

N-channel Enhancement Mode Power MOSFET

Features

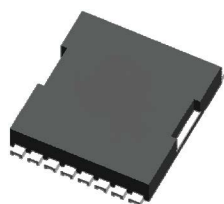
- Very Low On-resistance $R_{DS(ON)}$
- Low C_{rss}
- 100% avalanche tested
- Improved dv/dt capability

Applications

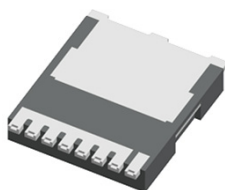
- PWM Application
- Motor drivers
- DC/DC Converter

Product Summary

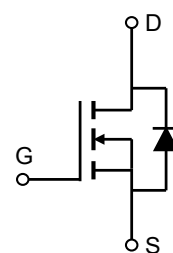
Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th_Typ)}$	2.8	V
$I_D(@V_{GS}=10V)$	198	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	0.8	$m\Omega$
$R_{DS(ON_Typ)}(@V_{GS}=4.5V)$	1.10	$m\Omega$



TOLL-8L Top View



TOLL-8L Bottom View



Schematic Diagram

Device	Marking	Package	Packing	Reel Size	Tape Width	Reel (pcs)
ZK40G003TL	40G003	TOLL	Reel	N/A	N/A	2000

MAXIMUM RATINGS ($T_a=25^{\circ}C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}C$	I_D	198	A
	$T_C = 100^{\circ}C$		94	
Pulsed Drain Current		I_{DM}	1098	A
Single Pulsed Avalanche Energy		E_{AS}	900	mJ
Power Dissipation		P_D	360	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	60	$^{\circ}C/W$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS

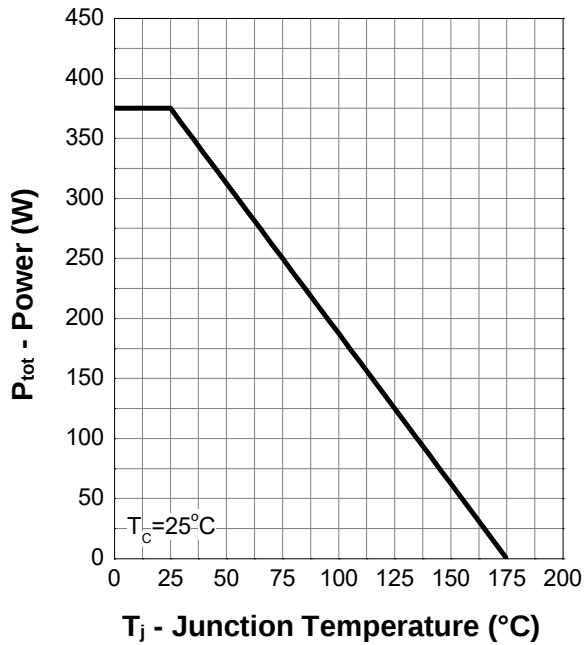
$T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	V _{(BR) DSS}	V _{GS} = 0V, I _D = 250 μA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 40V, V _{GS} =0V			1.0	μA
Gate-body leakage current	I _{GSS}	V _{DS} = 0V, V _{GS} =±20V			±100	nA
On characteristics ④						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA		2.8	3.4	V
Static drain-source on-sate resistance	R _{DS(on)}	V _{GS} =10V, I _D =15A		0.8	0.98	mΩ
		V _{GS} =4.5V, I _D =20A		1.10	1.20	mΩ
Dynamic characteristics ④ ⑤						
Input capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V f =1MHz		5800		pF
Output capacitance	C _{oss}			3200		
Reverse transfer capacitance	C _{rss}			240		
Gate Poly Resistance	R _g	f =1MHz		1.1		Ω
Switching characteristics ④ ⑤						
Total gate charge	Q _g	V _{GS} =0 to 10V V _{DS} =20V, I _D =30A		155		nC
Gate-source charge	Q _{gs}			25		
Gate-drain charge	Q _{gd}			35		
Turn-on delay time	t _{d(on)}	V _{DS} =20V, I _D =20A V _{GS} =10V, R _{GEN} =3Ω		16		ns
Turn-on rise time	t _r			56		
Turn-off delay time	t _{d(off)}			149		
Turn-off fall time	t _f			96		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V _{SD} ④	V _{GS} =0V, I _{SD} =30A			1.3	V
Continuous drain-source diode forward current	I _S ①	T _C =25℃			140	A
Reverse recovery time	trr	di/dt = 100A/μs, I _F = 30A		85		ns
Reverse recovery charge	Qrr			120		nC

