

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ✓ Surface-mounted package
- ✓ Super Trench
- ✓ Advanced trench cell design
- ✓ MSL3

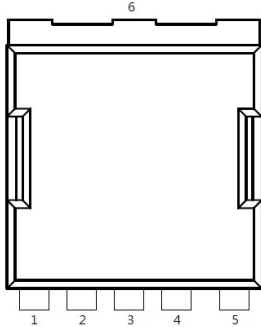
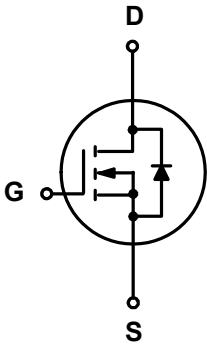
1.2 Applications

- ✓ BMS
- ✓ Drones
- ✓ High power inverter system
- ✓ Light electric vehicles

1.3 Quick reference

- ✓ $BV \geq 40\text{ V}$
- ✓ $P_{tot} \leq 174\text{ W}$
- ✓ $I_D \leq 350\text{ A}$
- ✓ $R_{DS(ON)} \leq 0.55\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ✓ $R_{DS(ON)} \leq 1.05\text{ m}\Omega @ V_{GS} = 6\text{ V}$

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		Rating	Unit
V _{DS}	Drain-Source Voltage		40	V
V _{GS}	Gate-Source Voltage		± 20	V
I _D Note3	Drain Current	T _C = 25 °C	350	A
		T _C = 100 °C	255	A
I _{DM} Note2	Pulsed Source Current	T _C = 25 °C	1400	A
I _S	Diode Forward Current	T _C = 25 °C	350	A
E _{AS}	Single Pulsed Avalanche Energy	L = 1.0mH	1860	mJ
P _{tot}	Total Power Dissipation	T _C = 25 °C	174	W
R _{θJA} Note1	Thermal Resistance- Junction to Ambient		48	°C / W
R _{θJC}	Thermal Resistance- Junction to Case		0.72	°C / W
T _{stg}	Storage Temperature		-55~150	°C
T _J	Junction Temperature		150	°C

Note 1 : Surface Mounted on 1 in² pad area, t ≤ 10 sec.

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

Note 3 : Limited by bonding wire.

4. Marking Information

Product Name	Marking
US005N04ST	AYWW01 005N04 XXXXXX XXXXXXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
US005N04ST	STOLL			2000	

6. Electrical Characteristics ($T_A=25^\circ$ Unless Otherwise Noted)

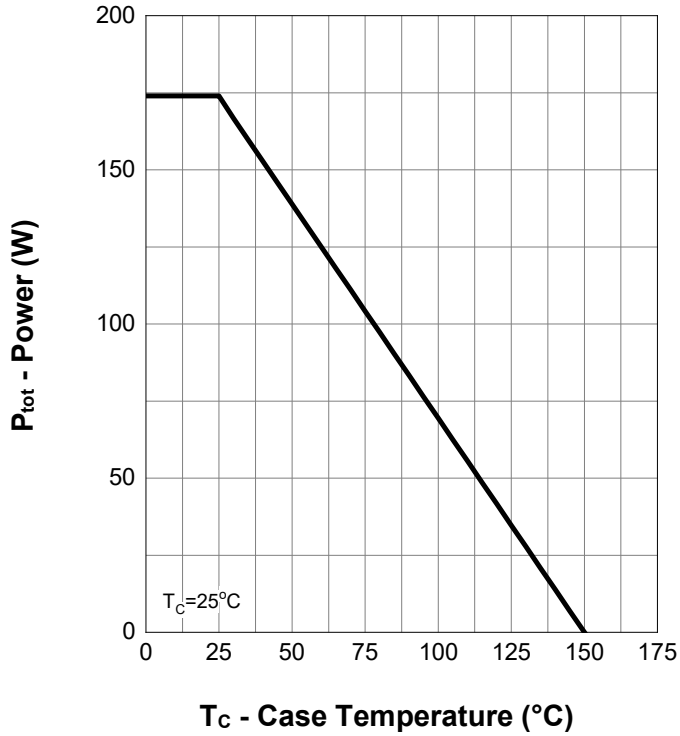
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = 250 μA	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	2	-	3	V
I _{DSS}	Drain Leakage Current	V _{DS} = 32 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^{Note1}	On-State Resistance	V _{GS} = 10 V, I _{DS} = 50 A	-	0.5	0.55	mΩ
		V _{GS} = 6 V, I _{DS} = 30 A	-	0.85	1.05	
Diode Characteristics						
V _{SD} ^{Note1}	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	-	61	-	nS
Q _{rr}	Reverse Recovery Charge		-	62	-	nC
Dynamic Characteristics ^{Note2}						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 20 V Frequency = 1 MHz	-	8032	-	pF
C _{oss}	Output Capacitance		-	3951	-	
C _{rss}	Reverse Transfer Capacitance		-	76	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 20 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 0.4 Ω, I _{DS} = 50 A	-	18	-	nS
t _r	Turn-on Rise Time		-	133	-	
t _{d(off)}	Turn-off Delay Time		-	98	-	
t _f	Turn-off Fall Time		-	76	-	
Gate Charge Characteristics ^{Note2}						
Q _g	Total Gate Charge	V _{DS} = 20 V, V _{GS} = 10 V, I _{DS} = 50 A	-	133	-	nC
Q _{gs}	Gate-Source Charge		-	36	-	
Q _{gd}	Gate-Drain Charge		-	27	-	

