

## P-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω) Max.	I <sub>D</sub> (A)	Q <sub>g</sub> (Typ.)
- 100	0.214 at V <sub>GS</sub> = - 10 V	- 18	37
	0.221 at V <sub>GS</sub> = - 4.5 V	- 14	

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

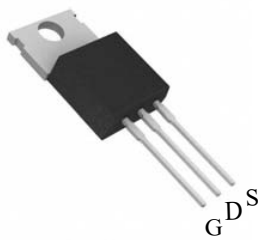


**RoHS**  
COMPLIANT

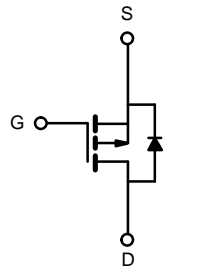
### APPLICATIONS

- Power Switch
- Load Switch in High Current Applications
- DC/DC Converters

TO-220 Pin Configuration



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V <sub>DS</sub>	- 100	V	
Gate-Source Voltage	V <sub>GS</sub>	± 20		
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	- 18	
		T <sub>C</sub> = 70 °C	- 13	
Pulsed Drain Current (t = 300 μs)	I <sub>DM</sub>	- 100	A	
Avalanche Current	I <sub>AS</sub>	- 10		
Single Avalanche Energy <sup>a</sup>	L = 0.1 mH	E <sub>AS</sub>	31	mJ
Maximum Power Dissipation <sup>a</sup>	T <sub>C</sub> = 25 °C	P <sub>D</sub>	11.7 <sup>b</sup>	W
	T <sub>A</sub> = 25 °C <sup>c</sup>		1.1	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient (PCB Mount) <sup>c</sup>	R <sub>thJA</sub>	60	°C/W
Junction-to-Case (Drain)	R <sub>thJC</sub>	9	

Notes:

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

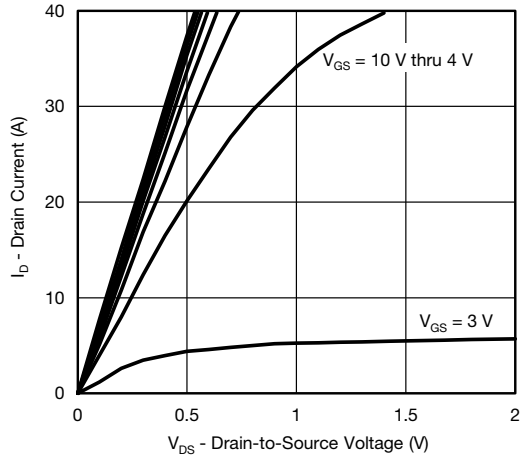
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{DS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-100			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3.5	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 250$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-250	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \leq -10\text{ V}, V_{GS} = -10\text{ V}$	-18			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -14\text{ A}$		0.214		$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -12\text{ A}$		0.221		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -20\text{ V}, I_D = -14\text{ A}$		20		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = -20\text{ V}, f = 1\text{ MHz}$		1765		$\mu\text{F}$
Output Capacitance	$C_{oss}$			330		
Reverse Transfer Capacitance	$C_{rss}$			280		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = -20\text{ V}, V_{GS} = -10\text{ V}, I_D = -14\text{ A}$		67	100	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			13.5		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			14		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$	0.5	2.5	5	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = -20\text{ V}, R_L = 2\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		10	20	ns
Rise Time <sup>c</sup>	$t_r$			11	20	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			42	63	
Fall Time <sup>c</sup>	$t_f$			12	20	
<b>Drain-Source Body Diode Ratings and Characteristics</b> $T_C = 25\text{ }^\circ\text{C}^b$						
Continuous Current	$I_S$				-18	A
Pulsed Current	$I_{SM}$				-100	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = -10\text{ A}, V_{GS} = 0\text{ V}$		-0.8	-1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = -10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		38	57	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.3	3.5	A
Reverse Recovery Charge	$Q_{rr}$			40	60	nC

**Notes:**

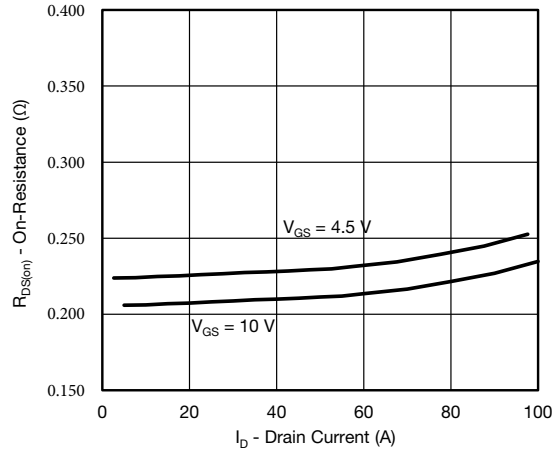
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

