

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ MSL1
- ☒ Advanced trench cell design
- ☒ Tjmax 175°C

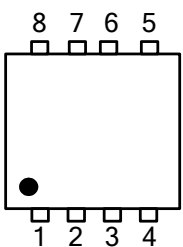
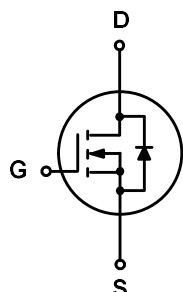
1.2 Applications

- ☒ MB and NB
- ☒ Half – bridge Drivers
- ☒ Motor drivers

1.3 Quick reference

- ☒ BV $\geq$ 30 V
- ☒ P_{tot} $\leq$ 75 W
- ☒ I_D $\leq$ 161 A
- ☒ R_{DS(ON)} $\leq$ 1.3 mΩ @ V_{GS} = 10 V
- ☒ R_{DS(ON)} $\leq$ 2.5 mΩ @ V_{GS} = 4.5 V

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1,2,3	Source		
4	Gate		
5, 6,7,8	Drain		

Top View
PDFN3.3x3.3-8L

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	30	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current (DC)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	161	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	113	A
$I_{DM}^{*,**}$	Drain Current (Pulsed)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	300	A
P_{tot}^*	Total Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	75	W
T_{stg}	Storage Temperature		- 55	175	$^{\circ}\text{C}$
T_J	Junction Temperature		-	175	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	161	A
E_{AS}^*	Single Pulsed Avalanche Energy	$V_{DD} = 30\text{ V}, L = 1.0\text{ mH}$	-	364	mJ
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	65	$^{\circ}\text{C} / \text{W}$
$R_{\theta JC}^*$	Thermal Resistance- Junction to Case		-	2	

Notes :

- * Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$
- ** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- *** Limited by bonding wire

4. Marking Information

Product Name	Marking
N1R5N03Q	1R5N03 YWWXXX YWWXXX: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
N1R5N03Q	PDFN3.3*3.3-8L			5000	