Note 1: Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

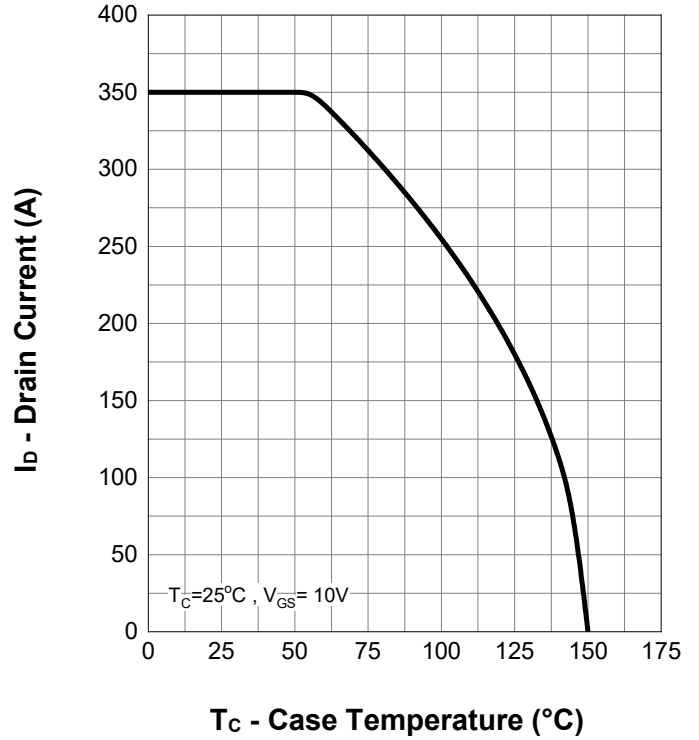
Note 2: Guaranteed by design, not subject to production testing.

