

Data Sheet

B15N10D

N- Channel 100-V (D-S) MOSFET

Version: A3

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General Description:

The B15N10D is the N-Channel logic enhancement mode power field effect transistors to provide excellent $R_{DS(on)}$, low gate charge and low gate resistance. It's up to 100V operation voltage is well suited in switching mode power supply, SMPS, notebook computer power management and other battery powered circuits.

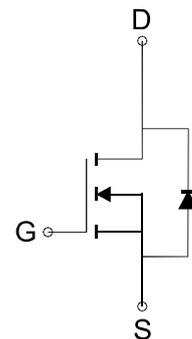
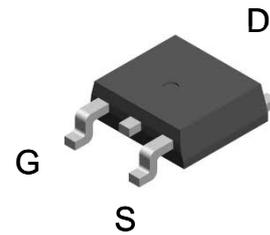
Features:

- $R_{DS(ON)} \leq 105m\Omega @ V_{GS}=10V$ (N-Ch)
- Super high cell density design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current

Applications:

- Switching power supply, SMPS
- Battery Powered System
- DC/DC Converter
- DC/AC Converter
- Load Switch

Pin layout



N-Channel MOSFET

Absolute maximum ratings ($T_A=25^\circ C$ unless otherwise noted):				
Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current ($T_j=150^\circ C$)*	$T_c=25^\circ C$	I_D	15	A
	$T_c=70^\circ C$		13	
Pulsed Drain Current		I_{DM}	60	A
Maximum Power Dissipation	$T_c=25^\circ C$	P_D	42	W
	$T_c=70^\circ C$		27	
Operating Junction Temperature		T_J	-55 to 150	$^\circ C$
Thermal Resistance-Junction to Case*		$R_{\theta JC}$	3	$^\circ C/W$

