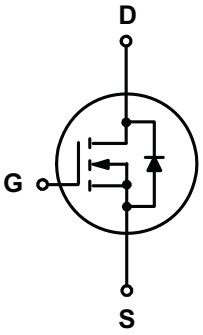
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM400N40TL

N-Channel Enhancement Mode Power MOSFET

Description

The RM400N40TL uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.



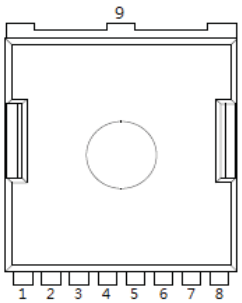
Schematic diagram

General Features

- V_{DS} =40V,I_D =400A
  $R_{DS(ON)}$ < 0.5mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ < 0.7mΩ @ V_{GS}=6V
- Surface-mounted package
- Super Trench
- Advanced trench cell design

Application

- Power Tool appliances
- High power inverter system
- BMS appliances
- Halogen-free



TOLL top view

Pin	Description
1	Gate(G)
2,3,4,5,6,7,8	Source(S)
9	Drain(D)

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
400N40	RM400N40TL	TOLL-8L	13 inch	2000pcs	14000pcs

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C=25℃	-	40	V
V_{GS}	Gate-Source Voltage	T_C=25℃	-	±20	V
I_D *, ***	Drain Current	T_C=25℃, V_{GS}=10 V	-	400	A
		T_C=100℃, V_{GS}=10 V	-	379	A
I_{DM} *	Pulsed Drain Current	T_C=25℃, V_{GS}=10 V	-	1600	A
P_{tot}	Drain power dissipation	T_C=25℃	-	300	W
T_{stg}	Storage Temperature		-55	175	℃
T_J	Junction Temperature		-	175	℃
I_S	Continuous-Source Current	T_C=25℃	-	400	A
E_{AS}	Single Pulsed Avalanche Energy	V_{DD}=40 V, L=1.0 mH	-	1984	mJ
$R_{\theta JA}$ **	Thermal Resistance-Junction to Ambient		-	47	℃/W
$R_{\theta JC}$ **	Thermal Resistance-Junction to Case		-	0.5	

Notes: * Pulse width ≤ 300 μs, duty cycle ≤ 2%
** Surface Mounted on 1 in^2 pad area, t ≤ 10 sec
*** Limited by bonding wire

Electrical Characteristics (T_A=25℃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	1.5	-	3.5	V
I_{DSS}	Drain Leakage Current	V_{DS}=32 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]	On-State Resistance	V_{GS}=10 V, I_{DS}=50 A	-	0.45	0.50	mΩ
		V_{GS}=6 V, I_{DS}=30 A	-	0.60	0.70	
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_{SD}=50 A, V_{GS}=0 V, dI_{SD}/dt=100 A/μs	-	59	-	ns
Q_{rr}	Reverse Recovery Charge		-	70	-	nC
Dynamic Characteristics [b]						
C_{iss}	Input Capacitance	V_{GS}=0 V, V_{DS}=20 V Frequency=1 MHz	-	10505	-	pF
C_{oss}	Output Capacitance		-	3829	-	
C_{rss}	Reverse Transfer Capacitance		-	80	-	
$t_{d(on)}$	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	-	21	-	ns
t_r	Turn-on Rise Time		-	113	-	
$t_{d(off)}$	Turn-off Delay Time		-	171	-	
t_f	Turn-off Fall Time		-	134	-	
Gate Charge Characteristics [b]						
Q_g	Total Gate Charge	V_{DS}=20 V, V_{GS}=10 V, I_{DS}=50 A	-	191	-	nC
Q_{gs}	Gate-Source Charge		-	44	-	
Q_{gd}	Gate-Drain Charge		-	37	-	