7. Typical Characteristics

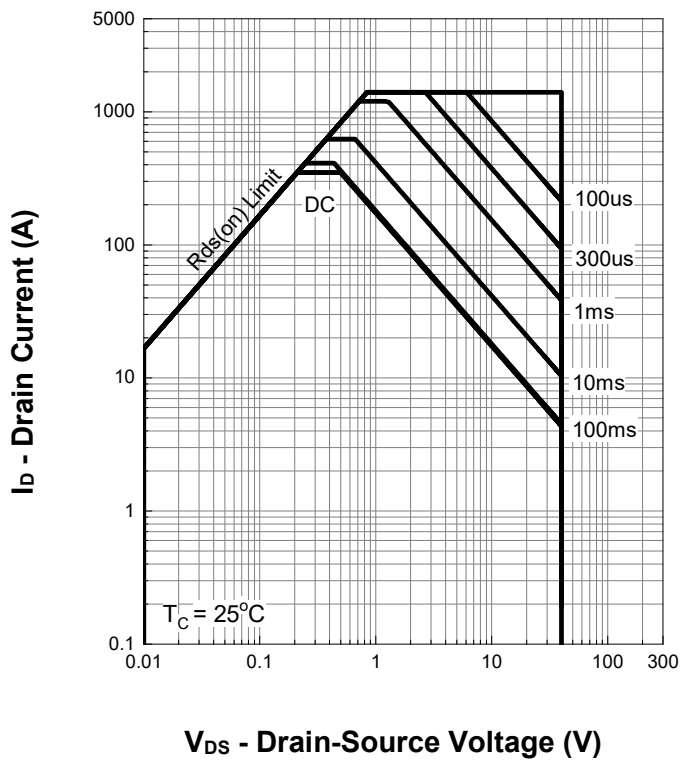
Power Capability



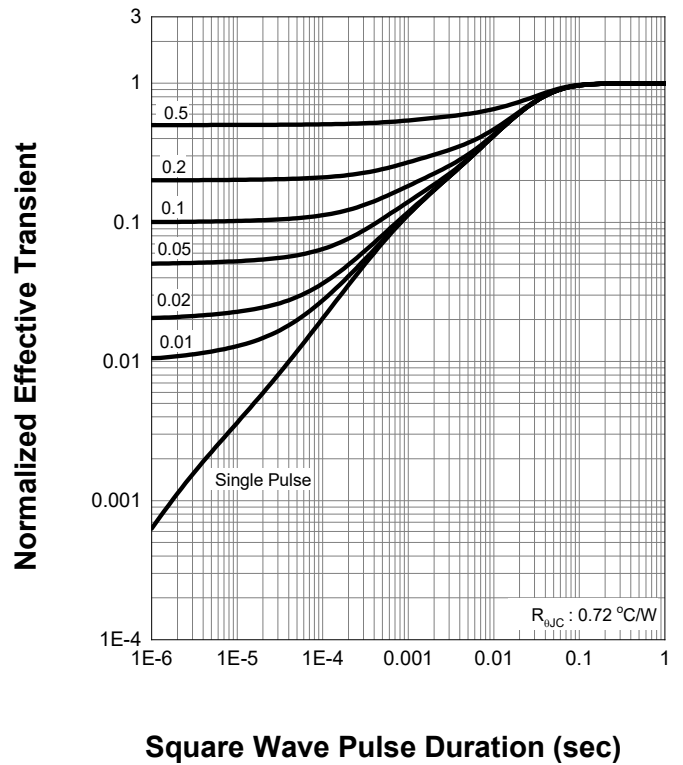
Current Capability



Safe Operating Area

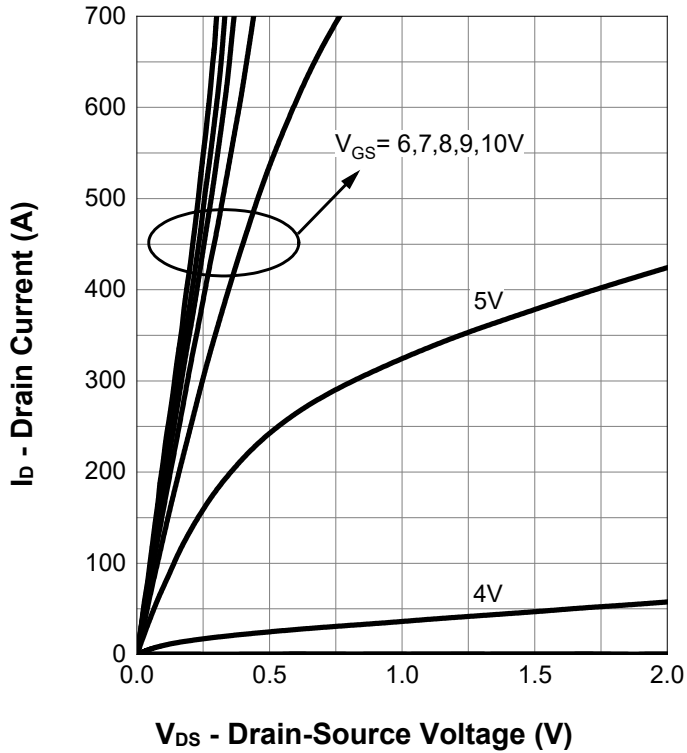


Transient Thermal Impedance

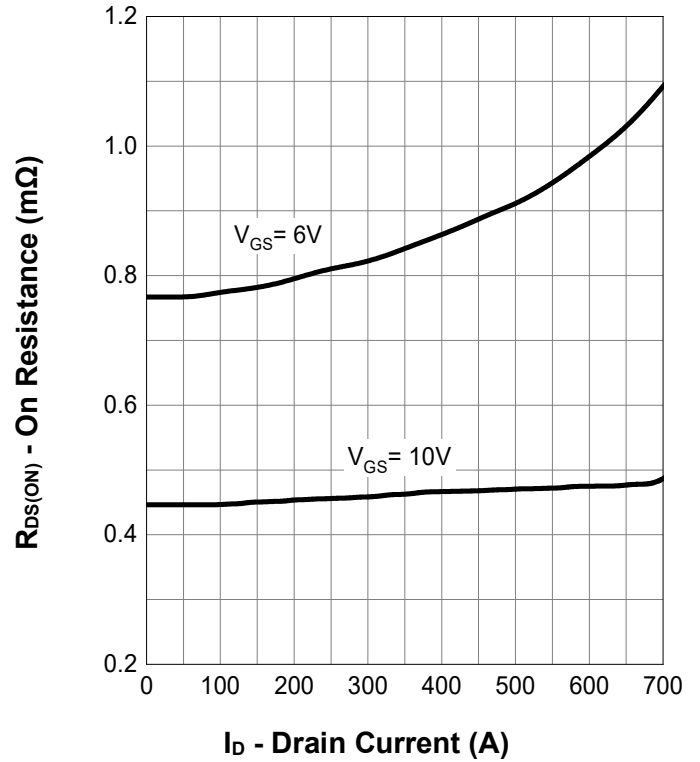