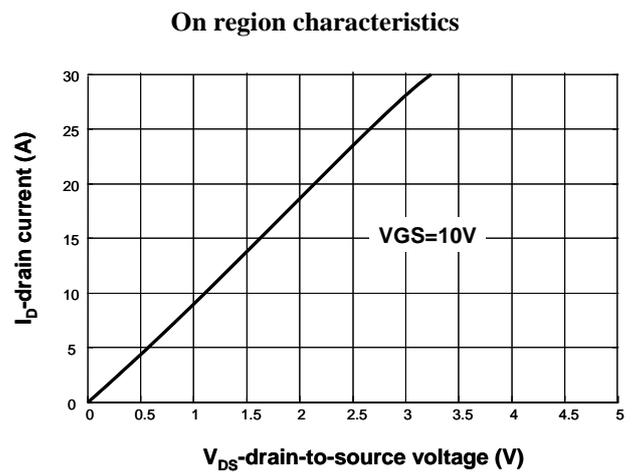
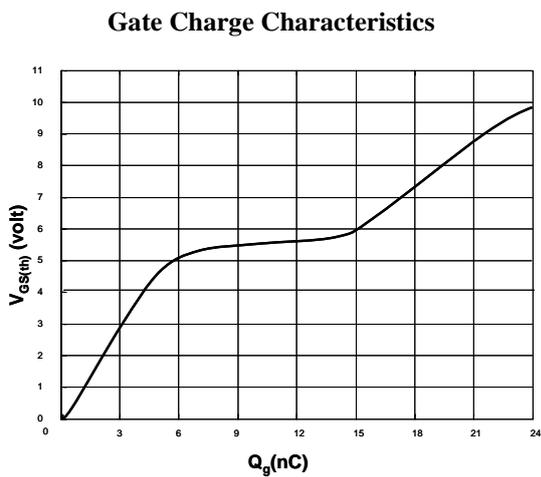
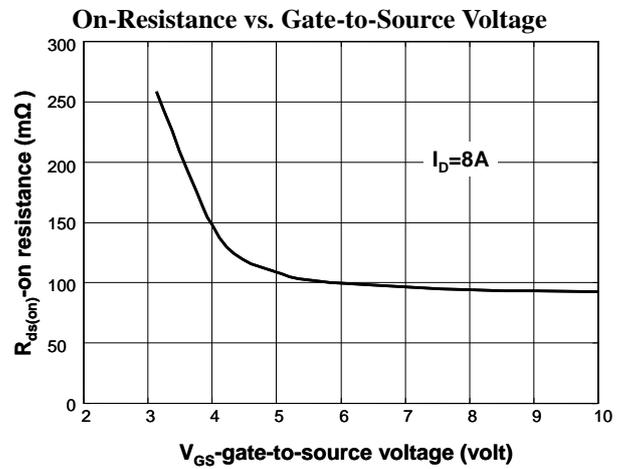
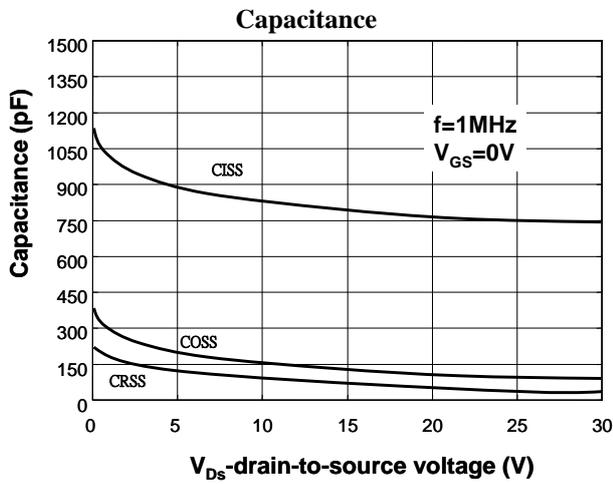
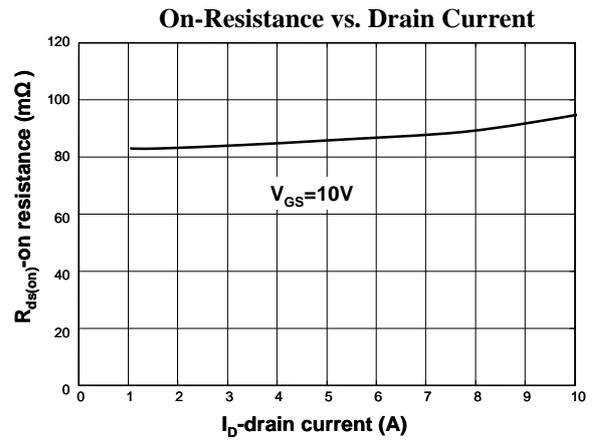
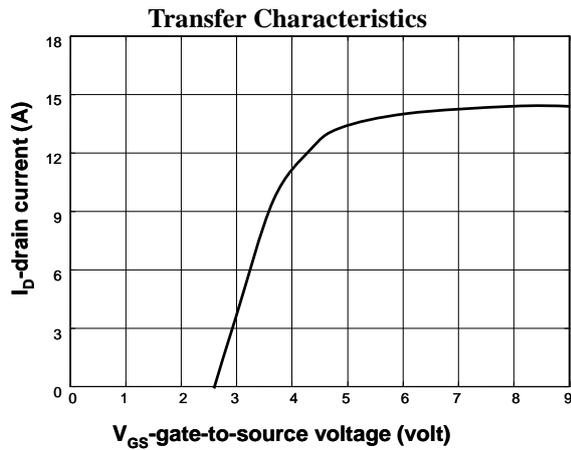
*The device mounted on 1in2 FR4 board with 2 oz copper