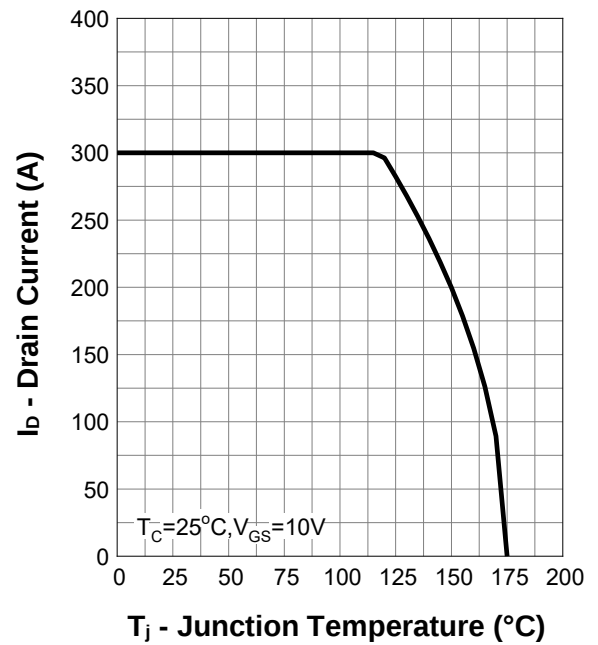
Notes:

1. Guaranteed by design, not subject to production testing
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$

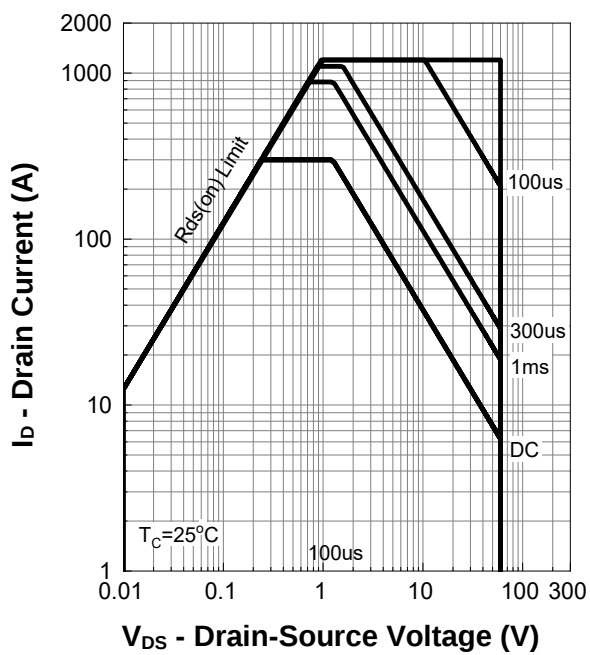
Power Capability



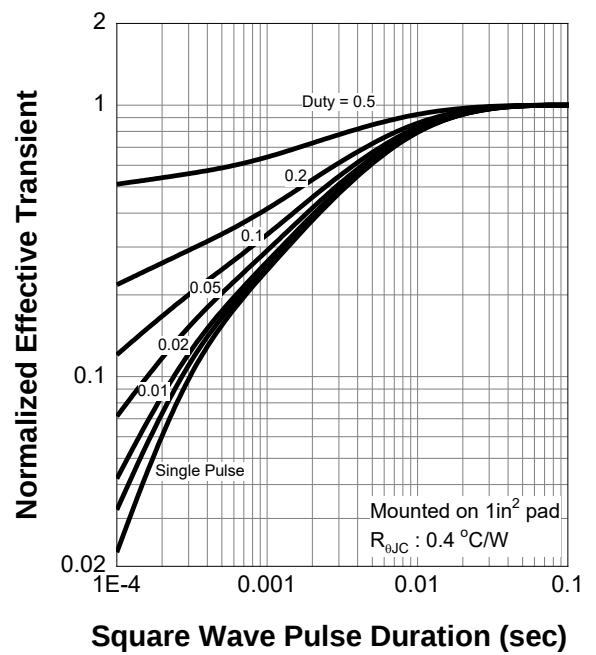
Current Capability



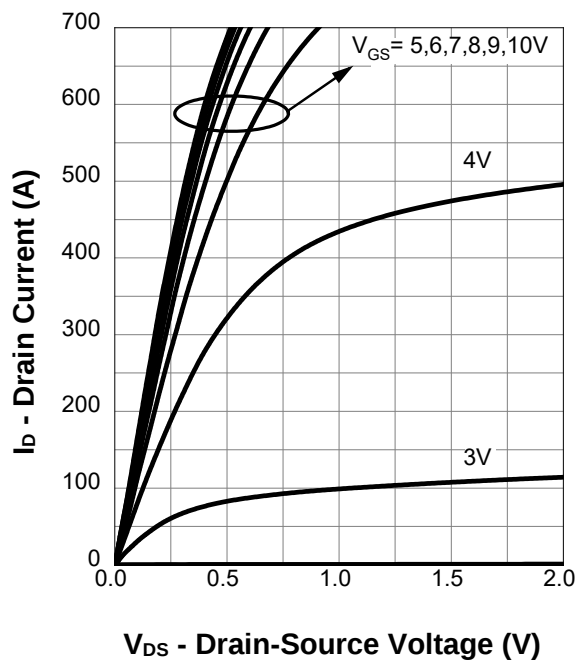
Safe Operation Area



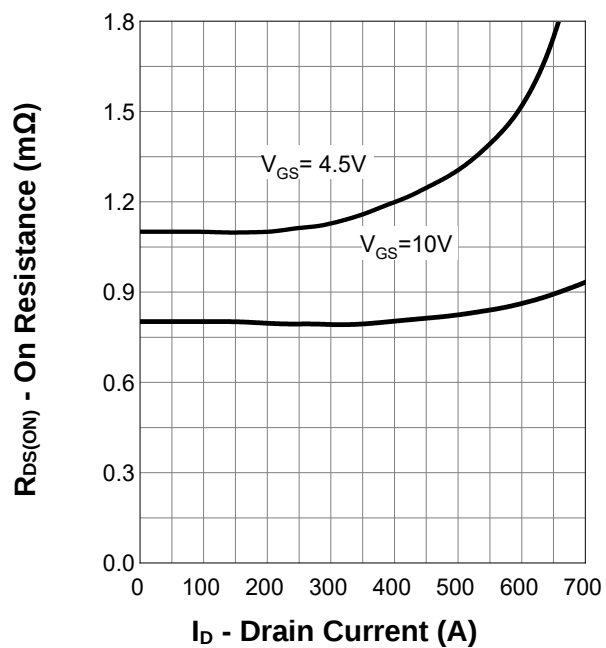
Transient Thermal Impedance



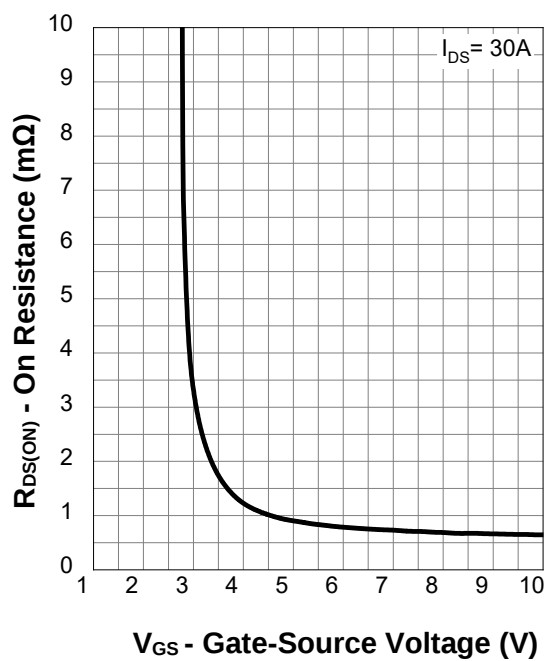
Output Characteristics



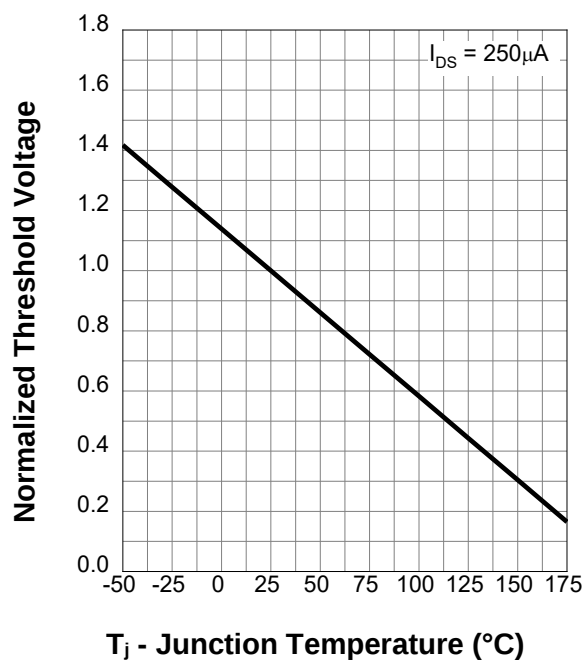
