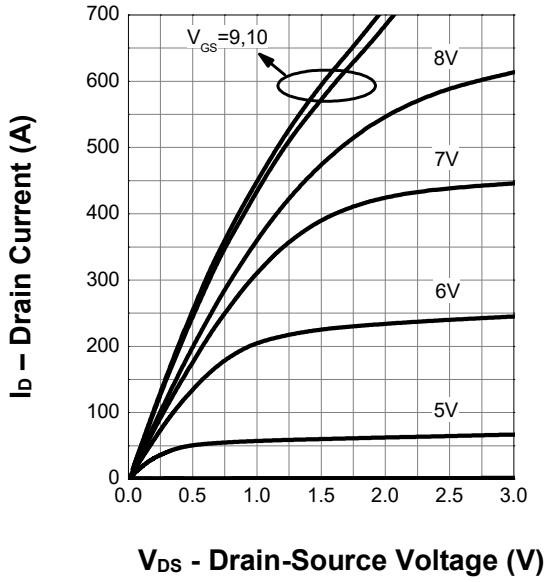


Thermal Transient Impedance

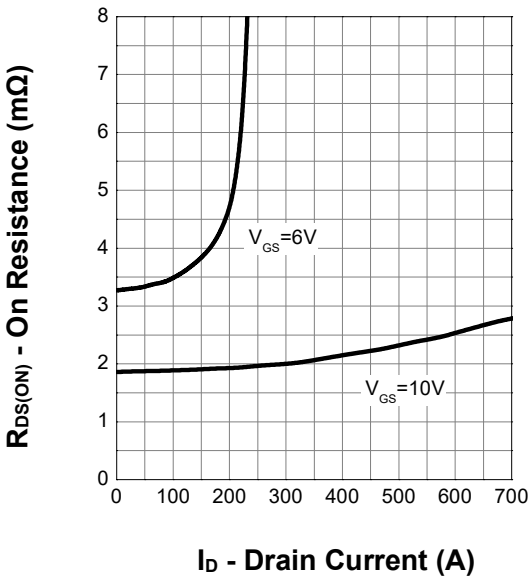


7. Typical Characteristics (cont.)

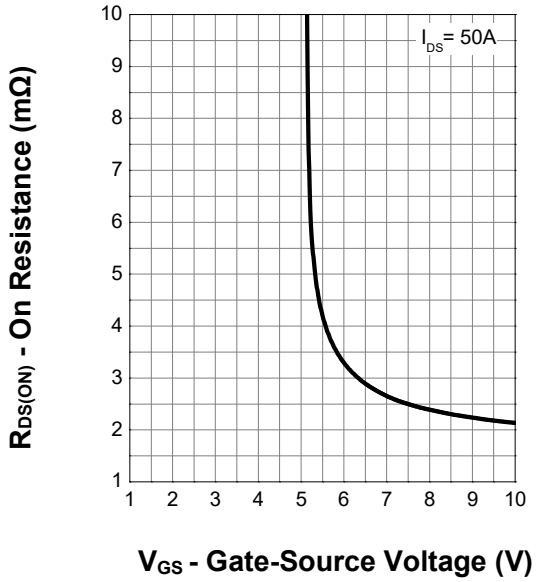
Output Characteristics



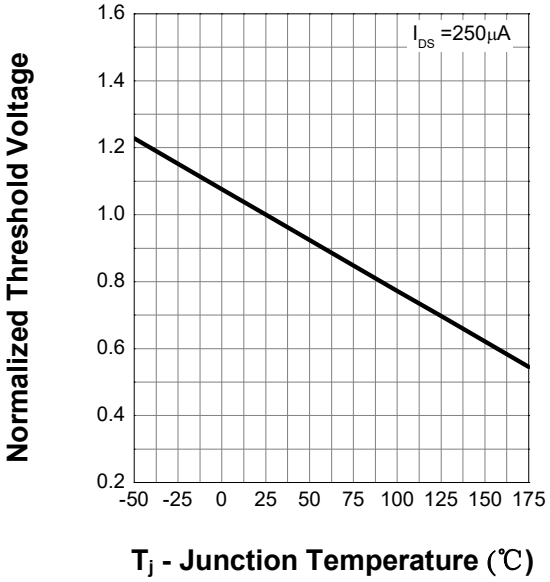
Drain-Source On Resistance



Transfer Characteristics

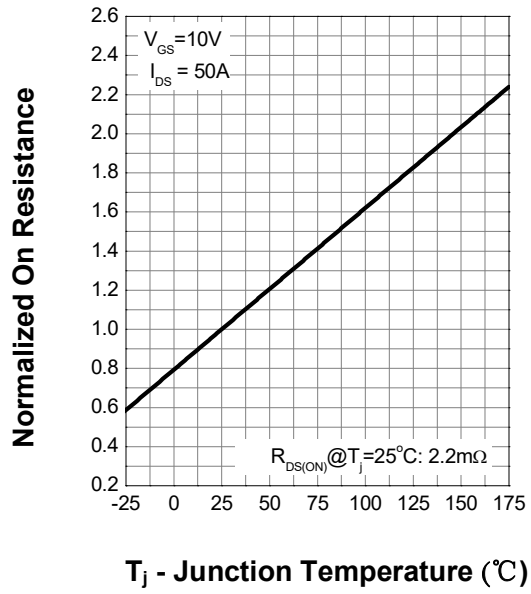


Gate Threshold Voltage

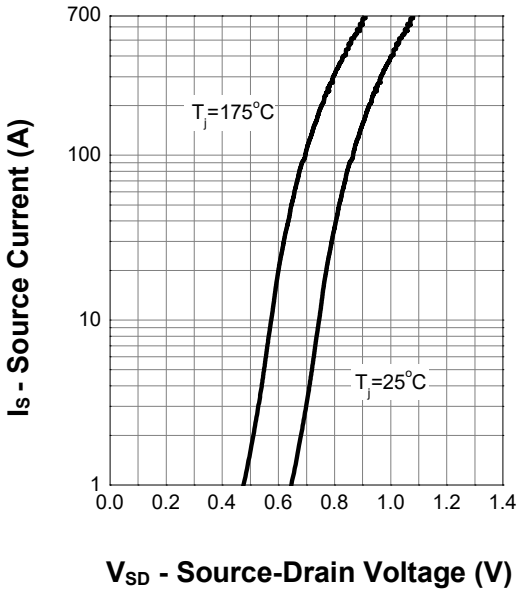