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

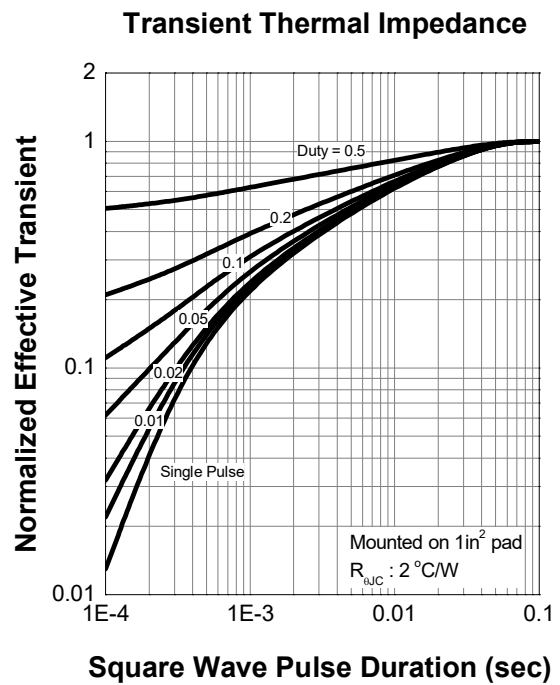
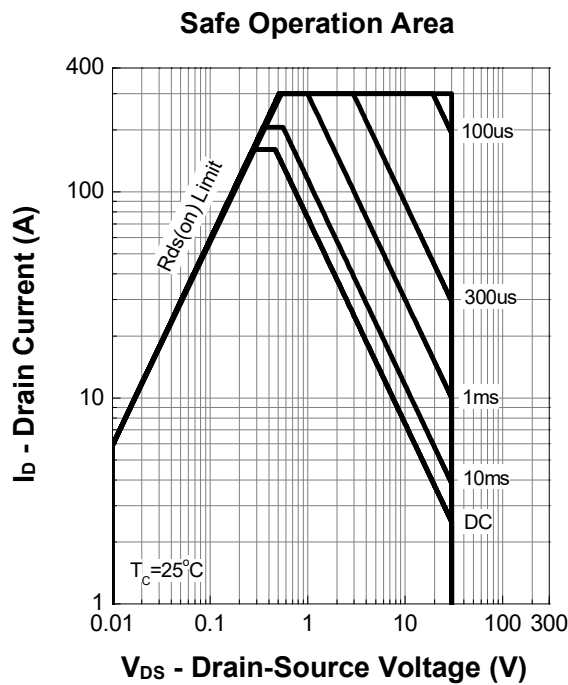
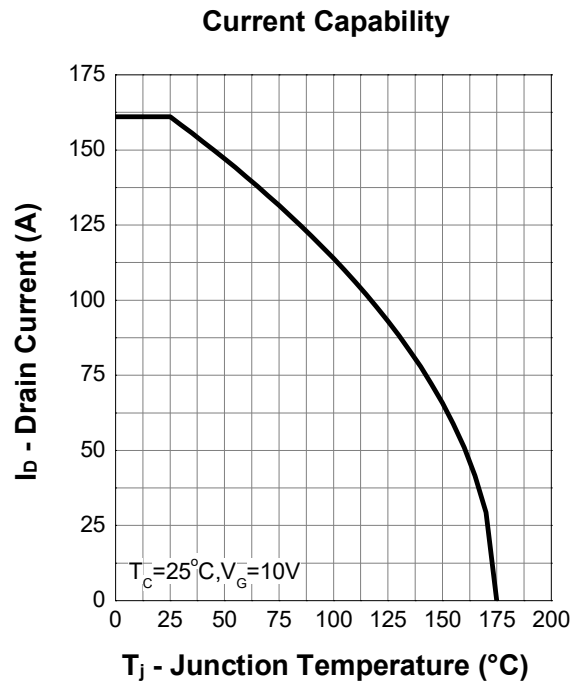
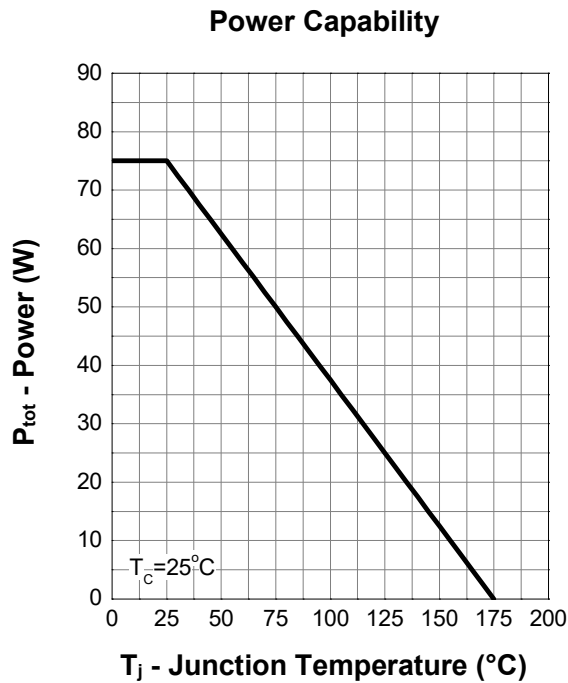
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	30	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	1	-	2	V
I _{DSS}	Zero Gate Voltage Source Current	V _{DS} = 24 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V	-	-	± 100	nA
R _{DS(ON)} ^a	Drain-Source On-State Resistance	V _{GS} = 10 V, I _D = 20 A	-	1.1	1.3	m Ω
		V _{GS} = 4.5 V, I _D = 10 A	-	2.1	2.5	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 20 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = 20 A, dI _{SD} /dt = 100 A/μs	-	30	-	nS
Q _{rr}	Reverse Recovery Charge		-	15	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 15 V Frequency = 1 MHz	-	2537	-	pF
C _{oss}	Output Capacitance		-	965	-	
C _{rss}	Reverse Transfer Capacitance		-	190	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 15 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 0.75 Ω, I _D = 20 A	-	8.7	-	nS
t _r	Turn-on Rise Time		-	55	-	
t _{d(off)}	Turn-off Delay Time		-	51	-	
t _f	Turn-off Fall Time		-	36	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{GS} = 10 V, V _{DS} = 15 V, I _{DS} = 20 A	-	51	-	nC
Q _{gs}	Gate-Source Charge		-	9.3	-	
Q _{gd}	Gate-Drain Charge		-	9.9	-	

Notes :

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

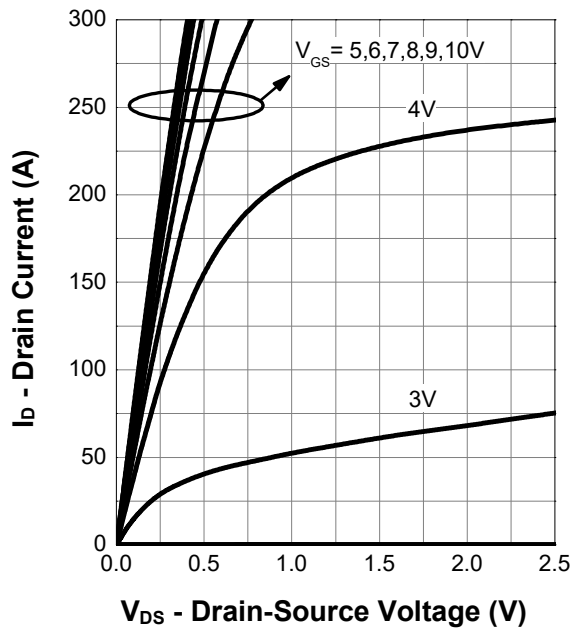
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

