

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

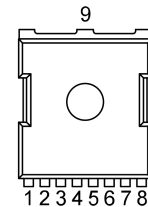
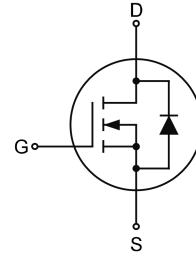
- Shielded Gate Trench Technology
- Excellent low $R_{DS(ON)}$
- Low gate charge

1.2 Applications

- DC/DC converter
- Power management switches

1.3 Quick reference

- $V_{DS} = 150\text{ V}$
- $I_D = 140\text{ A}$
- $R_{DS(ON)} \leq 9\text{ m}\Omega$ @ $V_{GS} = 10\text{ V}$ (Type: 7.5 m Ω)



Top View
TOLL-8L

2. Package Marking and Ordering Information

Product Name	Package	Marking	Reel size	Tape width	Quantity (pcs)
KJ0815T	TOLL-8L	KJ0815T XXXXXX-X	13"	24 mm	2000

3. Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current, $T_C=25^\circ\text{C}$ ^{1, 2}	140	A
	Continuous Drain Current, $T_C=100^\circ\text{C}$ ^{1, 2}	60	A
I_{DM}	Pulsed Drain Current ^{1, 2}	550	A
I_{AS}	Avalanche Current	65	A
E_{AS}	Single Pulse Avalanche Energy ³	506	mJ
P_D	Power Dissipation ⁴	147	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	25	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	0.85	$^\circ\text{C/W}$

4. Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V, I _{DS} =250 μA	150	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 μA	2.0	-	4.5	V
I _{DSS}	Drain Leakage Current	V _{DS} =150 V, V _{GS} =0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} =0 V, V _{GS} =±20 V	-	-	±100	nA
R _{DS(ON)}	On-State Resistance ⁴	V _{GS} =10 V, I _{DS} =20 A	-	7.5	9.0	mΩ
g _{FS}	Forward Transconductance ⁴	V _{GS} =5 V, I _{DS} =20 A	-	60	-	S
R _g	Gate Resistance	Frequency=1 MHz	-	2.5	-	Ω
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _{SD} =20 A, V _{GS} =0 V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	I _{DS} =20 A, V _{GS} =0 V, dI _{SD} /dt=100 A/μs	-	98	-	ns
Q _{rr}	Reverse Recovery Charge		-	320	-	nC
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} =10 V, V _{DS} =75 V, I _{DS} =20 A, Frequency=1 MHz	-	2184	-	pF
C _{oss}	Output Capacitance		-	360	-	
C _{rss}	Reverse Transfer Capacitance		-	8	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} =75 V, V _{GEN} =10 V, R _G =3 Ω, I _{DS} =20 A	-	13	-	ns
t _r	Turn-on Rise Time		-	24	-	
t _{d(off)}	Turn-off Delay Time		-	30	-	
t _f	Turn-off Fall Time		-	25	-	
Gate Charge Characteristics						
Q _g	Total Gate Charge	V _{DS} =75 V, V _{GS} =10 V, I _{DS} =20 A	-	30	-	nC
Q _{gs}	Gate-Source Charge		-	7.5	-	
Q _{gd}	Gate-Drain Charge		-	6.6	-	

Notes:

1. Tested by surface mounted on a 1 inch² FR-4 board with 2 OZ copper.
2. Tested by pulsed, pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
3. The E_{AS} data shows Max. rating. The test condition is $V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $L=0.5\text{ mH}$, $I_{AS}=45\text{ A}$.
4. The power dissipation is limited by 150°C junction temperature.
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