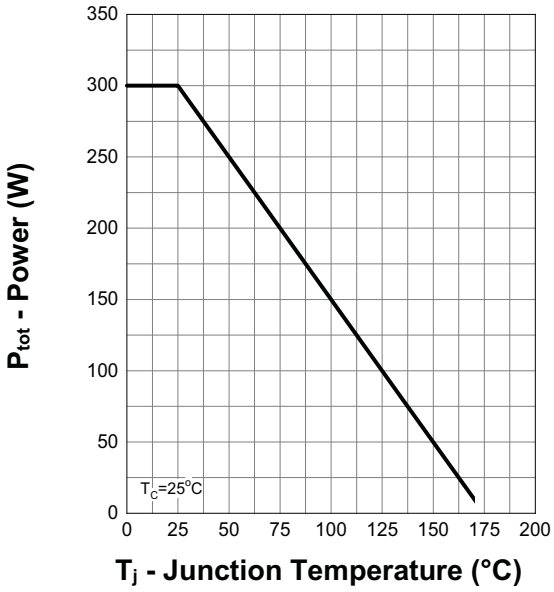
Notes:

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

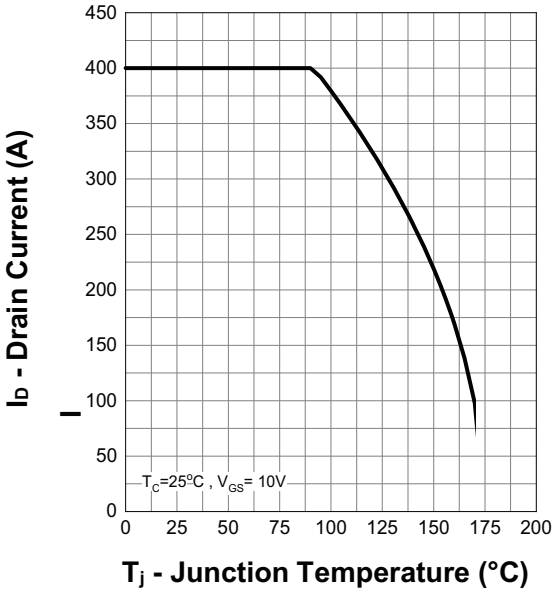
b. Guaranteed by design, not subject to production testing

RATING AND CHARACTERISTICS CURVES (RM400N40TL)

