

Dual N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ✓ Surface-mounted package
- ✓ Source Down
- ✓ Low Thermal Resistance
- ✓ ESD

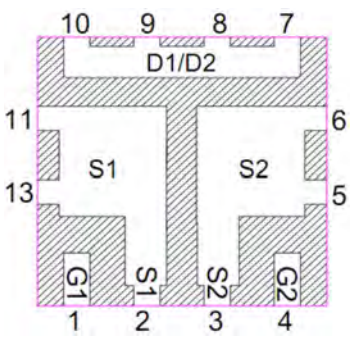
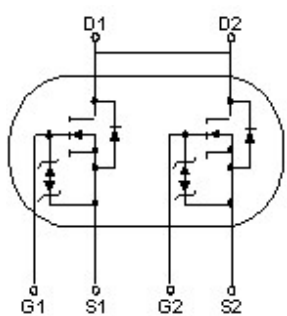
1.2 Applications

- ✓ Motor drivers
- ✓ DC - DC Converter

1.3 Quick reference

- ✓ $BV \geq 16 \text{ V}$
- ✓ $P_{tot} \leq 58 \text{ W}$
- ✓ $I_D \leq 100 \text{ A}$
- ✓ $R_{SS(ON)} \leq 2.0 \text{ m}\Omega @ V_{GS} = 4.5 \text{ V}$
- ✓ $R_{SS(ON)} \leq 2.2 \text{ m}\Omega @ V_{GS} = 2.5 \text{ V}$
- ✓ $R_{SS(ON)} \leq 2.5 \text{ m}\Omega @ V_{GS} = 1.8 \text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate 1		
2,11,13	Source1		
3,5,6	Source2		
4	Gate 2		
7,8,9,10	Drain1/ Drain2		

TTFN13 3.3x3.3-13L

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DS}	Drain-Source Voltage	T _C = 25 °C	16	-	V
V _{GS}	Gate-Source Voltage	T _C = 25 °C	-	± 10	V
I _D *	Drain Current (DC)	T _C = 25 °C, V _{GS} = 10 V	-	100	A
		T _C = 100 °C, V _{GS} = 10 V		58	A
I _{DM} *,**,***	Drain Current (Pulsed)	T _C = 25 °C, V _{GS} = 10 V	-	144	A
P _{tot} *	Total Power Dissipation	T _C = 25 °C	-	58	W
T _{stg}	Storage Temperature		- 55	150	°C
T _J	Junction Temperature		-	150	°C
I _S	Diode Forward Current	T _C = 25 °C	-	100	A
E _{AS} *	Single Pulsed Avalanche Energy	V _{DD} = 20 V , L= 1 mH	-	388	mJ
R _{θJA} *	Thermal Resistance- Junction to Ambient		-	60	°C / W
R _{θJC} *	Thermal Resistance- Junction to Case		-	6.8	

Notes :

- * Surface Mounted on 1 in² pad area, t ≤ 10 sec
- ** Pulse width ≤ 300 μs, duty cycle ≤ 2 %
- *** limited by bonding wire

4. Marking Information

Product Name	Marking
UD3316Q	3316 YWWXXX YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UD3316Q	TTFN13			5000	

Note: UOE defines “ Green ” as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

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 _D = 250 μA	16	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	0.5	-	1	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = 16 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 10 V, V _{DS} = 0 V	-	-	± 100	nA
R _{SS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} = 4.5 V, I _D = 20 A	-	1.8	2.0	m Ω
		V _{GS} = 2.5 V, I _D = 15 A	-	1.9	2.2	
		V _{GS} = 1.8 V, I _D = 15 A	-	2.2	2.5	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 10 A, V _{GS} = 0 V	-	-	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} = 10 A, dI _{SD} /dt = 100 A/μs	-	37	-	nS
Q _{rr}	Reverse Recovery Charge		-	27	-	nC
Dynamic Characteristics ^b						
C _{iSS}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 10 V Frequency = 1 MHz	-	3364	-	pF
C _{oSS}	Output Capacitance		-	536	-	
C _{rSS}	Reverse Transfer Capacitance		-	462	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 10 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 1 Ω, I _D = 10 A	-	8.3	-	nS
t _r	Turn-on Rise Time		-	41	-	
t _{d(off)}	Turn-off Delay Time		-	99	-	
t _f	Turn-off Fall Time		-	51	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{GS} = 4.5 V, V _{DS} = 10 V, I _{DS} = 10 A	-	41	-	nC
Q _{gs}	Gate-Source Charge		-	9.5	-	
Q _{gd}	Gate-Drain Charge		-	12	-	

