

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

### PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
100	0.085 at $V_{GS} = 10$ V	20 <sup>a</sup>

### FEATURES

- DT-Trench Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- 100 %  $R_g$  and UIS Tested

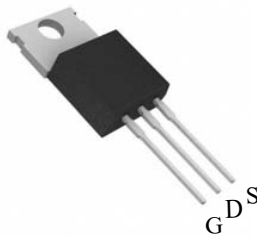


**RoHS**  
COMPLIANT

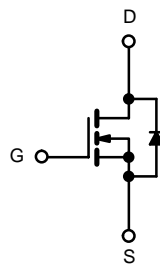
### APPLICATIONS

- Isolated DC/DC Converters

TO-220 Pin Configuration



Top View



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175$ °C)	$I_D$	$T_C = 25$ °C	20 <sup>a</sup>
		$T_C = 125$ °C	11 <sup>a</sup>
Pulsed Drain Current	$I_{DM}$	80	A
Avalanche Current	$I_{AS}$	18	
Single Pulse Avalanche Energy <sup>b</sup>	$E_{AS}$	27	
Maximum Power Dissipation <sup>b</sup>	$P_D$	$T_C = 25$ °C	70 <sup>c</sup>
		$T_A = 25$ °C <sup>d</sup>	3.3
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	$R_{thJA}$	55	°C/W
Junction-to-Case (Drain)	$R_{thJC}$	0.5	

Notes:

- Package limited.
- Duty cycle  $\leq 1$  %.
- See SOA curve for voltage derating.
- When Mounted on 1" square PCB (FR-4 material).

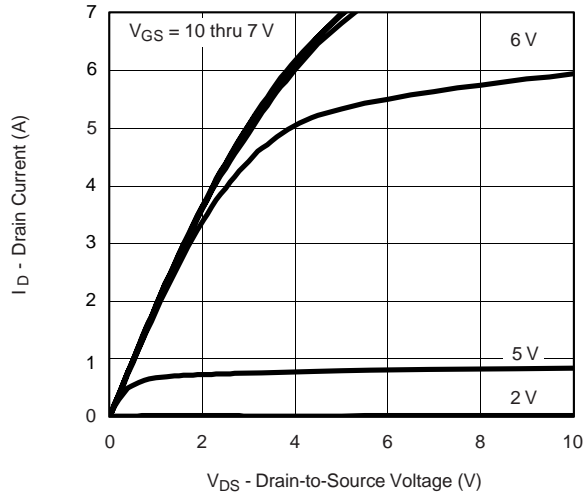
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	100			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 8\text{ A}$		0.085	0.105	$\Omega$
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 50\text{ V}, I_D = 8\text{ A}$		15		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 50\text{ V}, f = 1\text{ MHz}$		1883		pF
Output Capacitance	$C_{oss}$			406		
Reverse Transfer Capacitance	$C_{rss}$			60		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 8\text{ A}$		33		nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			11		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			17		
Gate Resistance	$R_g$			1.8		$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong 8\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		34		ns
Rise Time <sup>c</sup>	$t_r$			250		
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			55		
Fall Time <sup>c</sup>	$t_f$			210		
<b>Source-Drain Diode Ratings and Characteristics</b> $T_C = 25\text{ }^\circ\text{C}$ <sup>b</sup>						
Continuous Current	$I_S$				20	A
Pulsed Current	$I_{SM}$				80	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = 20\text{ A}, V_{GS} = 0\text{ V}$		0.7	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		130		ns
Reverse Recovery Charge	$Q_{rr}$				349	