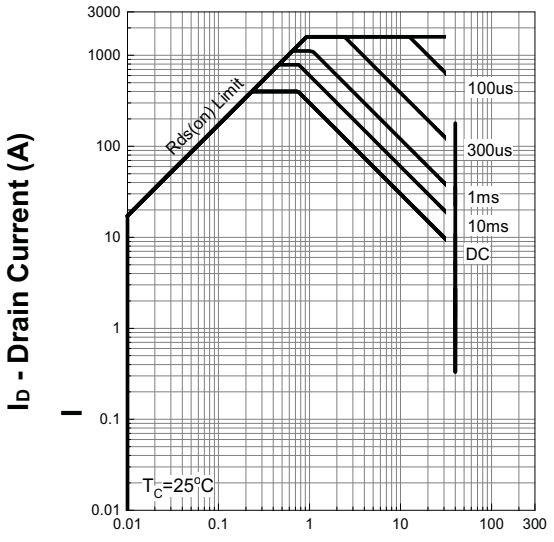
Power Capability



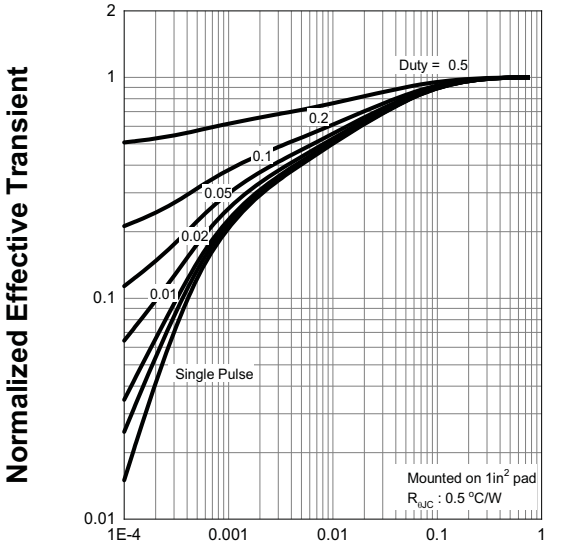
Current Capability



Safe Operating Area

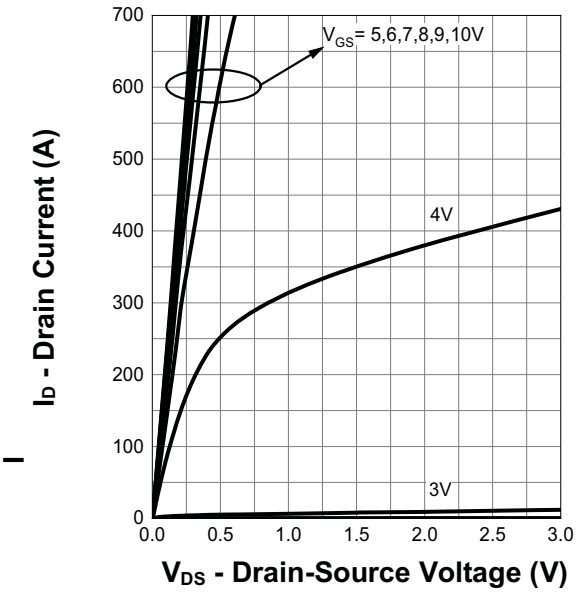


Transient Thermal Impedance

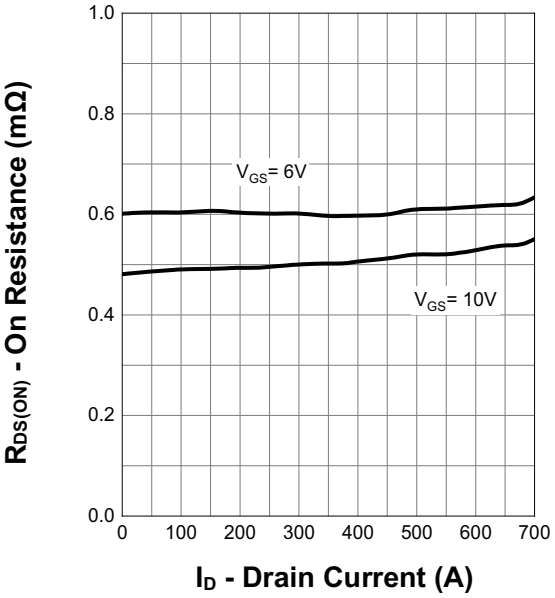


RATING AND CHARACTERISTICS CURVES (RM400N40TL)