On Resistance



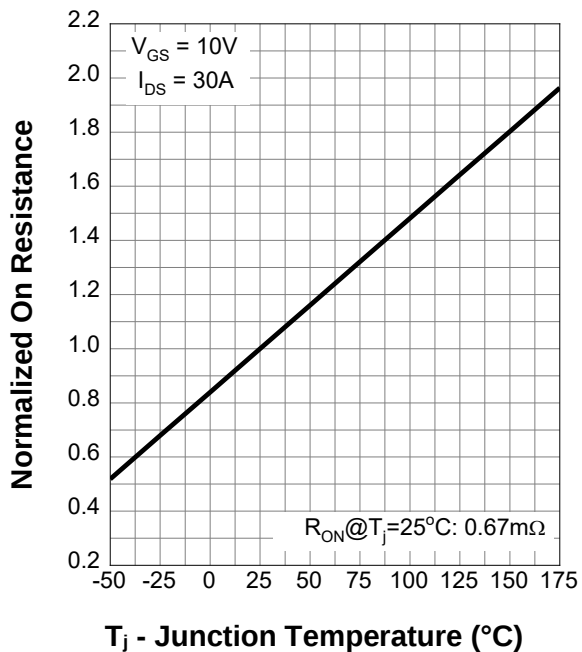
Transfer Characteristics



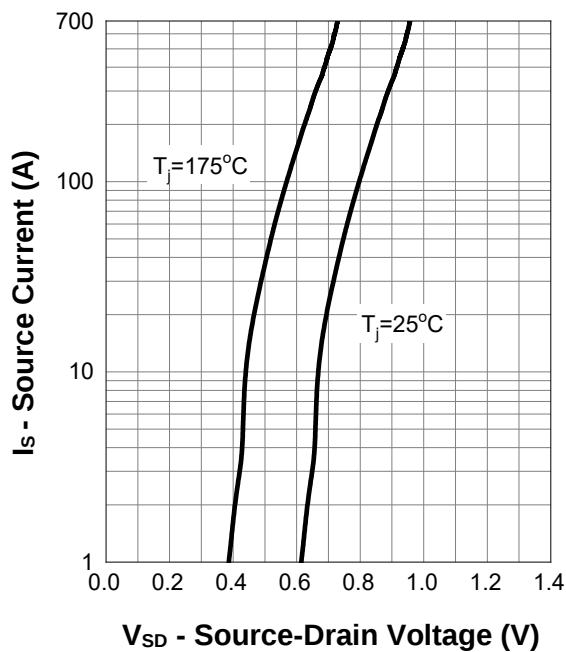
Normalized Threshold Voltage



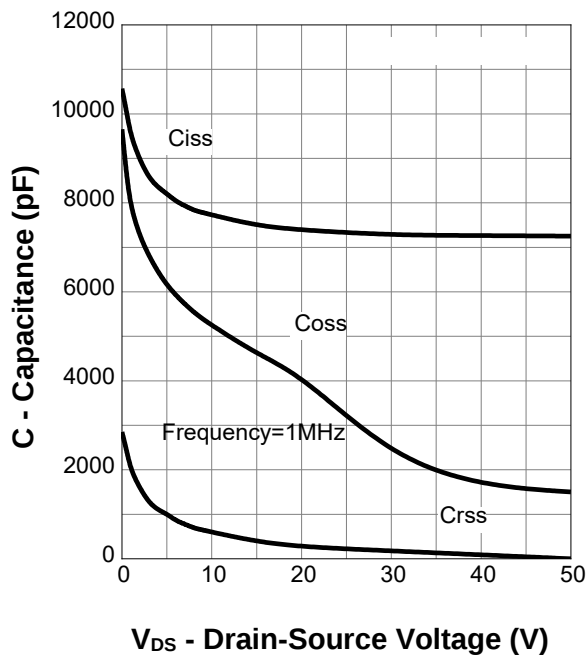
Normalized On Resistance



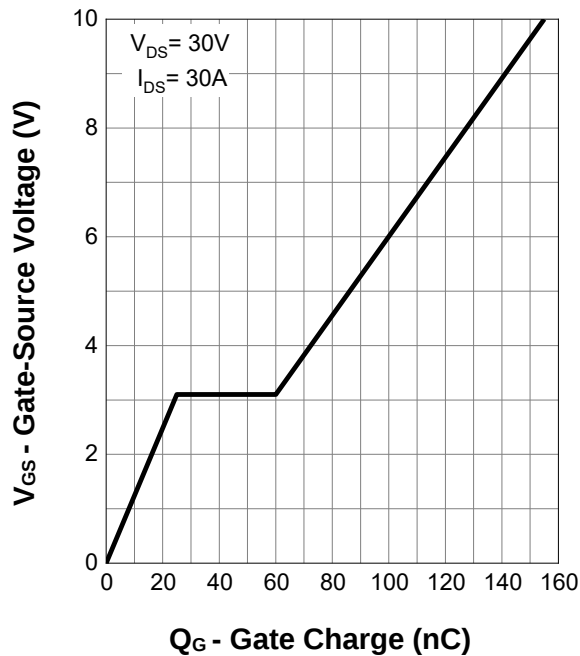
Diode Forward Current



Capacitance

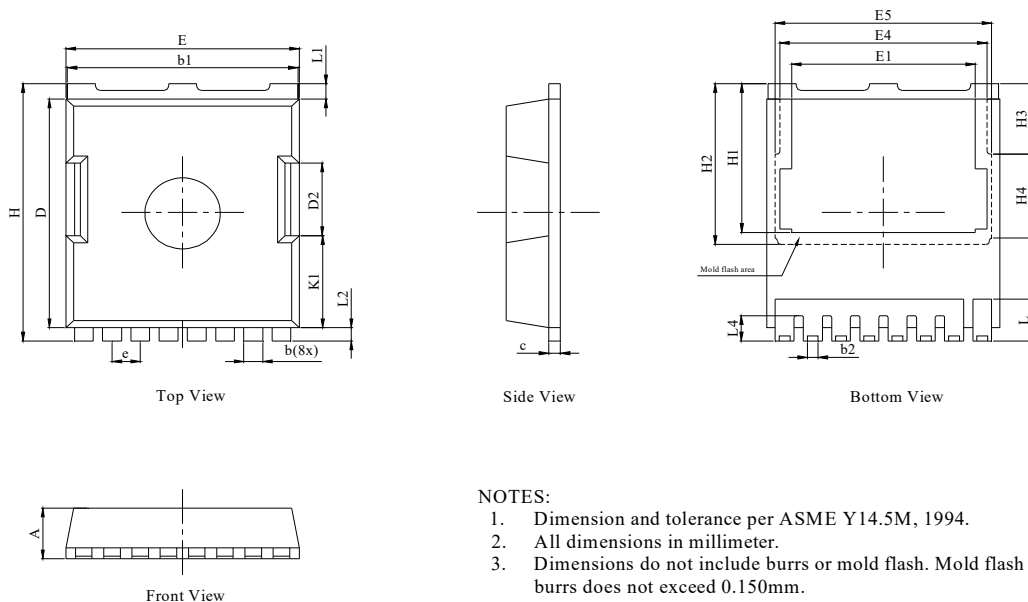


Gate Charge



Package Mechanical Data(TOLL-8L)

Package Outlines



NOTES:

1. Dimension and tolerance per ASME Y14.5M, 1994.
2. All dimensions in millimeter.
3. Dimensions do not include burrs or mold flash. Mold flash or burrs does not exceed 0.150mm.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.42	0.46	0.50
c	0.40	0.50	0.60
D	10.28	10.38	10.58
D2		3.30	
E	9.70	9.90	10.10
E1		7.80	
E4		8.80	
E5		9.20	
e	1.20 (BSC)		
H	11.48	11.68	11.88
H1	6.55	6.75	6.85
H2		7.30	
H3		3.20	
H4		3.80	
K1		4.18	
L	1.70	1.90	2.10
L1		0.70	
L2		0.60	
L4	1.00	1.15	1.30

Recommended Soldering Footprint