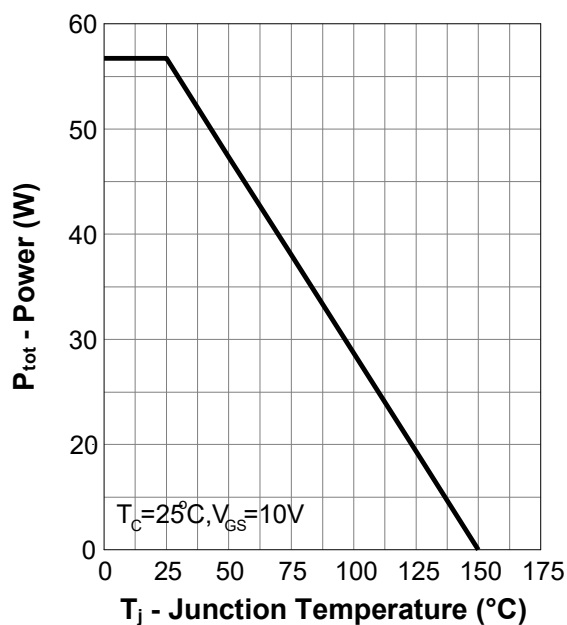
Notes :

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

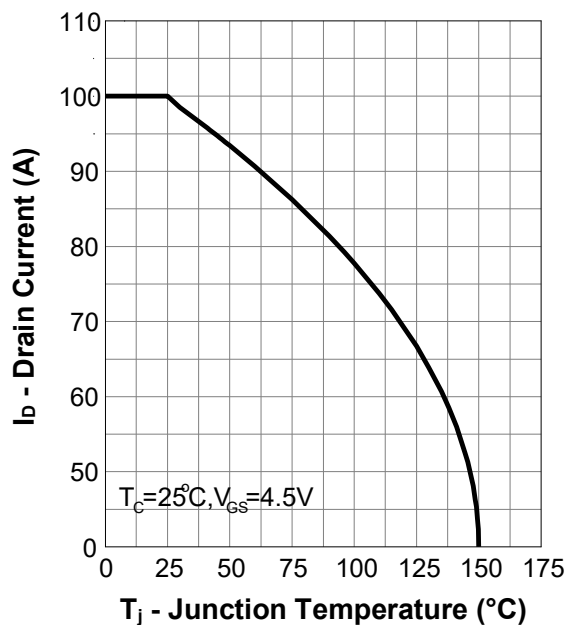
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