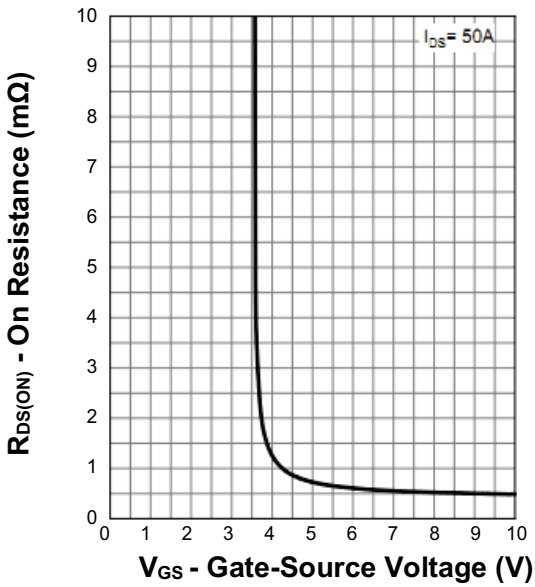
Output Characteristics



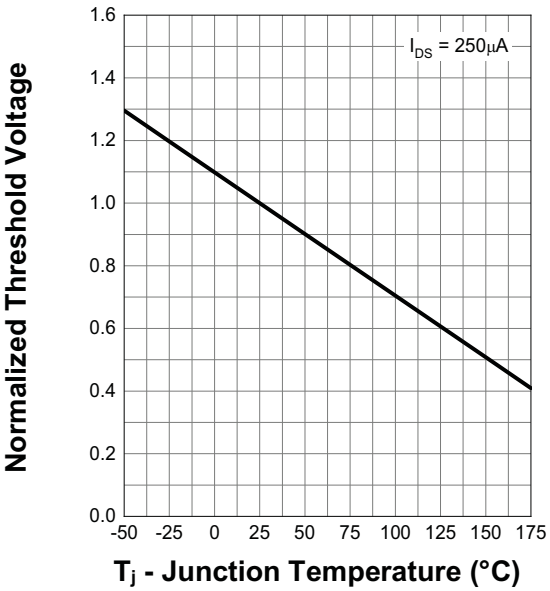
On Resistance



Transfer Characteristics

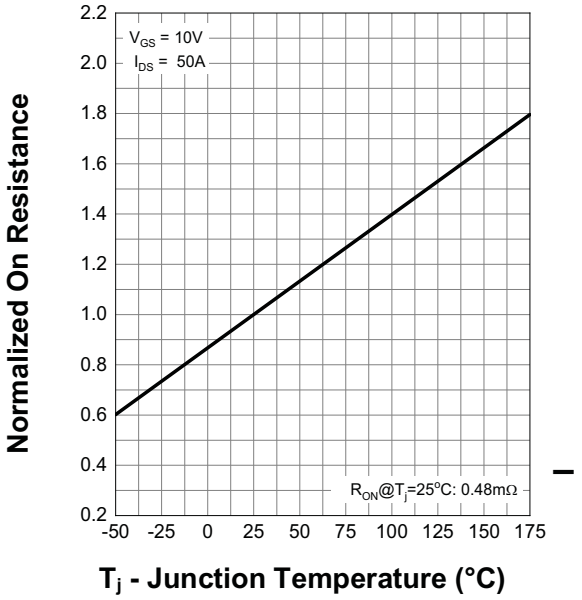


Normalized Threshold Voltage

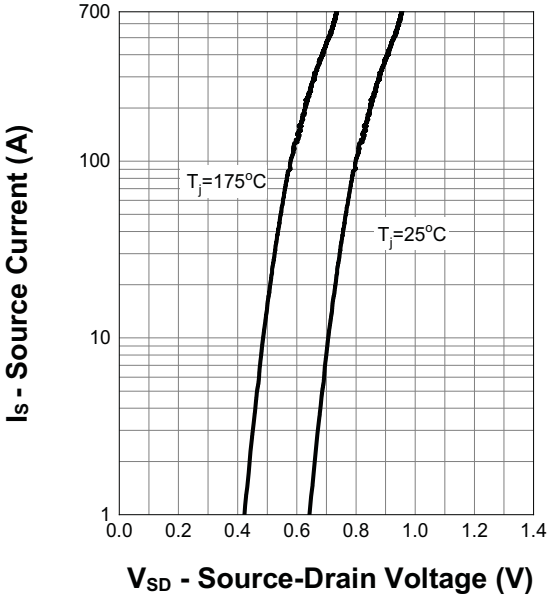


RATING AND CHARACTERISTICS CURVES (RM400N40TL)