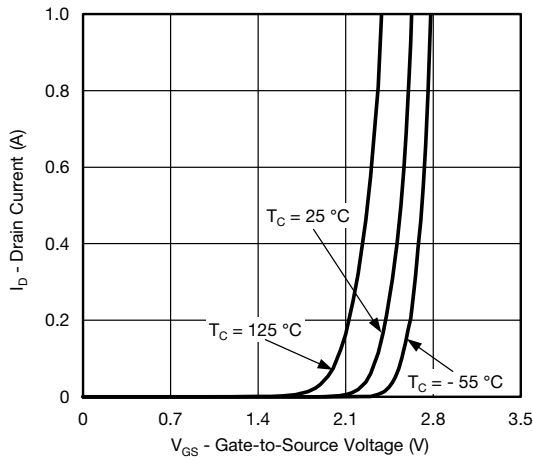
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



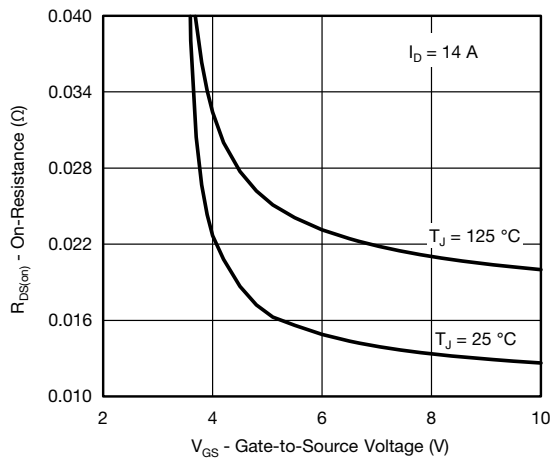
**Output Characteristics**



**On-Resistance vs. Drain Current**



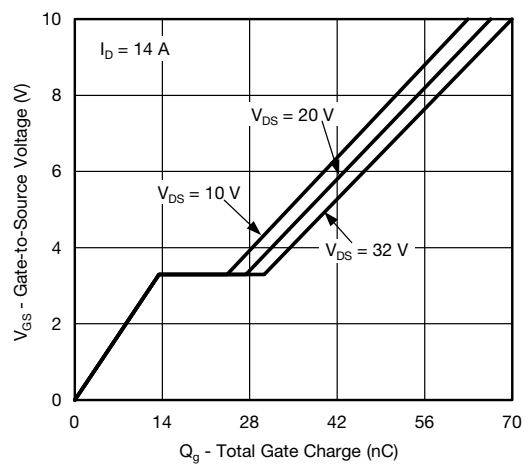
**Transfer Characteristics**



**On-Resistance vs. Gate-to-Source Voltage**



**Transconductance**



**Gate Charge**

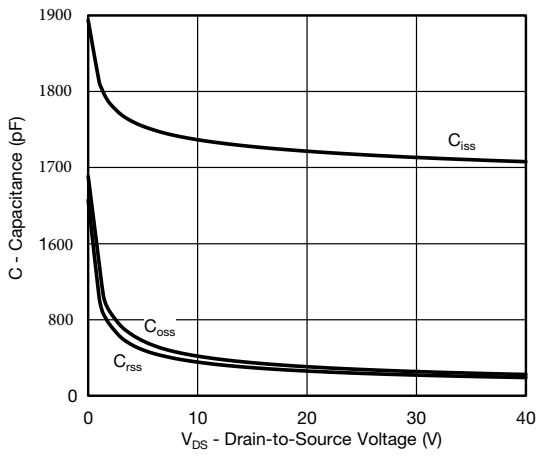
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