Electrical characteristics ($T_A = 25^\circ\text{C}$ unless otherwise specified):						
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
STATIC						
V_{DS}	Drain-source breakdown voltage	$V_{GS}=0V, I_D=1\text{mA}$	100			V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS}=V_{GS}, I_D=250\ \mu\text{A}$	1		3	V
I_{GSS}	Gate leakage current	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
I_{DSS}	Zero gate voltage drain current	$V_{DS}=80V, V_{GS}=0V$			1	μA
$R_{DS(ON)}$	Drain-source on-resistance. Note 1	$V_{GS}=10V, I_D=8\text{A}$		80	105	$\text{m}\Omega$
V_{SD}	Diode forward voltage	$I_S=1\text{A}$		0.9	1.2	V
DYNAMIC						
C_{iss}	Input capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHz}, \text{Note 2}$		751	980	pF
C_{oss}	Output capacitance			71	97	
C_{rss}	Reverse transfer capacitance			48	66	
Q_g	Total gate charge	$V_{DS}=80V, V_{GS}=10V,$ $I_D=10\text{A}, \text{Note 2}$		16.8	23	nC
Q_{gs}	Gate-source charge	$V_{DS}=80V, V_{GS}=10V,$ $I_D=10\text{A}, \text{Note 2}$		4.88	7.4	
Q_{gd}	Gate-drain charge			2.96	4.3	
$t_{d(on)}$	Turn-on delay time	$V_{DS}=50V, R_L=5\Omega$ $I_D=10\text{A}, V_{GS}=10V$ $R_G=10\Omega, \text{Note 2}$		17.6	57	ns
t_r	Turn-on rise time			18	27	
$t_{d(off)}$	Turn-off delay time			34.8	63.8	
t_f	Turn-off fall time			8.4	27.5	

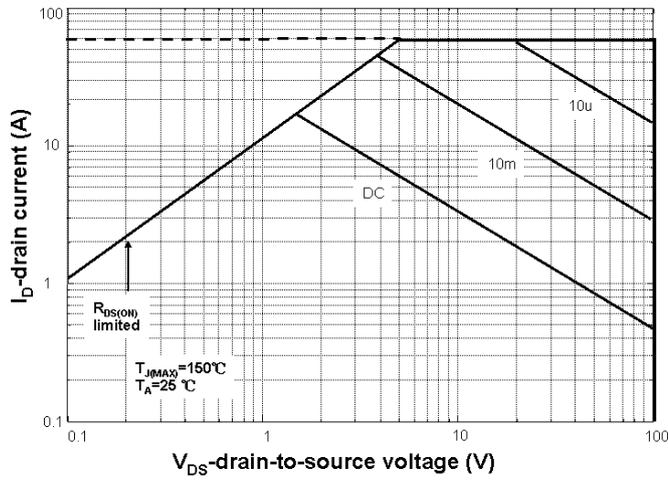
Notes:

1. Pulse test; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
2. Guaranteed by design.

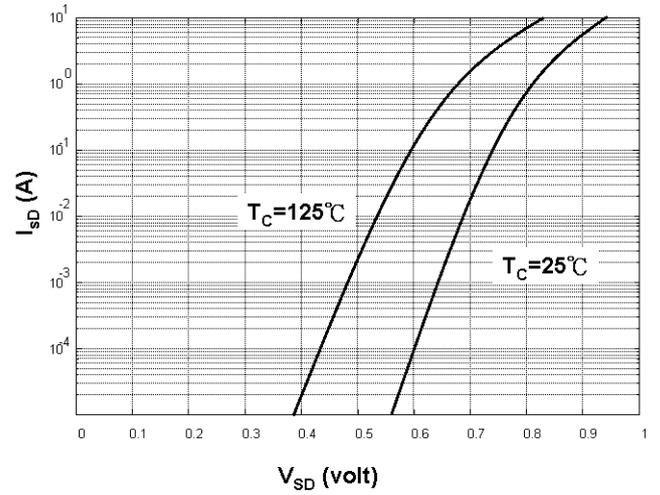
Typical Characteristics (T_J = 25°C Noted):