7. Typical Characteristics (cont.)

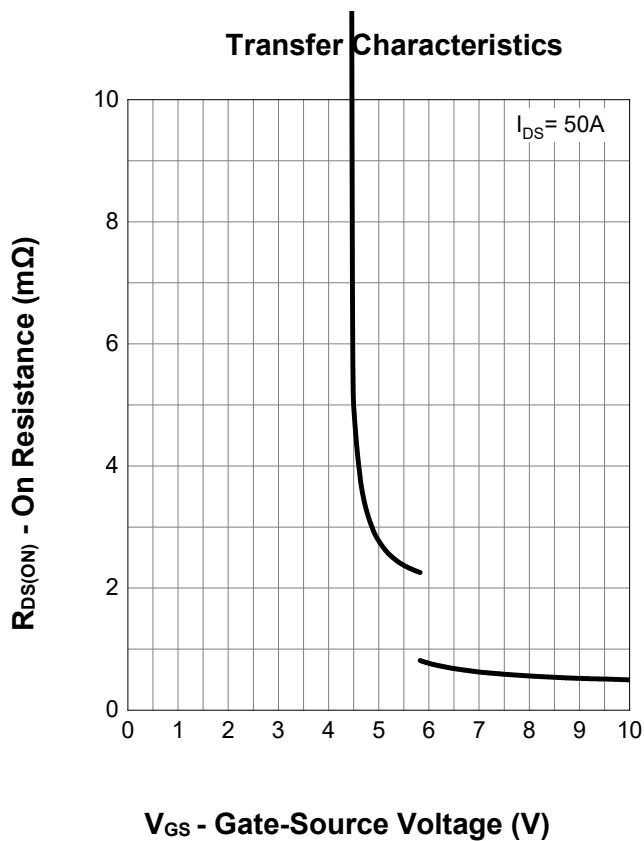
Output Characteristics



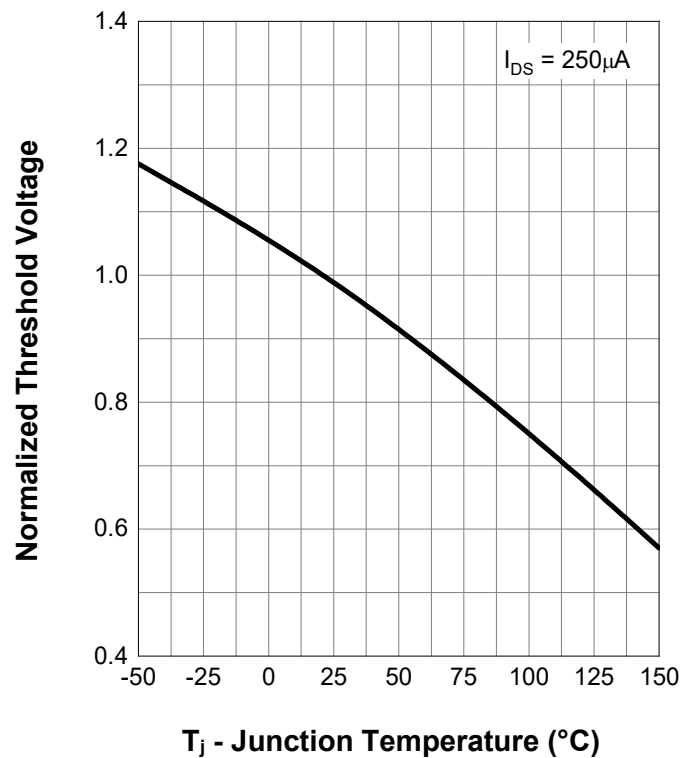
On Resistance



Transfer Characteristics

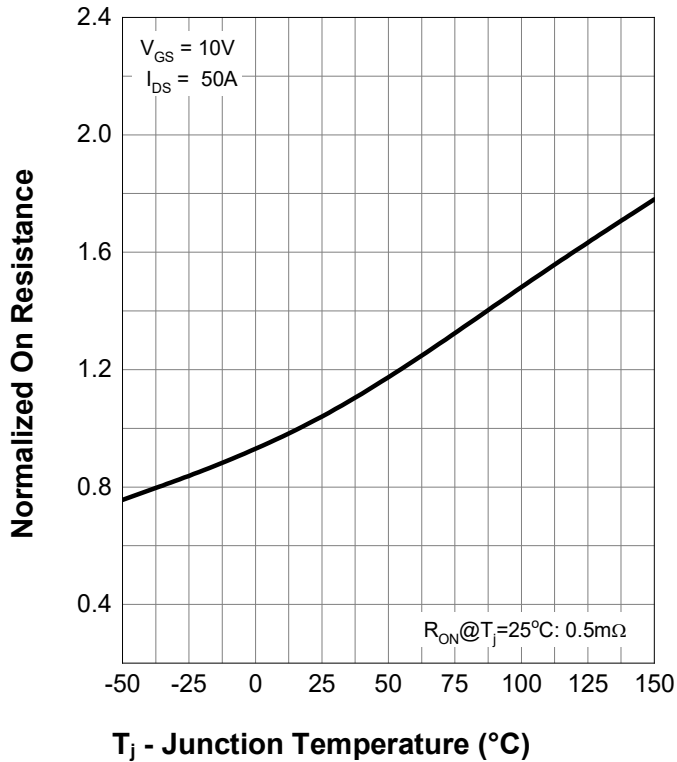


Normalized Threshold Voltage

