

N-Channel 40V MOSFET

FEATURES

- Advance Trench Process Technology
- High Density Cell Design for Ultra Low On-resistance

Application

- DC/DC converters
- Battery Protection
- Consumer Electronics

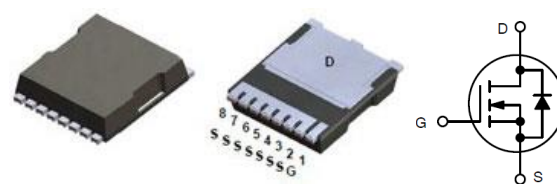
Mechanical

- Case: TOLL Package

PRODUCTY SUMMARY

V_{DS} (V)	I_D (A)	$R_{DS(on)}$ m(Ω) Max	
40	600	1.1	@ $V_{GS}=10V$
		1.5	@ $V_{GS}=4.5V$

TOLL



Packing Information

Package	Packing
TOLL	2000EA/13" Reel

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current, V_{GS} @10V (Silicon Limited) ¹⁾³⁾	I_D	600	A
Drain Current, V_{GS} @10V (Wire Bond Limited) ¹⁾³⁾	I_D	400	A
Peak Drain Current, Pulsed ¹⁾²⁾³⁾	I_{DM}	640	A
Maximum Power Dissipation ¹⁾	P_{tot}	500	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 ¹⁾	$R_{\theta JA}$	42	$^{\circ}C/W$
Junction-to-Ambient Thermal Resistance ¹⁾	$R_{\theta JC}$	0.25	$^{\circ}C/W$

Note:

1. Surface Mounted on a 1 in² pad area, $t_{\leq 10}sec$
2. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
3. Limited by bonding wire
4. Essentially independent of operating temperature typical characteristics.
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 $T_J = 25^{\circ}C$.
6. The maximum current rating is package limited.
7. Guaranteed by design, not subject to production testing.

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 =250uA	40	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	1.00	1.50	2.50	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10.0V, I _D =95.0A	-	-	1.1	mΩ
		V _{GS} =4.5V, I _D =20.0A	-	-	1.5	mΩ
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1.0	uA
GateSource Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	± 100	nA

Dynamic ²⁾						
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =1.0A	-	352	-	nC
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =4.5V, I _D =1.0A	-	171	-	nC
Gate-Source Charge	Q _{gs}		-	38	-	nC
Gate-Drain Charge	Q _{gd}		-	66	-	nC
Gate resistance	R _G	V _{DS} =20V, V _{GS} =0V, f=200KHz	-	0.82	-	Ω
Input Capacitance	C _{iss}		-	21865	-	pF
Output Capacitance	C _{oss}		-	1190	-	pF
Reverse Transfer Capacitance	C _{rss}		-	1155	-	pF

Switching						
Turn-On Delay Time	t _{d(on)}	V _{DS} =20V, R _L =10.0Ω, V _{GEN} =10V, R _G =3.0Ω	-	53	-	ns
Turn-On Rise Time	t _r		-	36	-	ns
Turn-Off Delay Time	t _{d(off)}		-	357	-	ns
Turn-Off Fall Time	t _f		-	100	-	ns

Drain-Source Diode						
Body-Diode Continuous Current	I _S	-	-	-	160	A
Diode Forward Voltage ¹⁾	V _{SD}	I _{SD} =50A, V _{GS} =0V	-	-	1.3	V

Note:

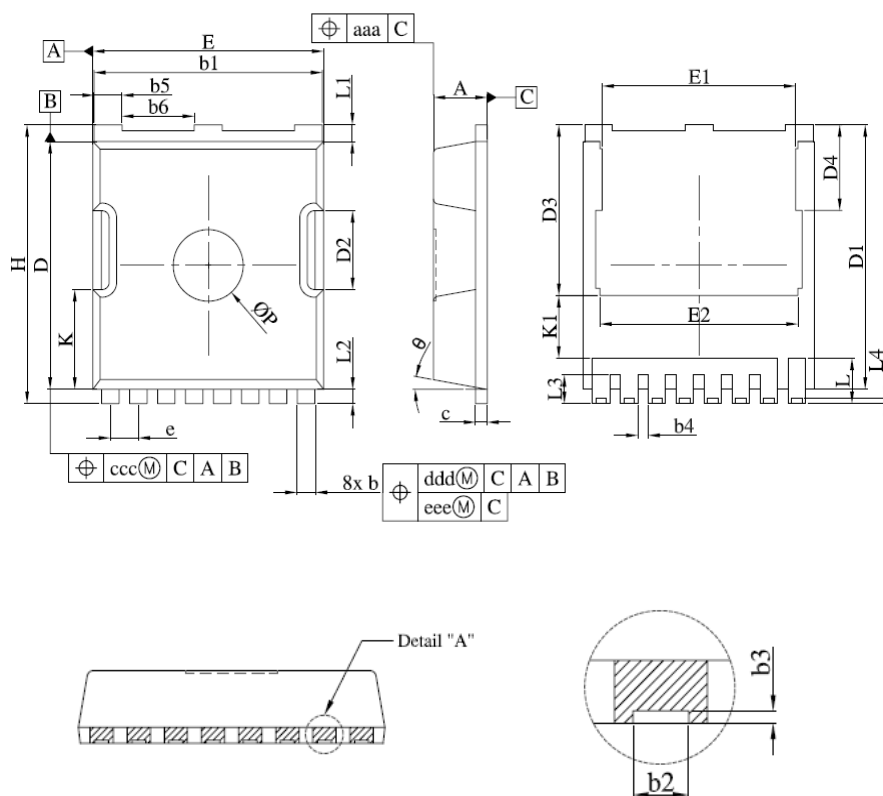
1. Pulse width<300us, Duty cycle<2%.

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

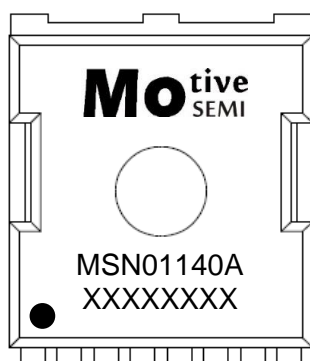
Package Outline Dimensions (inches and millimeters)

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

MSN01140A = Product number

XXXXXXX = Tracking number

Fourth line = Gate pin point

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