

P-Channel -60V MOSFET

FEATURES

- Trench Process Technology
- Ultra Low On-resistance Design

Application

- BMS Application
- Consumer Electronics
- DC/DC Converters

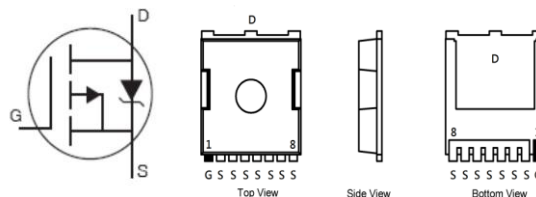
Mechanical

- Case:TOLL Package

PRODUCTY SUMMARY

V_{DS}	I_D	$R_{DS(on)}$ (m Ω) Max	
-60	-100	12.0	@ $V_{GS}=-10V$
		16.0	@ $V_{GS}=-4.5V$

TOLL



Packing Information

Package	Packing
TOLL	2K/13" Reel

Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise specified)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ²⁾	$T_C=25^{\circ}C, V_{GS}=-10V$	I_D	-100	A
	$T_C=25^{\circ}C, V_{GS}=-4.5V$		-91	
Pulsed Drain Current ¹⁾	$T_C=25^{\circ}C$	$I_{DM,pulesd}$	-400	A
Power Dissipation	$T_C=25^{\circ}C$	P_D	300	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^{\circ}C$

Typical Thermal Resistance

Parameter	Symbol	Limit	Unit
Junction-to-Ambient Thermal Resistance ⁵⁾	$R_{\theta JA}$	62	$^{\circ}C/W$
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	0.5	$^{\circ}C/W$

Note:

1. Pulse width<300us, Duty cycle<2%.

2. Fused current that based on wire numbers and diameter.

3. Guaranteed by design, not subject to production testing.

4. The maximum current rating is package limited.

5. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^{\circ}C$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^{\circ}C$.

Electrical Characteristics (T_A = 25°C UNLESS OTHERWISE NOTED)

Characteristics	Symbol	Test Condition	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	B _{VDSS}	V _{GS} =0V, I _D =-250μA	-60	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-1.5	-3.0	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =-10.0V, I _D =-100A	-	-	12	mΩ
		V _{GS} =-4.5V, I _D =-91A	-	-	16	mΩ
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-60V, V _{GS} =0V	-	-	-1.0	μA
GateSource Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	-100	nA

Dynamic ³⁾

Total Gate Charge	Q _g	V _{DS} =-30V, V _{GS} =0 to -10V, I _D =-100A		-281		nC
Gate-Source Charge	Q _{gs}			-30		
Gate-Drain Charge	Q _{gd}			-76		
Input Capacitance	C _{iss}	V _{DS} =-30V, V _{GS} =0V, f=1MHz		8500		pF
Output Capacitance	C _{oss}			1200		
Reverse Transfer Capacitance	C _{rss}			260		

Switching

Turn-On Delay Time	t _{d(on)}	V _{DS} =-30V, V _{GS} =-10V, R _g =1.6Ω, I _D =-50A	-	22	-	ns
Turn-On Rise Time	t _r		-	33	-	
Turn-Off Delay Time	t _{d(off)}		-	277	-	
Turn-Off Fall Time	t _f		-	74	-	

Drain-Source Diode

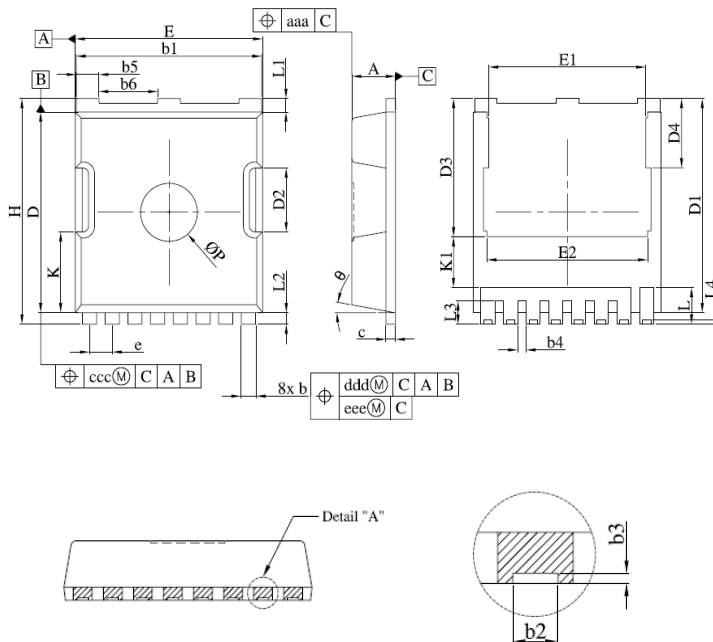
Maximum Continuous Body Diode Forward Current	I _S	T _C =25°C	-	-	-100	A
Diode Forward Voltage	V _{SD}	I _F =-100A, V _{GS} =0V, T _C =25°C	-	-0.9	-1.3	V
Reverse Recovery Time	t _{rr}	V _R =-30V, I _F =-100A, di _F /dt=100A/μS	-	88	-	ns
Reverse Recovery Charge	Q _{rr}		-	-324	-	nC

Note:

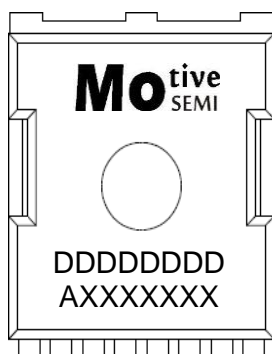
1. Pulse width<300us, Duty cycle<2%.
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.
4. The maximum current rating is package limited.
5. R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch² with 2oz.square pad of copper.
6. Guaranteed by design, not subject to production testing.

Package Outline Dimensions (inches and millimeters)

TOLL				
SYMBOL	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
b	0.70	0.90	0.028	0.035
b1	9.70	9.90	0.382	0.390
b2	0.36	0.55	0.014	0.022
b3	0.05	0.35	0.002	0.014
b4	0.30	0.50	0.012	0.020
b5	1.10	1.30	0.043	0.051
b6	3.00	3.20	0.118	0.126
c	0.40	0.60	0.016	0.024
D	10.28	10.55	0.405	0.415
D1	10.98	11.18	0.432	0.440
D2	3.20	3.40	0.126	0.134
D3	7.00	7.30	0.276	0.287
D4	3.44	3.74	0.135	0.147
e	1.10	1.30	0.043	0.051
E	9.80	10.00	0.386	0.394
E1	8.20	8.40	0.323	0.331
E2	8.35	8.65	0.329	0.341
H	11.50	11.85	0.453	0.467
K	4.08	4.28	0.161	0.169
K1	2.45	-	0.096	-
L	1.60	2.10	0.063	0.083
L1	0.50	0.90	0.020	0.035
L2	0.50	0.70	0.020	0.028
L3	1.00	1.30	0.039	0.051
L4	0.13	0.33	0.005	0.013
P	2.85	3.15	0.112	0.124
θ	10° REF.			
aaa	0.20		0.008	
ccc	0.20		0.008	
ddd	0.25		0.010	
eee	0.20		0.008	



Marking Information



First line = Company name

DDDDDDDD = Product number

A=TOLL

XXXXXXX = Tracking number

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