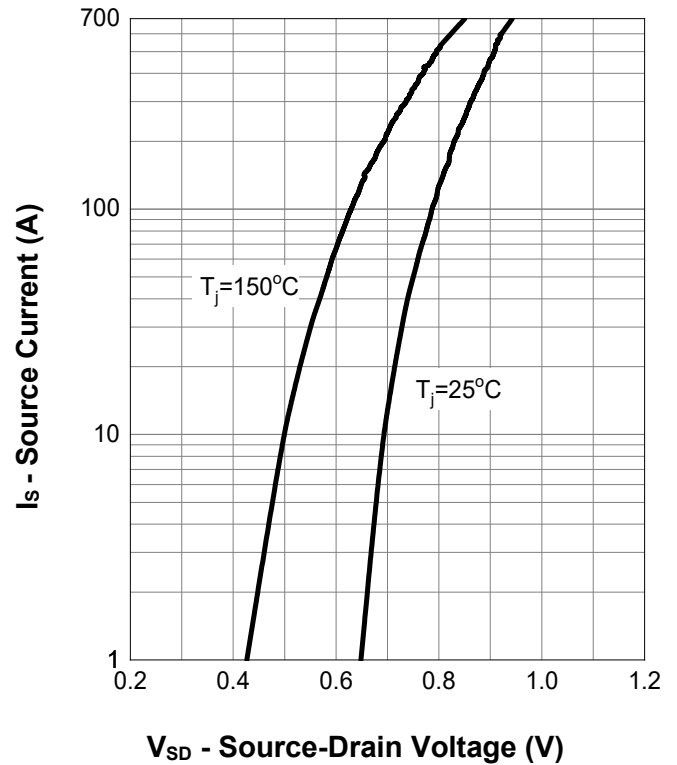


7. Typical Characteristics (cont.)

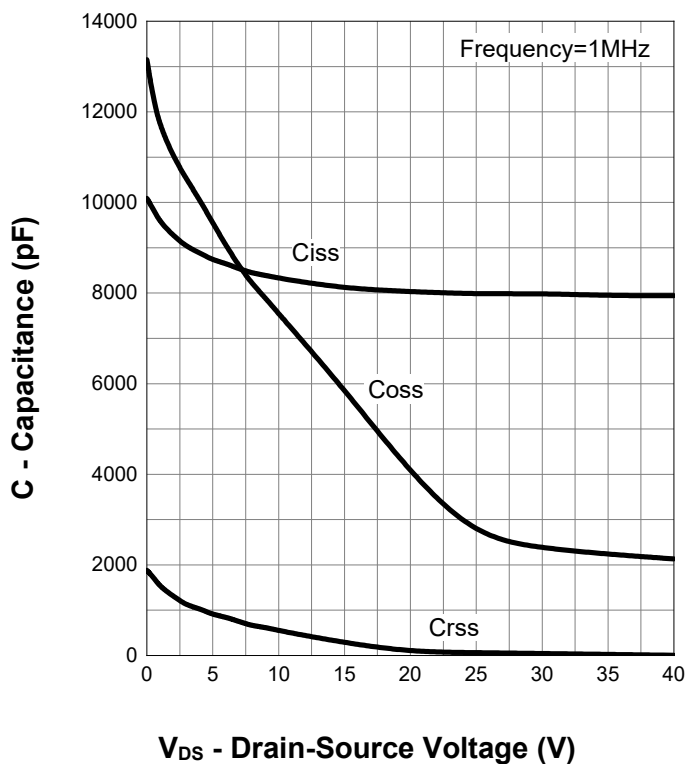
Normalized On Resistance



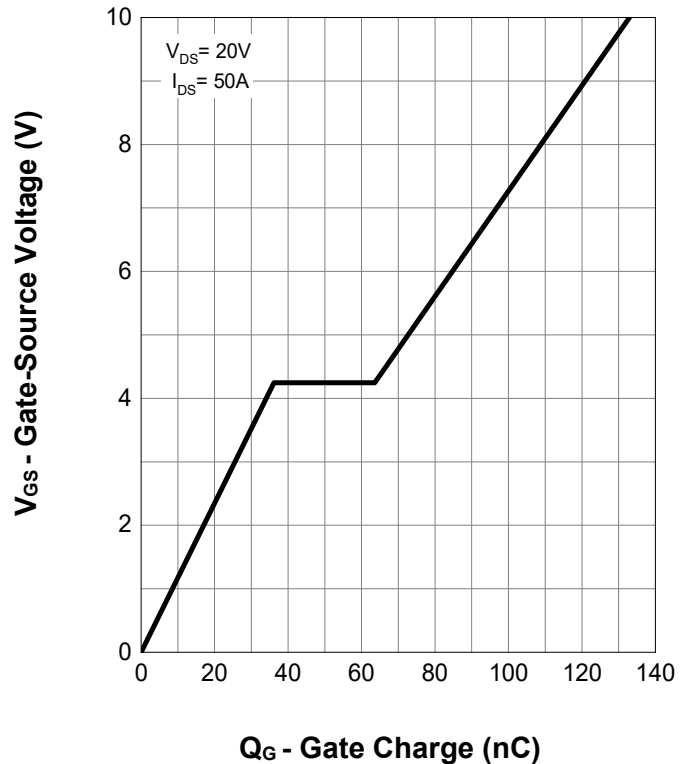
Diode Forward Current



Capacitance

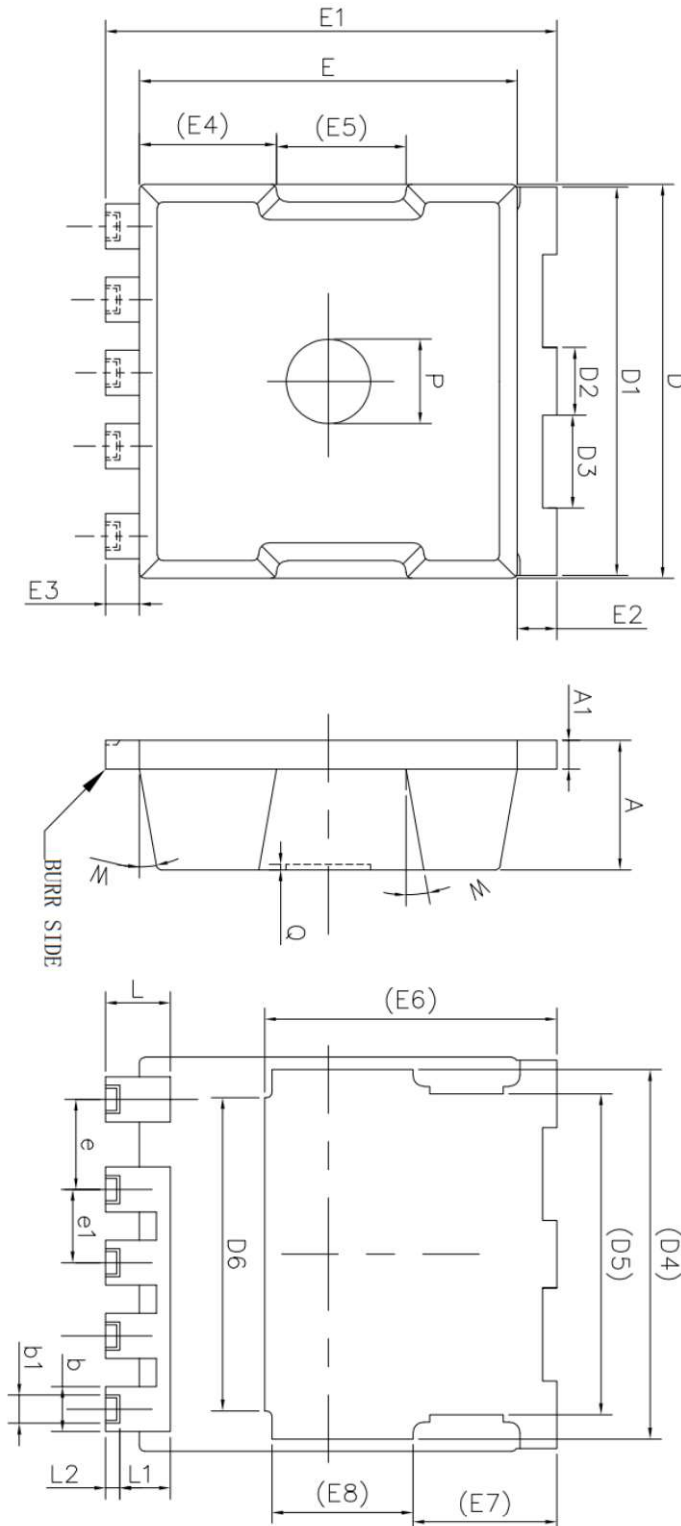


Gate Charge



8. Package Dimensions

STOLL Package



Symbol	Dimensions In Millimeters		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	0.40	0.50	0.60
b	0.70	0.80	0.90
b1	0.40	0.50	0.60
D	6.80	7.00	7.20
D1	6.80	6.90	7.20
D2	1.10	1.20	1.30
D3	1.55	1.65	1.75
D4	6.56		
D5	5.70		
D6	5.56		
E	6.50	6.70	6.90
E1	7.80	8.00	8.20
E2	0.60	0.70	0.80
E3	0.50	0.60	0.70
E4	2.43		
E5	2.30		
E6	5.18		
E7	2.55		
E8	2.50		
e	1.60		
e1	1.30		
L	1.05	1.15	1.25
L1	0.80	0.90	1.00
L2	0.15	0.25	0.35
P	1.40	1.50	1.60
Q	0	0.08	0.10
W	8°	10°	11°