Maximum Forward Biased Safe Operating Area



Body diode characteristics



Soldering Information

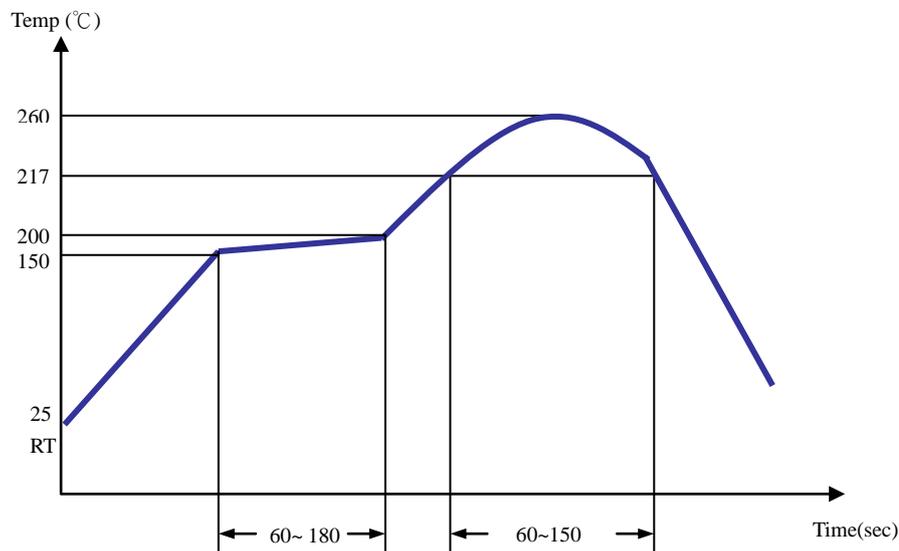
Reflow Soldering:

The choice of heating method may be influenced by plastic QFP package). If infrared or vapor phase heating is used and the package is not absolutely dry (less than 0.1% moisture content by weight), vaporization of the small amount of moisture in them can cause cracking of the plastic body. Preheating is necessary to dry the paste and evaporate the binding agent. Preheating duration: 45 minutes at 45 °C.

Reflow soldering requires solder paste (a suspension of fine solder particles, flux and binding agent) to be applied to the printed-circuit board by screen printing, stenciling or pressure-syringe dispensing before package placement. Several methods exist for reflowing; for example, convection or convection/infrared heating in a conveyor type oven. Throughput times (preheating, soldering and cooling) vary between 100 and 200 seconds depending on heating method.

Typical reflow peak temperatures range from 215 to 270 °C depending on solder paste material. The top-surface temperature of the packages should preferably be kept below 245 °C for thick/large packages (packages with a thickness ≥ 2.5 mm or with a volume ≥ 350 mm³ so called thick/large packages). The top-surface temperature of the packages should preferably be kept below 260 °C for thin/small packages (packages with a thickness < 2.5 mm and a volume < 350 mm³ so called thin/small packages).

Stage	Condition	Duration
1'st Ram Up Rate	max3.0+/-2°C/sec	-
Preheat	150°C ~200°C	60~180 sec
2'nd Ram Up	max3.0+/-2°C/sec	-
Solder Joint	217°C above	60~150 sec
Peak Temp	260 +0/-5°C	20~40 sec
Ram Down rate	6°C/sec max	-



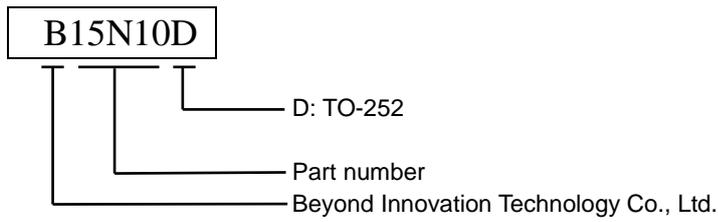
Wave Soldering:

Conventional single wave soldering is not recommended for surface mount devices (SMDs) or printed-circuit boards with a high component density, as solder bridging and non-wetting can present major problems.

Manual Soldering:

Fix the component by first soldering two diagonally-opposite end leads. Use a low voltage (24 V or less) soldering iron applied to the flat part of the lead. Contact time must be limited to 10 seconds at up to 300 °C. When using a dedicated tool, all other leads can be soldered in one operation within 2 to 5 seconds between 270 and 320 °C.