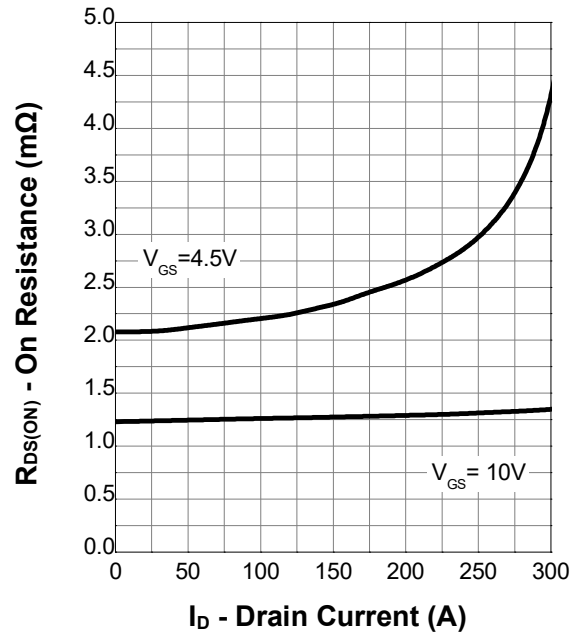


7. Typical Characteristics (Cont.)

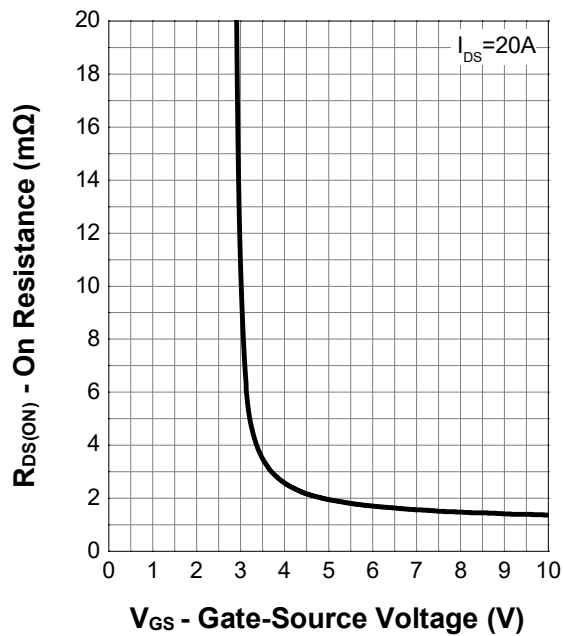
Output Characteristics



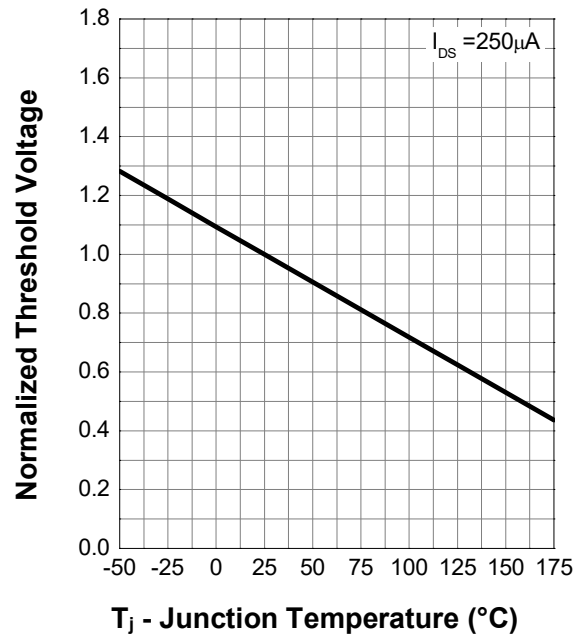
On Resistance