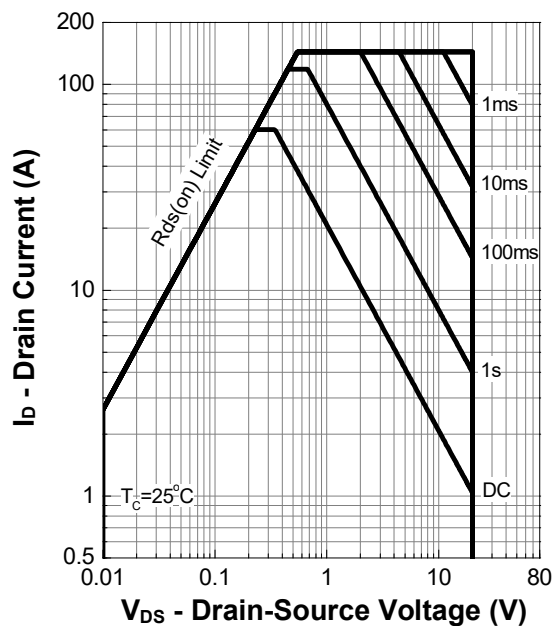
Power Capability



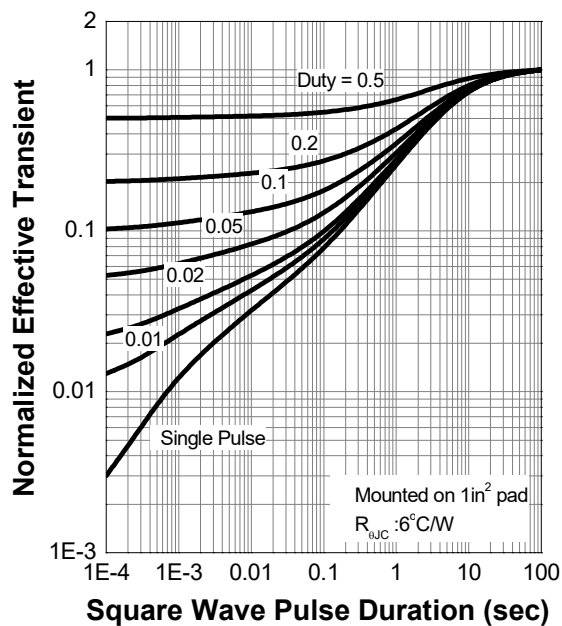
Current Capability



Safe Operation Area

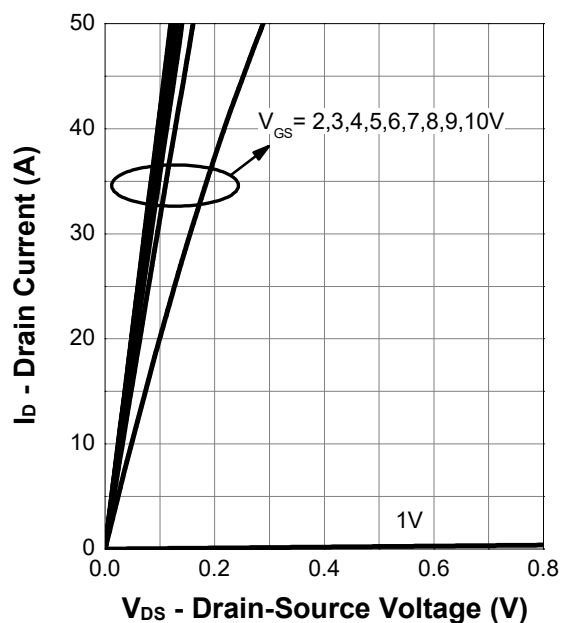


Transient Thermal Impedance

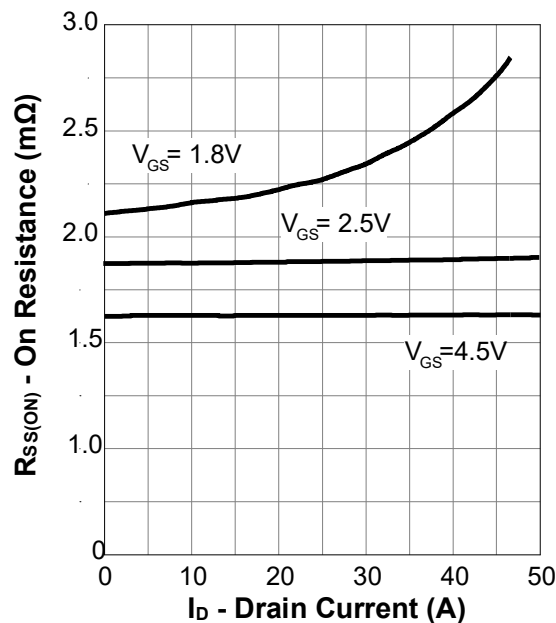


7. Typical Characteristics (Cont.)

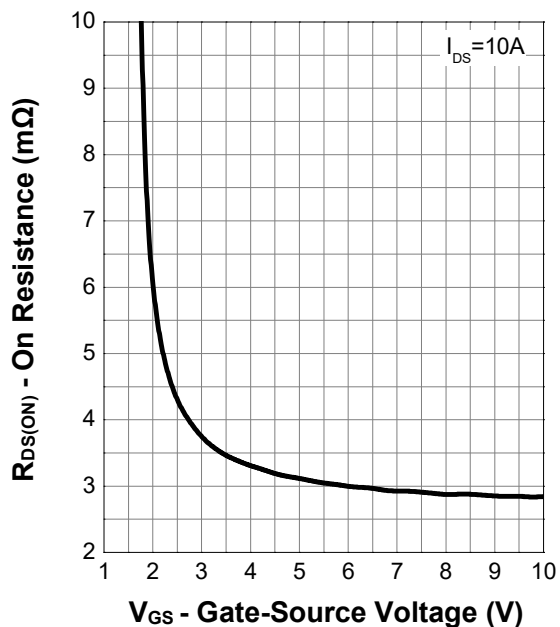
Output Characteristics