Order Information:



P/N	package	MOQ	SPQ
B15N10D	TO-252	2,500	2,500/Reel

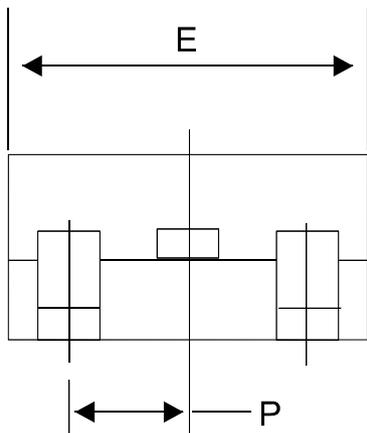
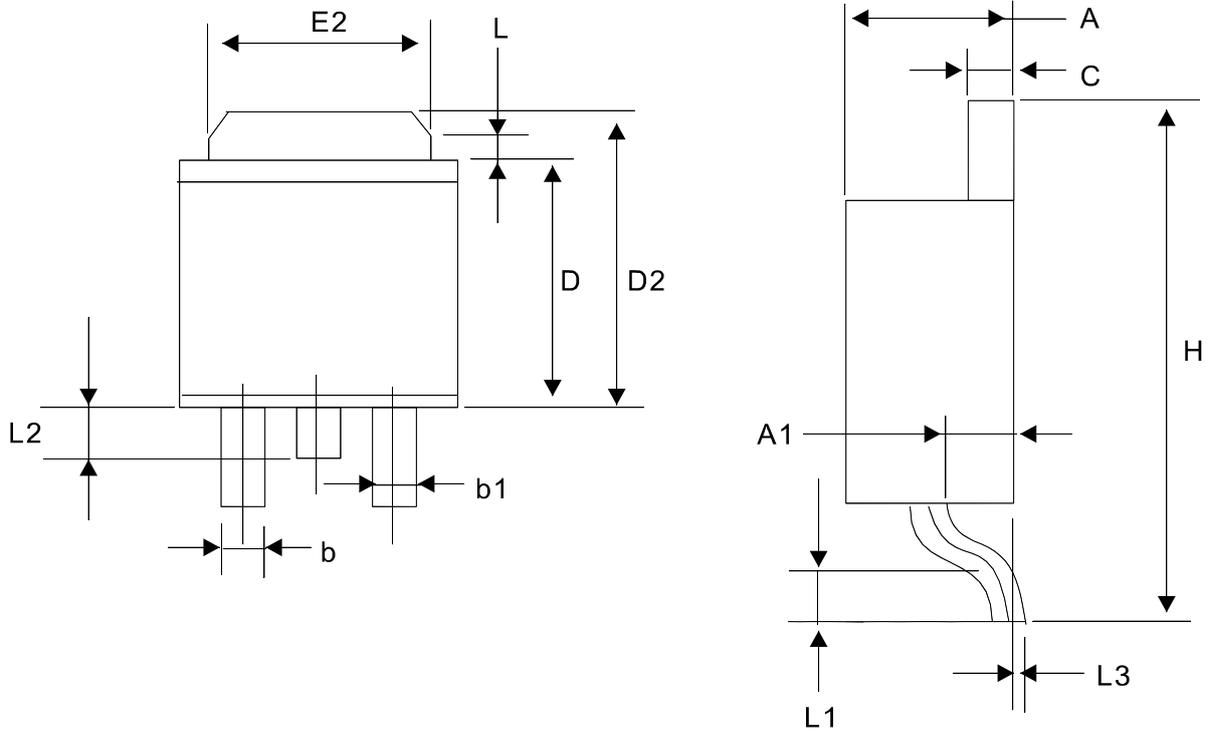
Marking Identification:



Remark	B15N10D : Product name
	LOTNO : Lot number
	ZYYWW : Date code

Package Information :