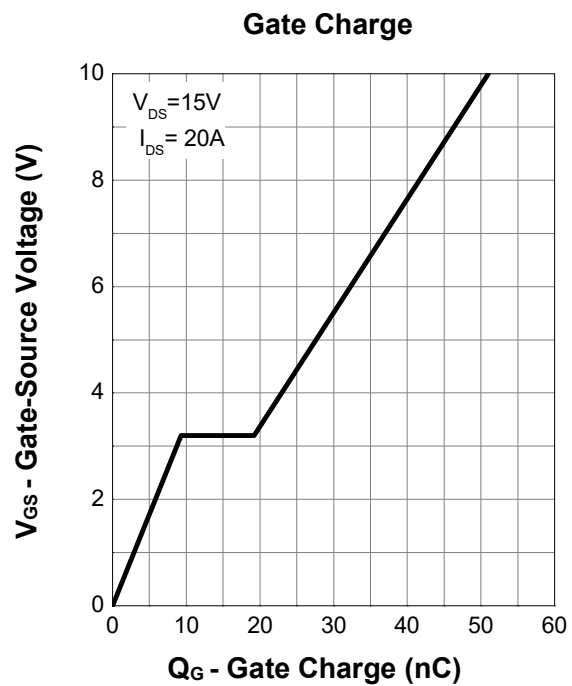
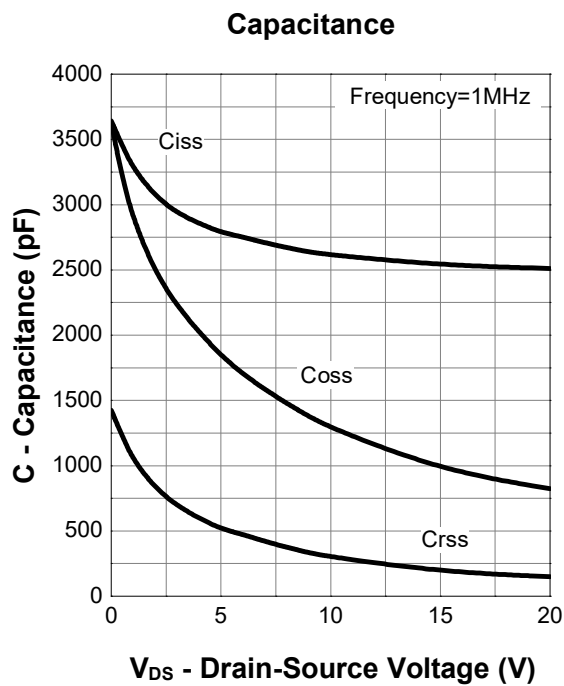
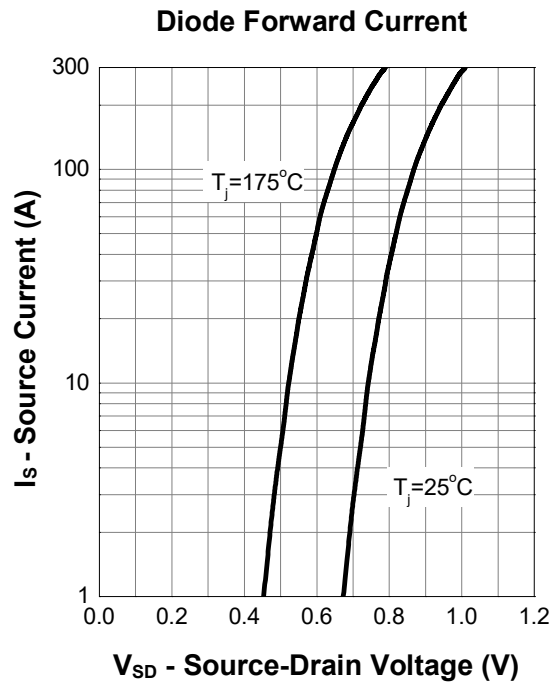
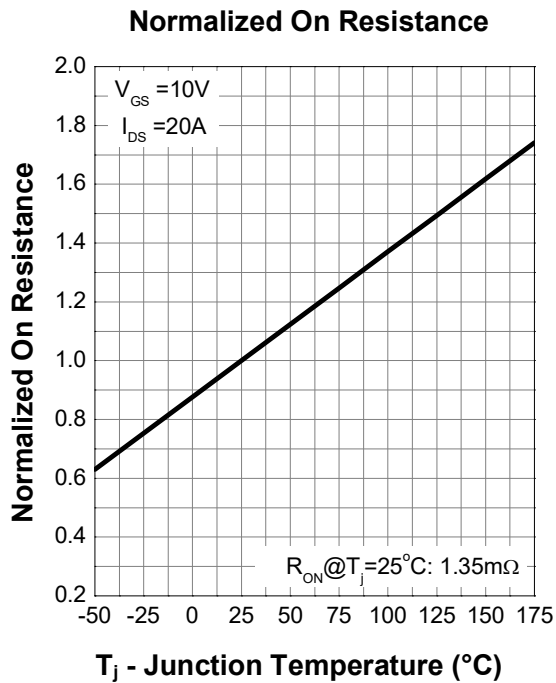
Transfer Characteristics



