

**P-Channel -40V MOSFET**
**FEATURES**

- Trench Process Technology
- Ultra Low On-resistance Design

**Application**

- BMS Application
- Consumer Electronics
- DC/DC Converters

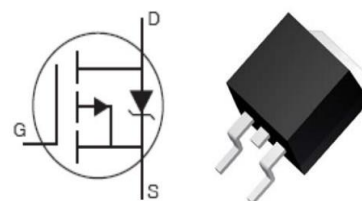
**Mechanical**

- Case:TO-263 Package

**Packing Information**

Package	Packing
TO-263	800EA/13" Reel

PRODUCTY SUMMARY				
$V_{DS}$	$I_D$	$R_{DS(on)}$ (m $\Omega$ ) Max		
-40	-120	3.1	@ $V_{GS}=10$	V
		3.8	@ $V_{GS}=4.5$	V

**TO-263**


Maximum Ratings ( $T_A=25^{\circ}\text{C}$ unless otherwise specified)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		$V_{DS}$	-40	V
Gate-Source Voltage		$V_{GS}$	$\pm 25$	V
Continuous Drain Current <sup>2)</sup>	$T_C=25^{\circ}\text{C}, V_{GS}=-10\text{V}$	$I_D$	-120	A
	$T_C=100^{\circ}\text{C}, V_{GS}=-10\text{V}^{3)}$		-114	
Pulsed Drain Current <sup>1)</sup>	$T_C=25^{\circ}\text{C}$	$I_{DM.pulesd}$	-480	A
Avalanche Current		$I_{AS}$	-120	A
Avalanche Energy	$I_D=-60\text{A}$	$E_{AS}$	60	mJ
Power Dissipation	$T_C=25^{\circ}\text{C}$	$P_D$	136	W
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 175	$^{\circ}\text{C}$

Typical Thermal Resistance			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient Thermal Resistance <sup>5)</sup>	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	1.1	$^{\circ}\text{C/W}$

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  $T_{J(MAX)}=150^{\circ}\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^{\circ}\text{C}$ .

**Electrical Characteristics (T<sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)**

Characteristics	Symbol	Test Condition	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	B <sub>VDSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-40	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.0	-1.6	-2.5	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10.0V, I <sub>D</sub> =-95A	-	-	3.1	mΩ
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-75A	-	-	3.8	mΩ
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V	-	-	-1.0	μA
GateSource Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V	-	-	±100	nA

**Dynamic <sup>3)</sup>**

Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-120A	-	369	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	30	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	72	-	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, f=1MHz	-	19678	-	pF
Output Capacitance	C <sub>oss</sub>		-	1254	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	1270	-	

**Switching**

Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =-10V, Rg=3.0Ω, I <sub>D</sub> =-120A	-	52	-	ns
Turn-On Rise Time	t <sub>r</sub>		-	47	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	418	-	
Turn-Off Fall Time	t <sub>f</sub>		-	118	-	

**Drain-Source Diode**

Maximum Continuous Body Diode Forward Current	I <sub>S</sub>	T <sub>C</sub> =25°C	-	-	-120	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> =-95A, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C	-	-0.66	-1	V
Reverse Recovery Time	t <sub>rr</sub>	V <sub>R</sub> =-20V, I <sub>F</sub> =-50A, di <sub>F</sub> /dt=100A/μS	-	54	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	60	-	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<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25°C.

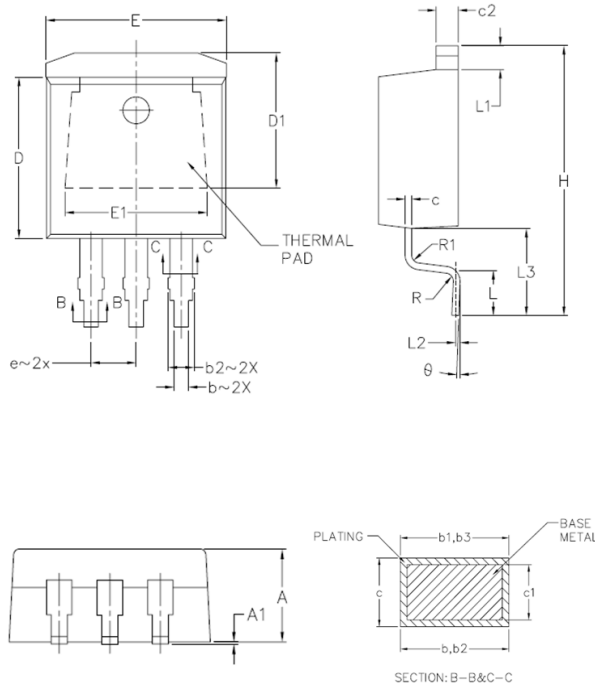
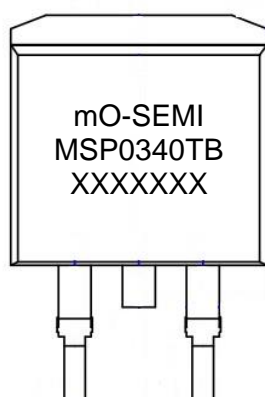
4. The maximum current rating is package limited.

5. R<sub>QJA</sub> 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)**

TO-263				
SYMBOL	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	4.064	4.826	0.160	0.190
A1	0.000	0.254	0.000	0.010
b	0.508	0.991	0.020	0.039
b1	0.508	0.889	0.020	0.035
b2	1.143	1.778	0.045	0.070
b3	1.143	1.727	0.045	0.068
c	0.381	0.737	0.015	0.029
c1	0.381	0.584	0.015	0.023
c2	1.143	1.651	0.045	0.065
D	8.382	9.652	0.330	0.380
D1	6.858	-	0.270	-
E	9.652	10.668	0.380	0.420
E1	6.223	-	0.245	-
e	2.54BSC		0.10BSC	
H	14.605	15.875	0.575	0.625
L	1.778	2.790	0.070	0.110
L1	-	1.676	-	0.066
L2	0.254BSC		0.010BSC	
L3	4.780	5.280	0.188	0.208
R	0.460 TYP		0.018 TYP	
R1	0.460 TYP		0.018 TYP	
θ	0°	8°	0°	8°


**Marking Information**


mO-SEMI

=Series Name

MSP0340

=Part Number Marking Code

XXXXXXX

=Product Tracking Code

\*TB=TO-263

=Single TO-263

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