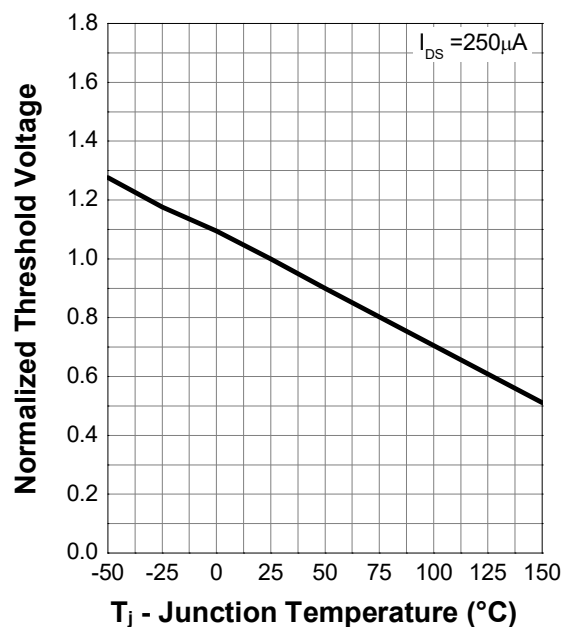
On Resistance



Transfer Characteristics

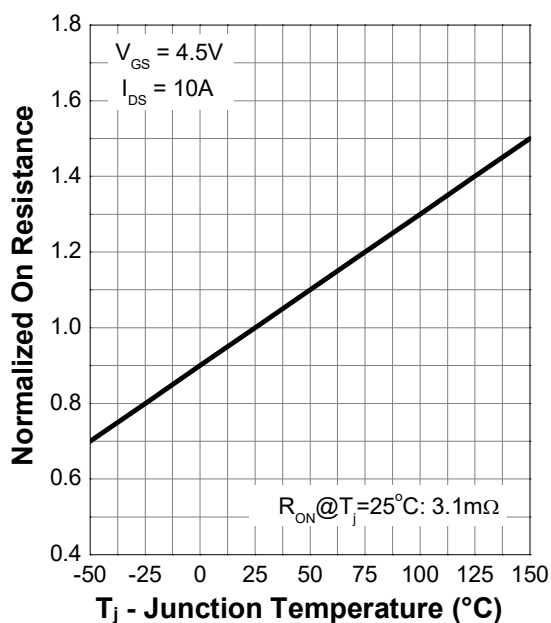


Normalized Threshold Voltage

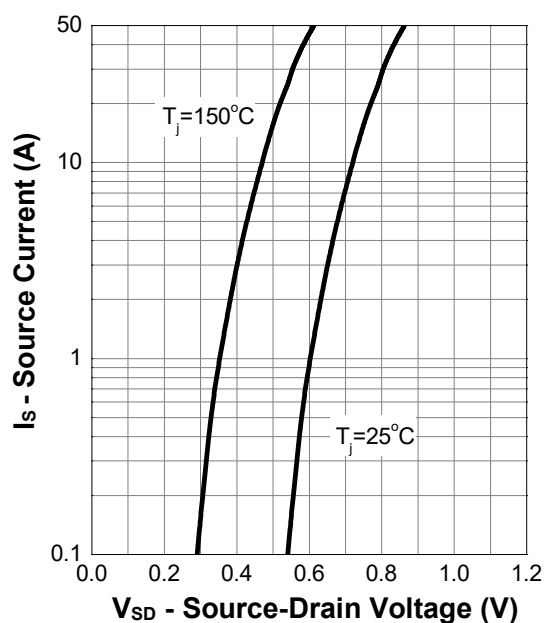


7. Typical Characteristics (Cont.)

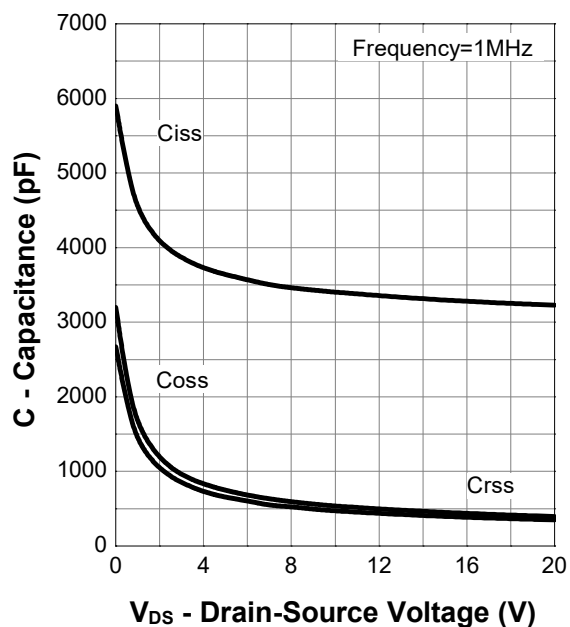
Normalized On Resistance



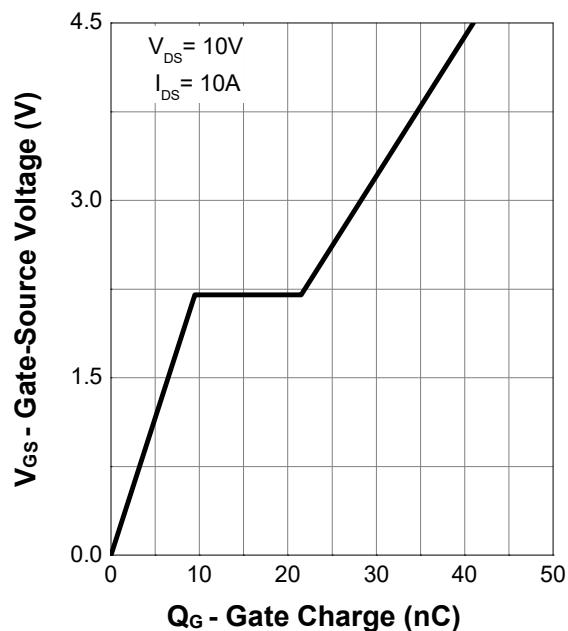
Diode Forward Current



Capacitance