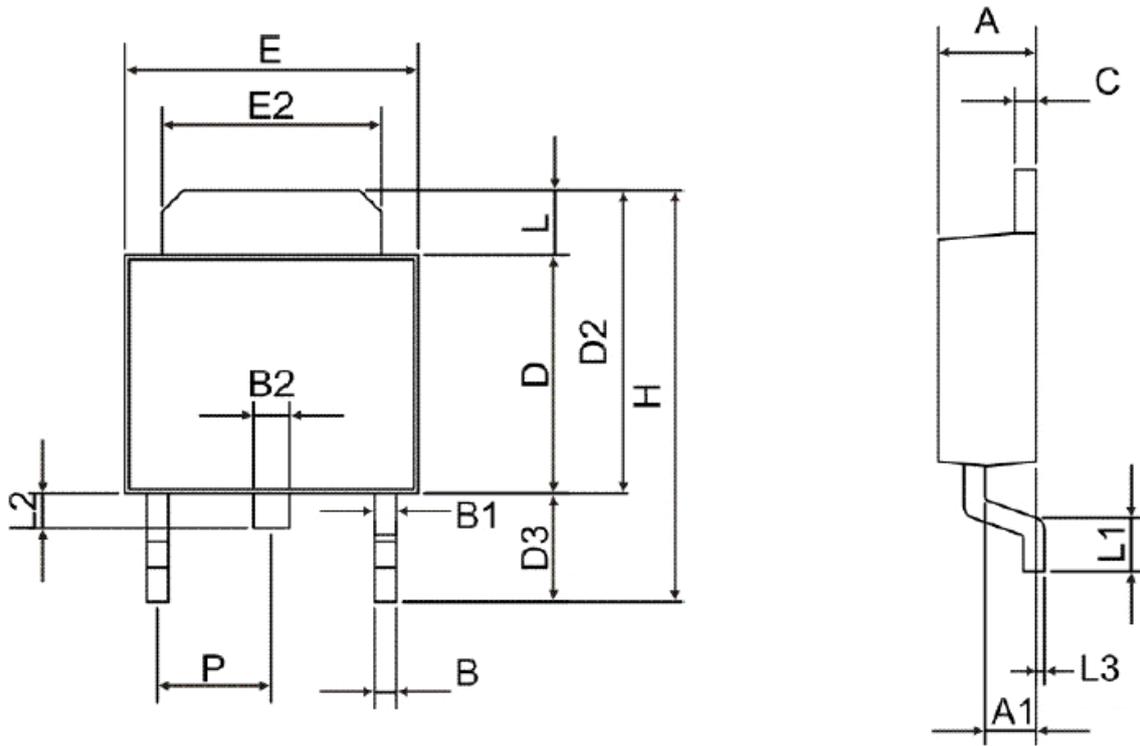
TO-252 Package Type I



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.250	2.350	0.089	0.093
A1	0.950	1.050	0.037	0.041
C	0.490	0.530	0.019	0.021
E	6.400	6.600	0.252	0.260
E2	5.300	5.450	0.209	0.215
D	6.000	6.200	0.236	0.244
D2	7.100	7.300	0.280	0.287
H	9.700	10.100	0.382	0.398
L	0.600	Ref	0.024	Ref
L1	1.425	1.625	0.056	0.064
L2	0.650	0.850	0.026	0.033
L3	0.020	0.120	0.001	0.005
b	0.770	0.850	0.030	0.033
b1	0.840	0.940	0.033	0.037
P	2.290	BSC	0.090	BSC

Package Information :

TO-252 Package Type II



SYMBOL	MILLIMETERS (mm)	
	MIN	MAX
A	2.00	2.50
A1	0.90	1.30
B	0.50	0.85
B1	0.50	0.80
B2	0.50	1.00
C	0.40	0.60
D	5.20	5.70
D2	6.50	7.30
D3	2.20	3.00
H	9.50	10.50
E	6.30	6.80
E2	4.50	5.50
L	1.30	1.70
L1	0.90	1.70
L2	0.50	1.10
L3	0	0.30
P	2.00	2.80