Normalized Threshold Voltage

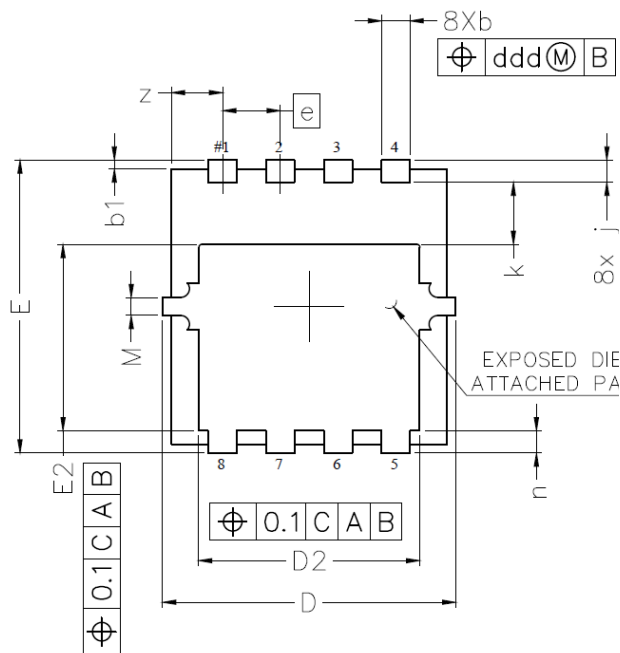
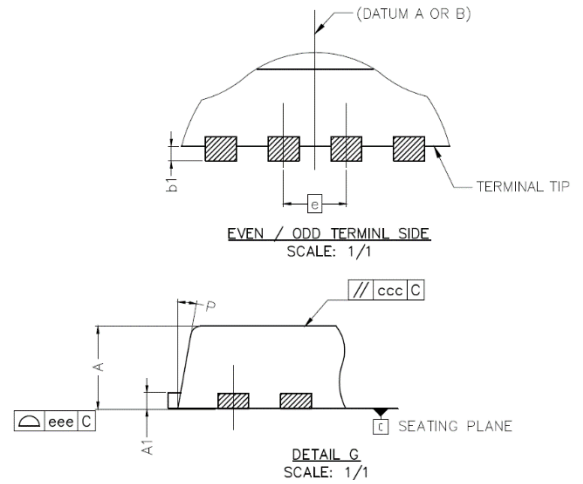
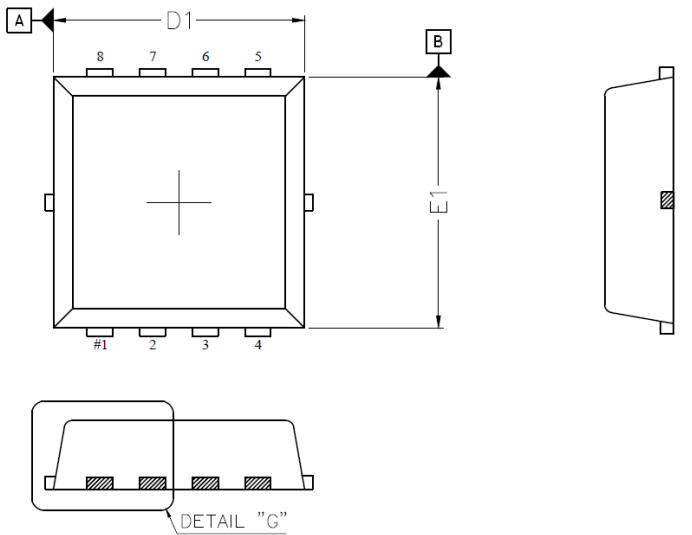


7. Typical Characteristics (Cont.)



8. Package Dimensions

PDFN3.3*3.3 -8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.80	0.90
A1	0.12	0.22
b	0.27	0.37
b1	0.05	0.15
D	3.00	3.60
D1	3.00	3.20
D2	2.29	2.69
E	3.00	3.60
E1	3.00	3.20
E2	2.00	2.20
e	0.60	0.70
j	0.15	0.35
k	0.60	0.80
n	0.15	0.35
M	0.20	
P	9°	11°
z	0.58	
ccc	0.10	
ddd	0.05	
eee	0.05	

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