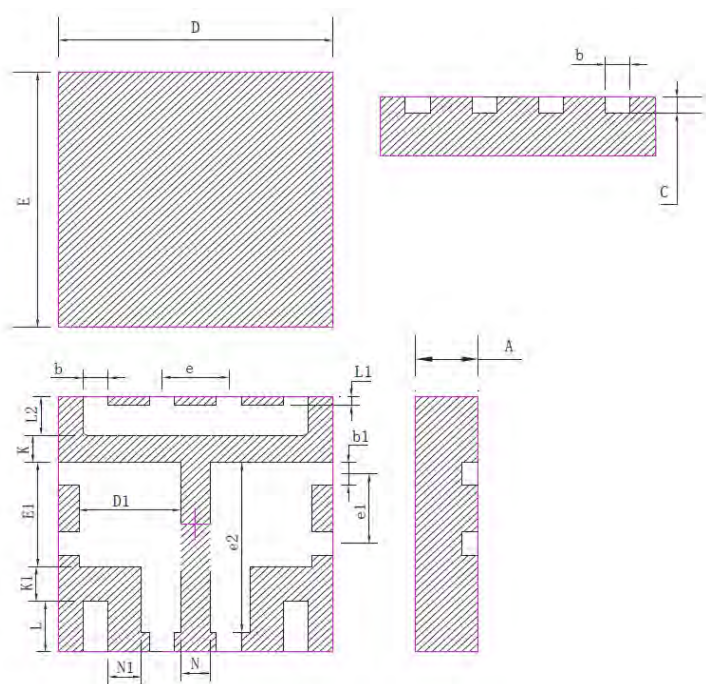


Gate Charge



8. Package Dimensions

TTFN13-3.3*3.3-13L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.70	0.80
b	0.20	0.40
b1	0.20	0.40
c	0.18	0.25
D	3.20	3.40
D1	1.12	1.32
E	3.20	3.40
E1	1.25	1.45
E2	2.10	2.30
e	0.70	0.90
e1	0.80	1.00
K	0.25	0.45
K1	0.35	0.55
L	0.55	0.75
L1	0.10	0.30
L2	0.40	0.60
N	0.25	0.45
N1	0.30	0.50