5. Typical Characteristics

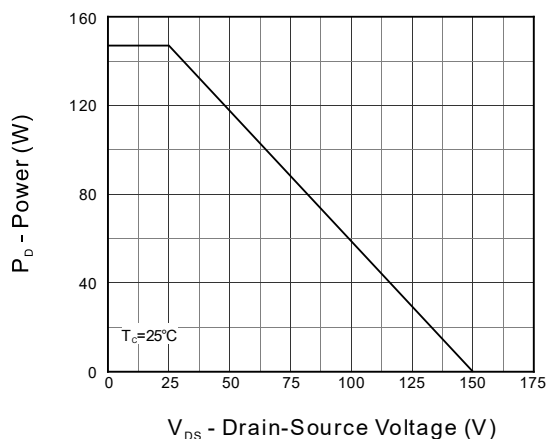


Figure 1. Output Characteristics

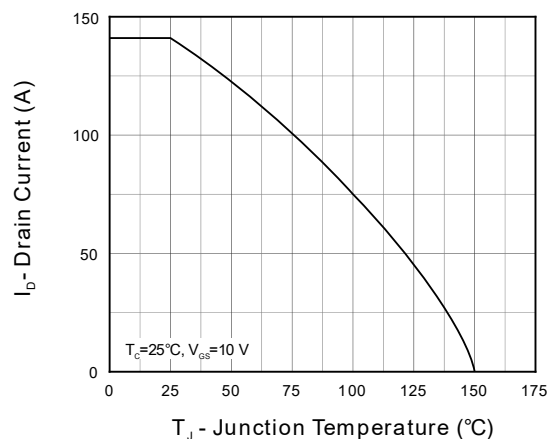


Figure 2. Current Capability

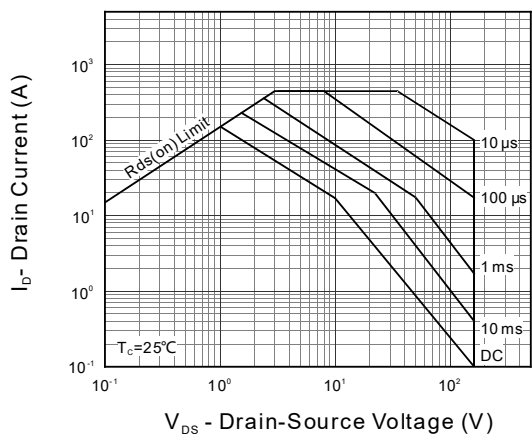


Figure 3. Safe Operation Area

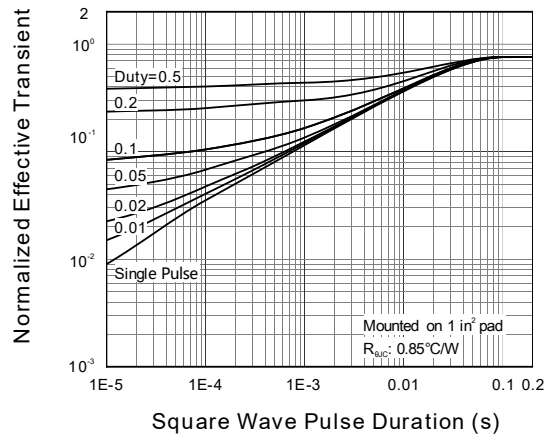


Figure 4. Transient Thermal Impedance

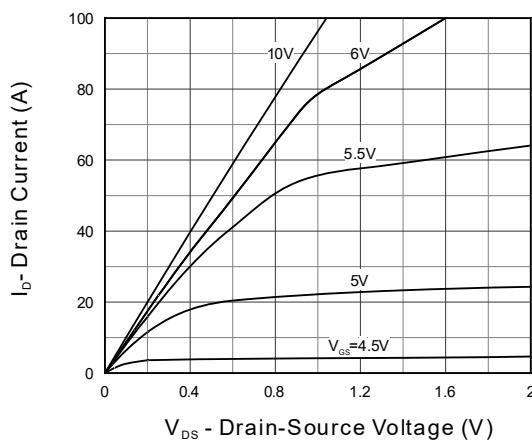


Figure 5. Output Characteristics

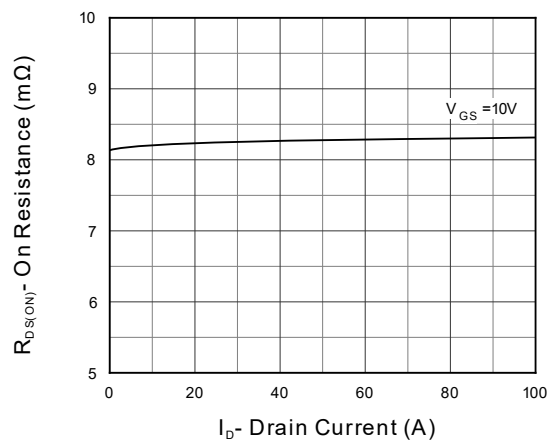


Figure 6. On Resistance