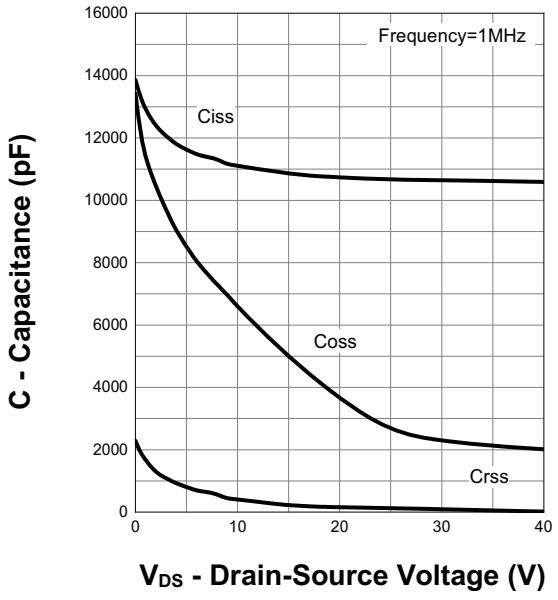
Normalized On Resistance



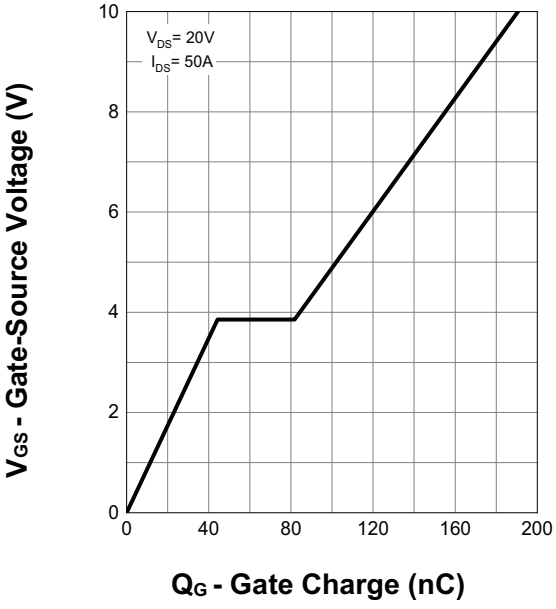
Diode Forward Current



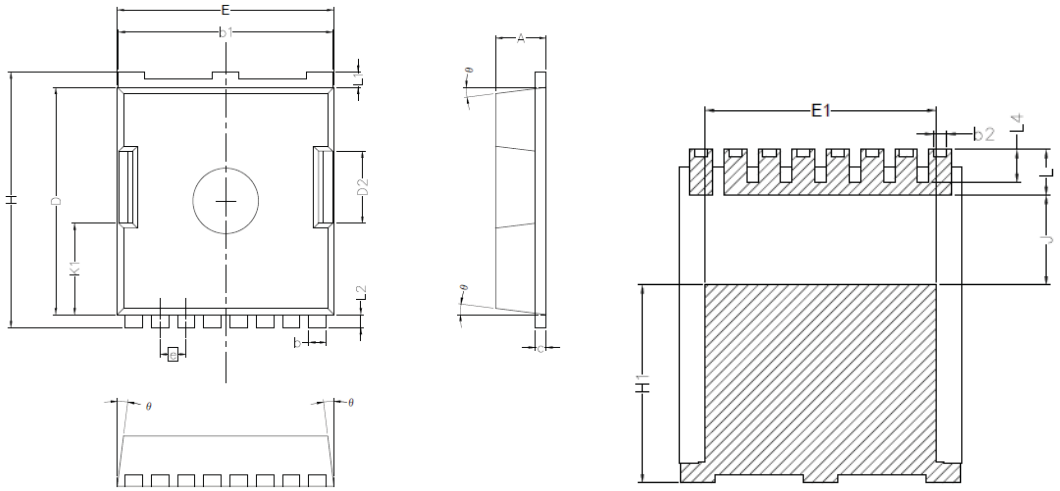
Capacitance



Gate Charge



TOLL-8L Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.20	2.40
b	0.90	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D2	3.10	3.50
E	9.70	10.10
E1	7.90	8.30
e	1.20BSC	
H	11.48	11.88
H1	6.75	7.15
N	8	
J	3.00	3.30
K1	3.98	4.38
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L4	1.00	1.30
θ	4°	10°

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