7. Typical Characteristics (cont.)

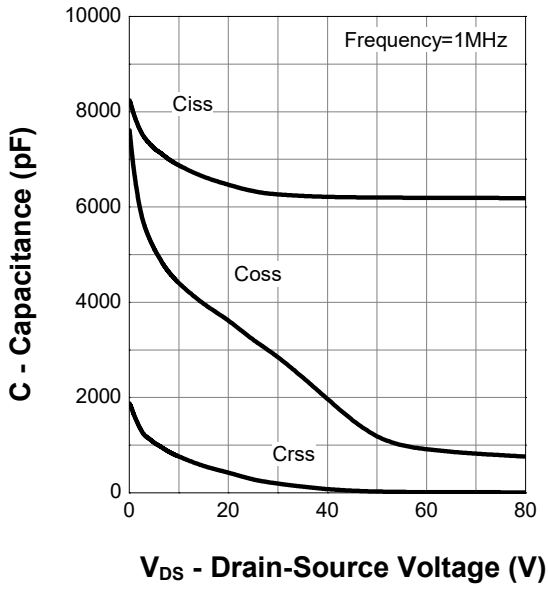
Drain-Source On Resistance



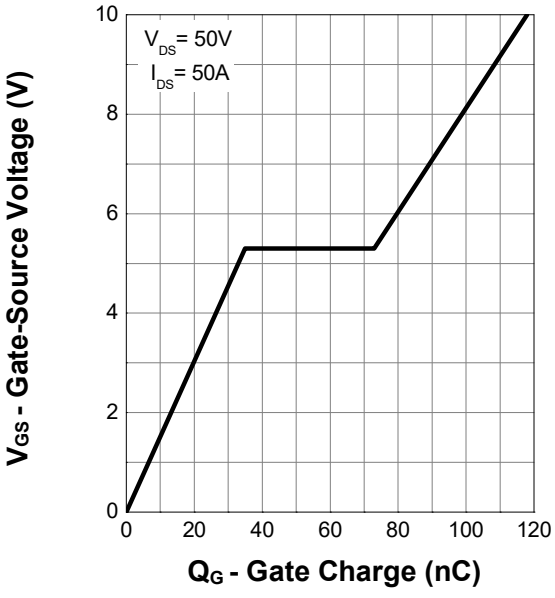
Body Diode Characteristics



Capacitance

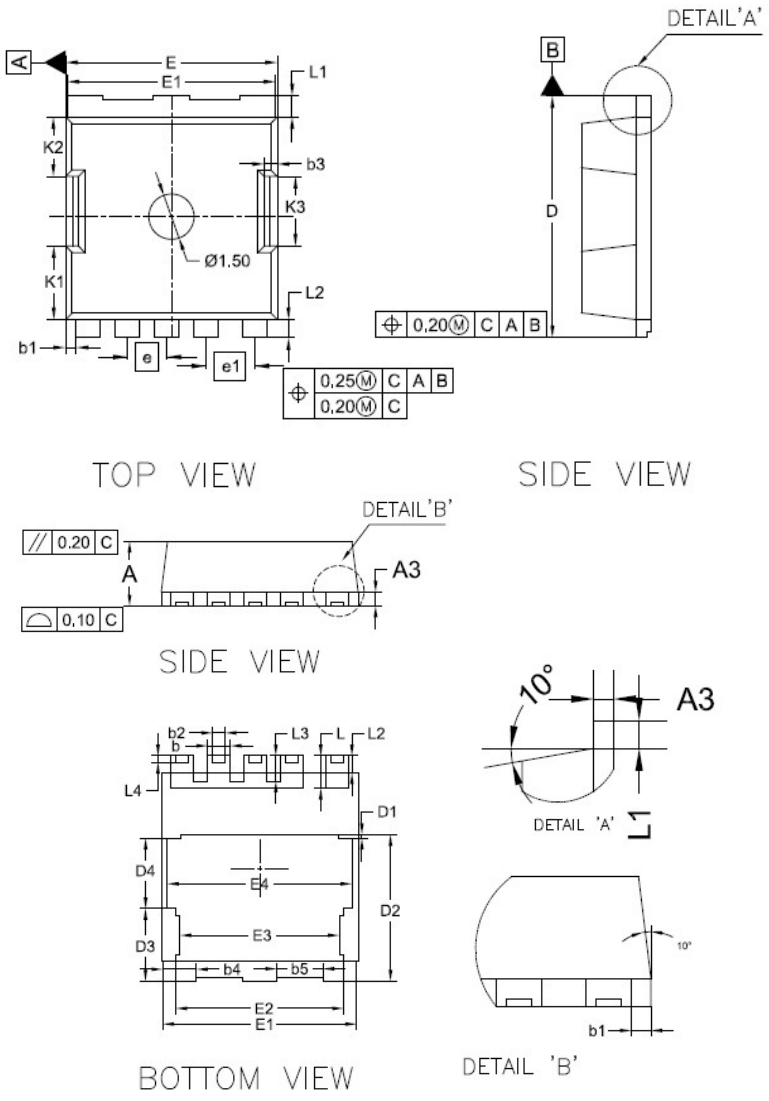


Gate Charge



8. Package Dimensions

sTOLL Package



SYMBOS	DIMENSION IN MM		
	MIN	NOM	MAX
A	2.300	2.200	2.400
A3	0.490	0.500	0.508
D	7.900	8.000	8.100
E	6.900	7.000	7.100
e	1.30 BSC		
e1	1.60 BSC		
D1	0.130 ref		
D2	5.100	5.200	5.300
D3	2.470	2.570	2.670
D4	2.400	2.500	2.600
b	0.750	0.800	0.850
b1	0.350 ref		
b2	0.350	0.450	0.550
b3	0.425 ref		
b4	1.100	1.200	1.300
b5	1.550	1.650	1.750
L	1.050	1.150	1.250
L1	0.600	0.700	0.800
L2	0.500	0.600	0.700
L3	0.800	0.900	1.000
L4	0.135	0.235	0.335
E1	6.800	6.900	7.000
E2	5.860	5.960	6.060
E3	5.560	5.660	5.760
E4	6.460	6.560	6.660
K1	2.430 ref		
K2	1.970 ref		