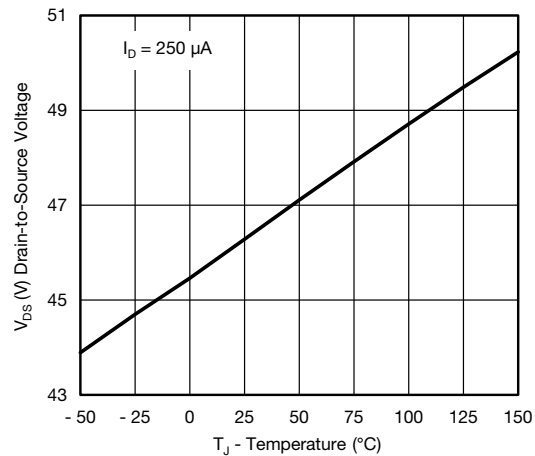
**Source-Drain Diode Forward Voltage**



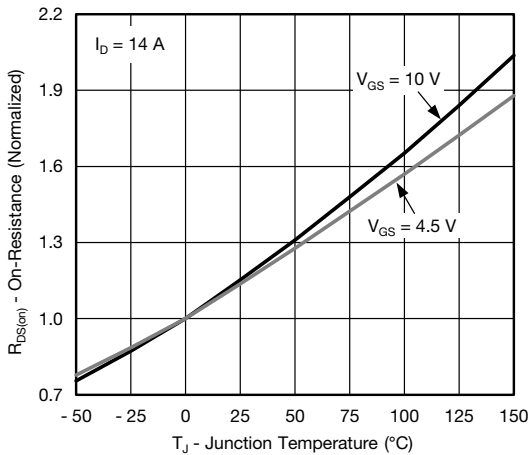
**Threshold Voltage**



**Capacitance**



**Drain Source Breakdown vs. Junction Temperature**

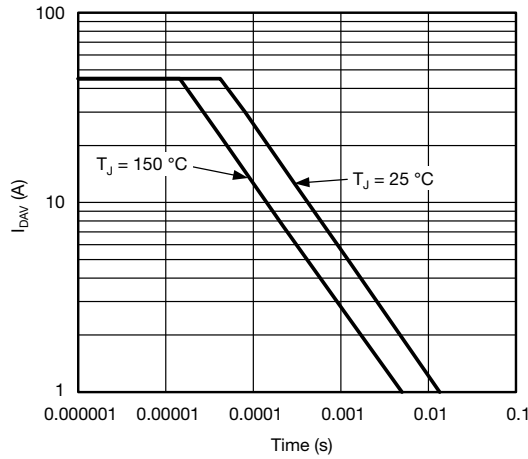


**On-Resistance vs. Junction Temperature**

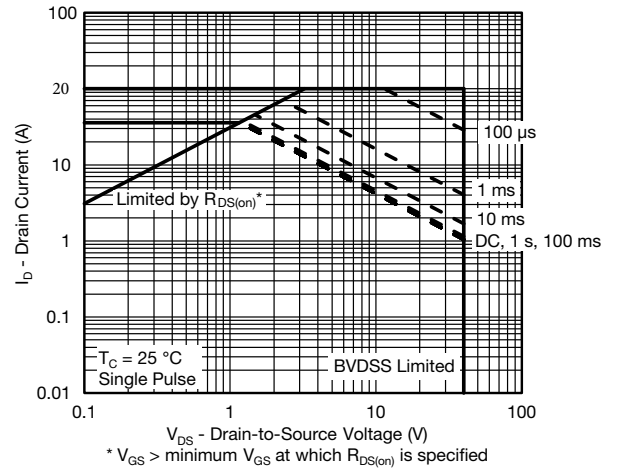


**Current Derating**

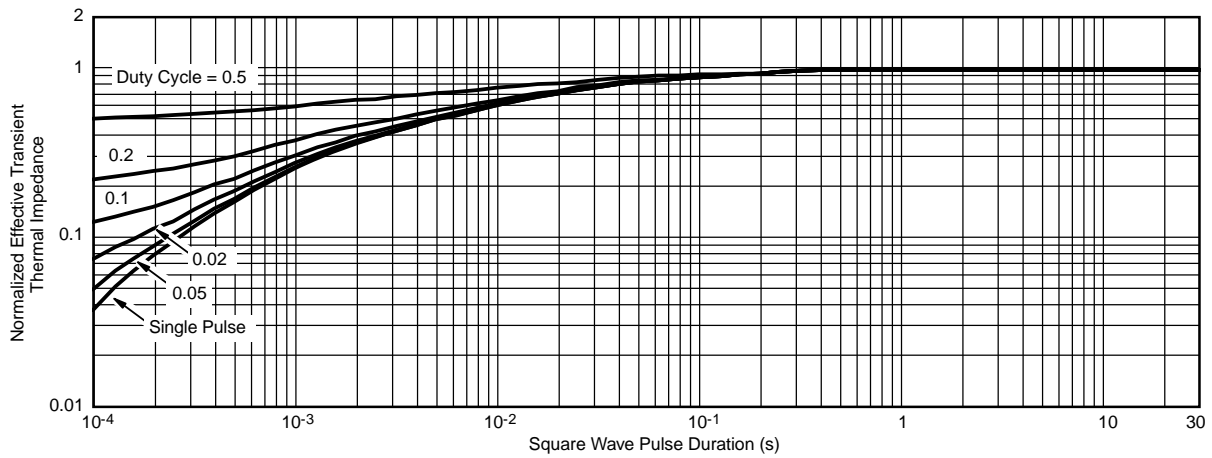
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**Single Pulse Avalanche Current Capability vs. Time**