5. Typical Characteristics (cont.)

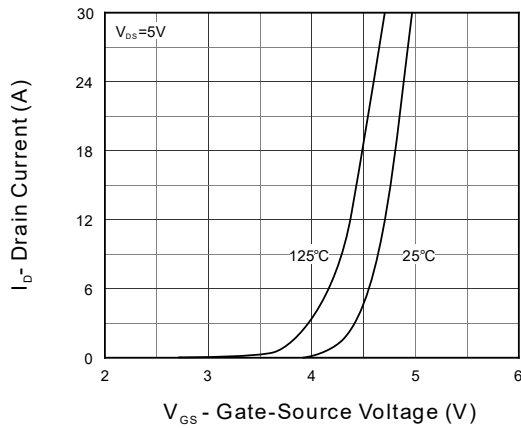


Figure 7. Transfer Characteristics

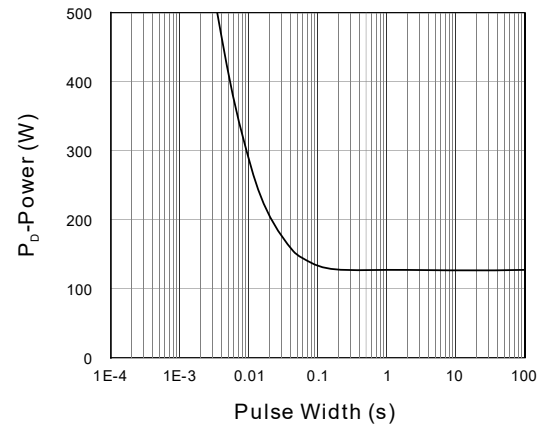


Figure 8. Single Pulse Power Rating, Junction-Case

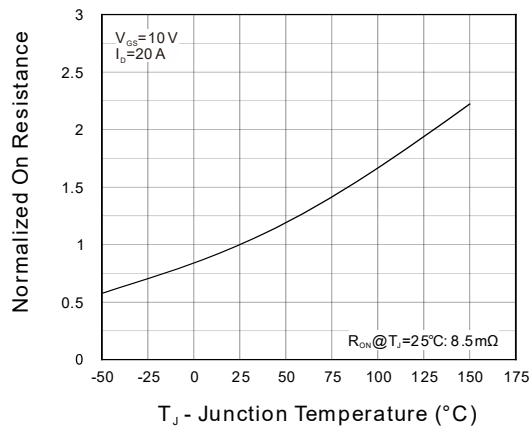


Figure 9. Normalized On Resistance

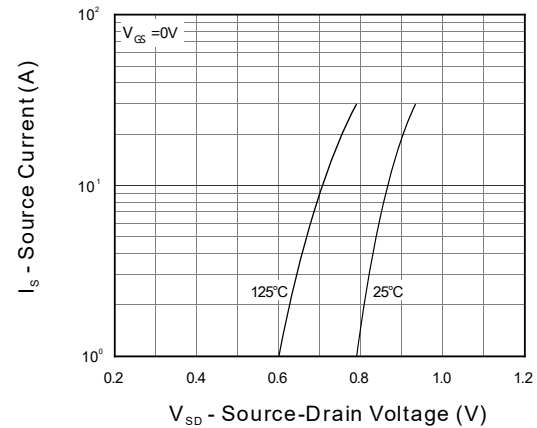


Figure 10. Diode Forward Current

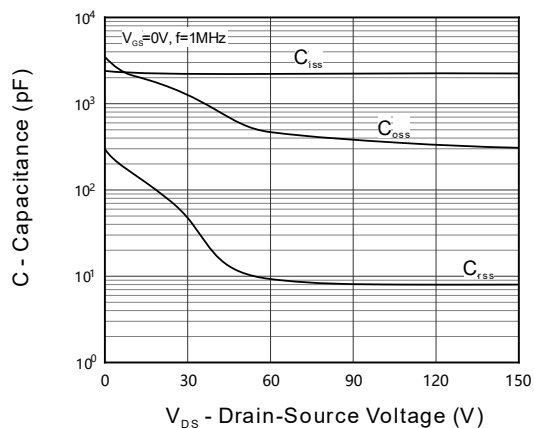


Figure 11. Capacitance

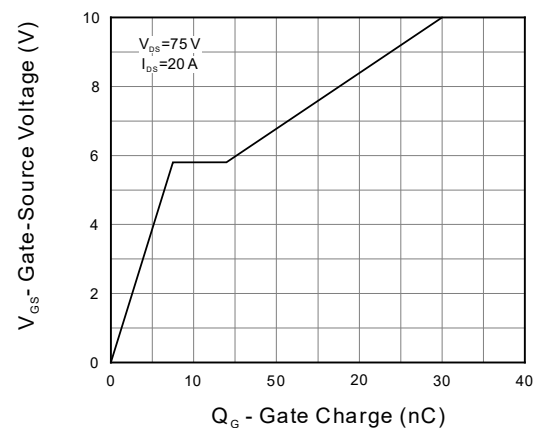
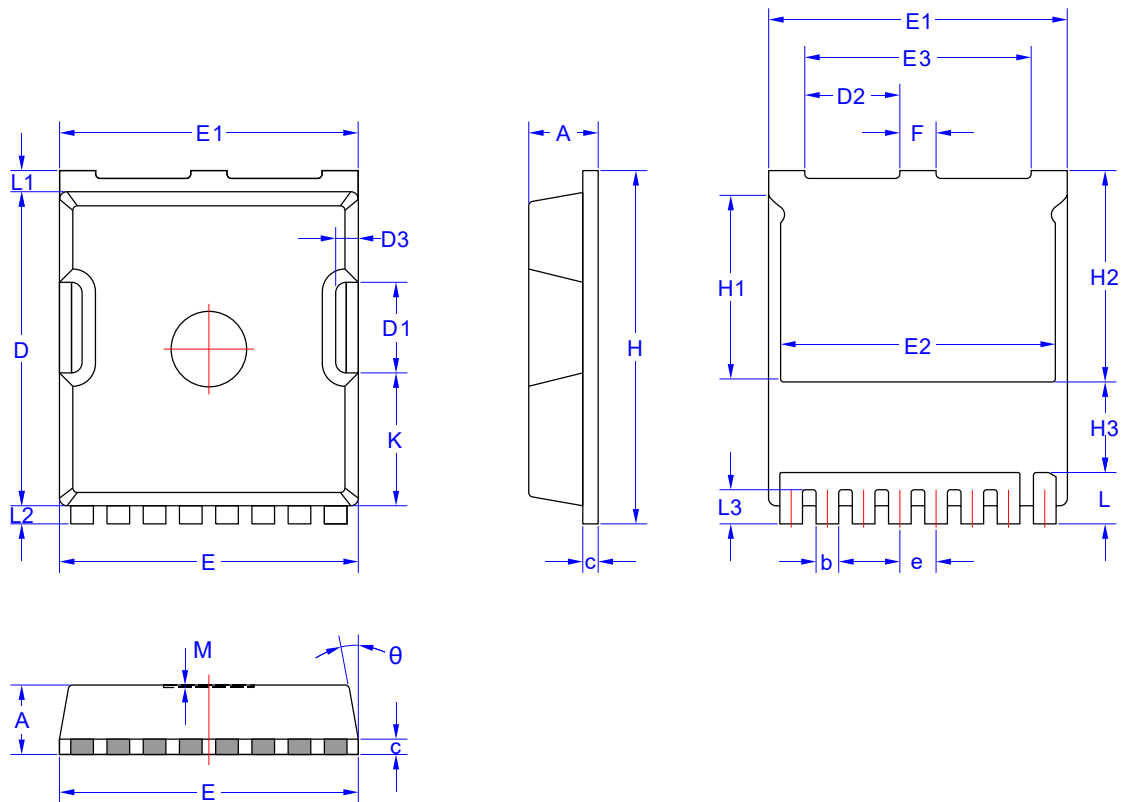


Figure 12. Gate Charge

6. Package Dimensions

TOLL-8L Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.65	0.75	0.85
c		0.508 REF	
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
D2	2.95	3.10	3.25
D3		0.75 REF	
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e		1.20 BSC	

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3		3.00 BSC	
K	4.25	4.40	4.55
L	1.55	1.70	1.85
L1	0.55	0.70	0.85
L2	0.45	0.60	0.75
L3	1.00	1.15	1.30
M		0.08 REF	
θ	8°	10°	12°