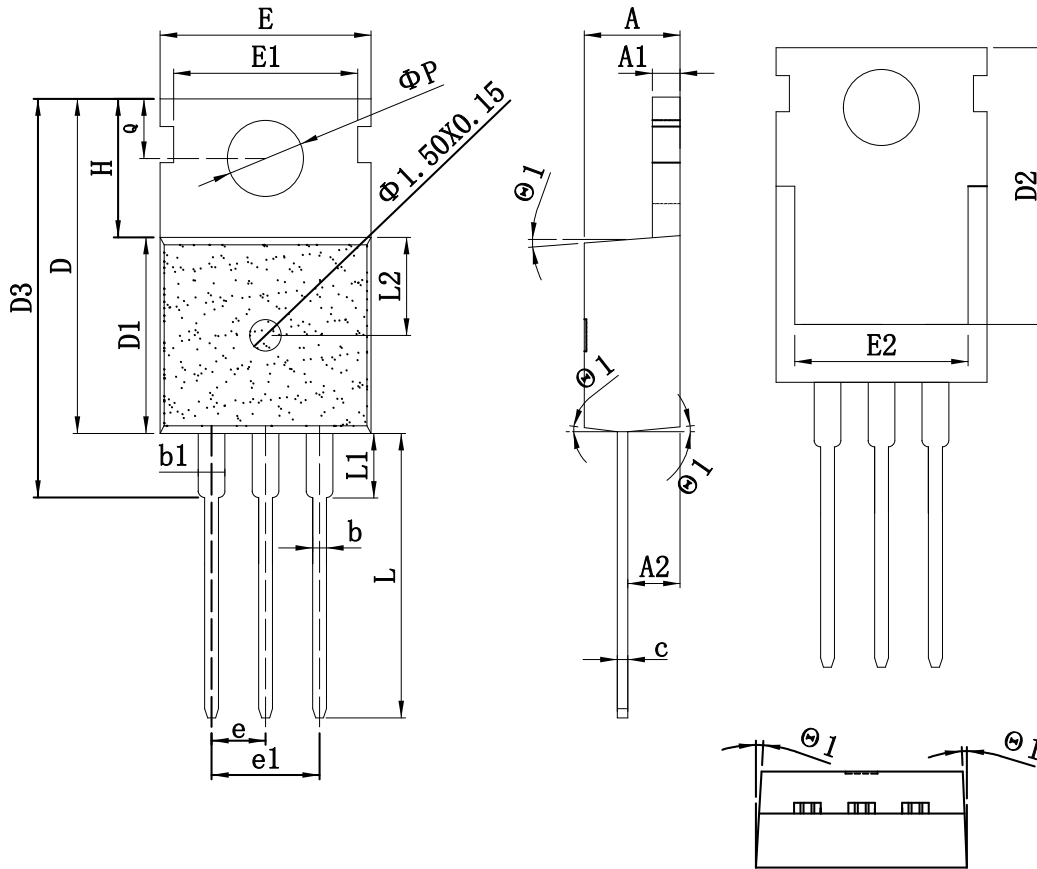


**Safe Operating Area**



**Normalized Thermal Transient Impedance, Junction-to-Case**

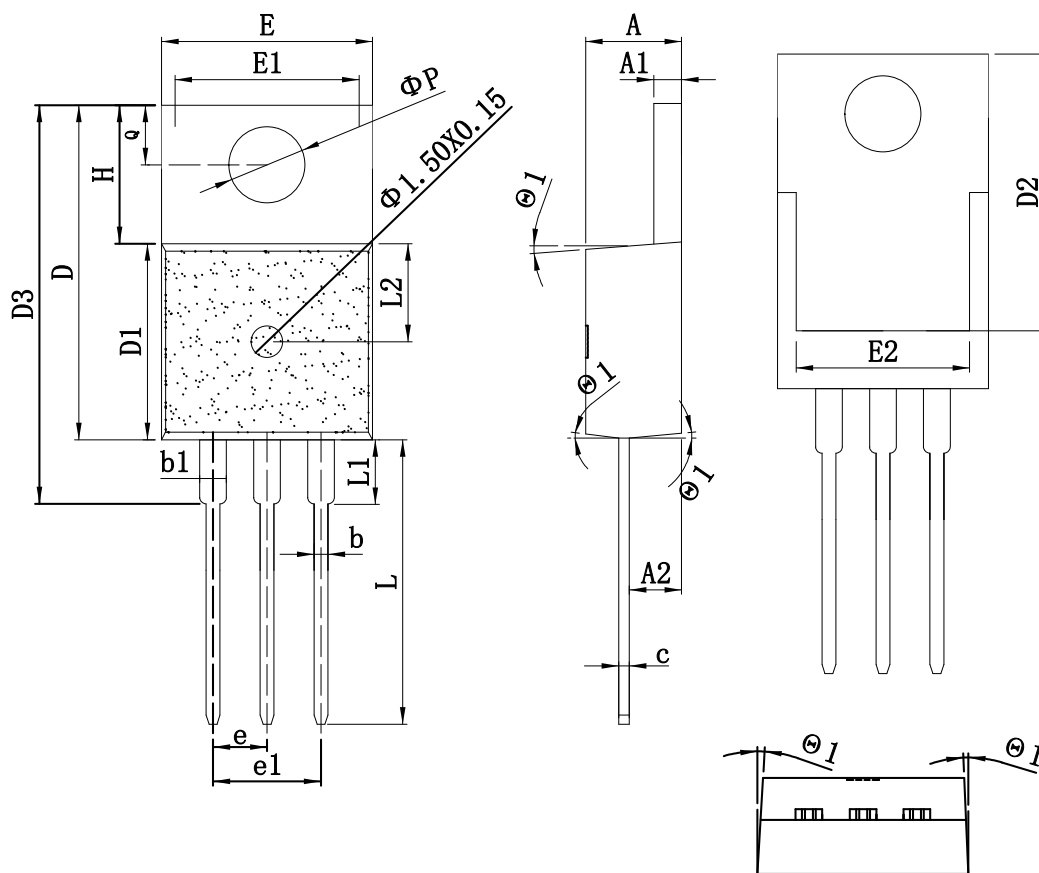
**TO-220\_3L-A PACKAGE OUTLINE**



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	mm			SYMBOL	mm		
	MIN	TYP	MAX		MIN	TYP	MAX
A	4.15	4.50	4.80	E1	8.25	8.70	9.15
A1	1.15	1.30	1.50	E2	7.20	8.00	8.80
A2	2.10	2.40	2.65	e	2.38	2.54	2.74
b	0.65	0.80	1.00	e1	5.08REF		
b1	1.10	1.33	1.80	H	6.20	6.50	6.90
c	0.35	0.50	0.65	L	12.75	13.28	13.70
D	14.25	15.75	16.15	L1	-	-	3.50
D1	8.70	9.20	9.60	L2	2.30	4.65	7.00
D2	12.30	13.10	13.85	$\phi P$	3.40	3.65	3.85
D3	16.20	18.80	20.60	Q	2.50	2.80	3.00
E	8.68	10.02	11.00	$\theta$	2°	-	7°

## TO-220\_3L-B PACKAGE OUTLINE



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	mm			SYMBOL	mm		
	MIN	TYP	MAX		MIN	TYP	MAX
A	4.15	4.50	4.80	E1	8.25	8.70	9.15
A1	1.15	1.30	1.50	E2	7.20	8.00	8.80
A2	2.10	2.40	2.65	e	2.38	2.54	2.74
b	0.65	0.80	1.00	e1	5.08REF		
b1	1.10	1.33	1.80	H	6.20	6.50	6.90
c	0.35	0.50	0.65	L	12.75	13.28	13.70
D	14.25	15.75	16.15	L1	-	-	3.50
D1	8.70	9.20	9.60	L2	2.30	4.65	7.00
D2	12.30	13.10	13.85	$\phi P$	3.40	3.65	3.85
D3	16.20	18.80	20.60	Q	2.50	2.80	3.00
E	8.68	10.02	11.00	$\theta$	2°	-	7°

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