**Notes:**

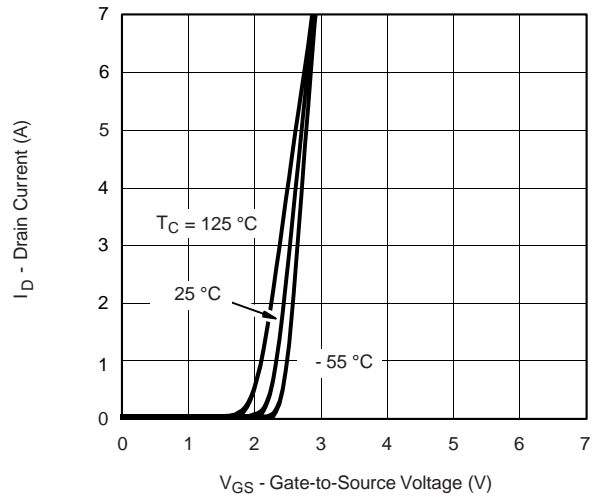
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

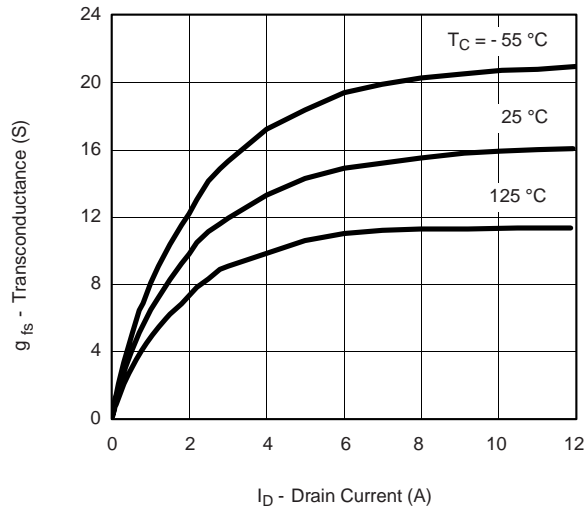
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



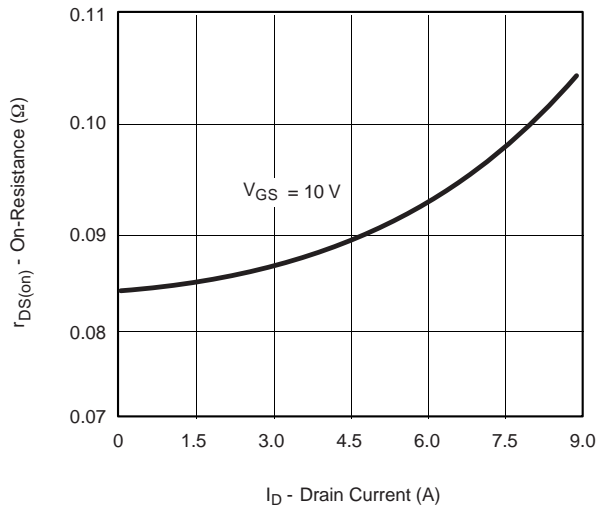
**Output Characteristics**



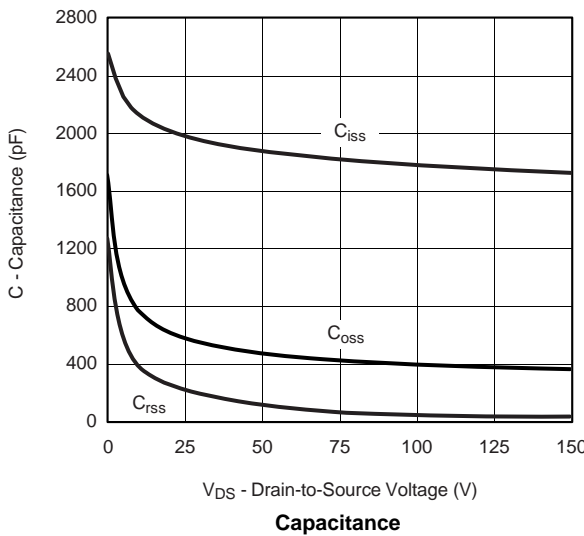
**Transfer Characteristics**



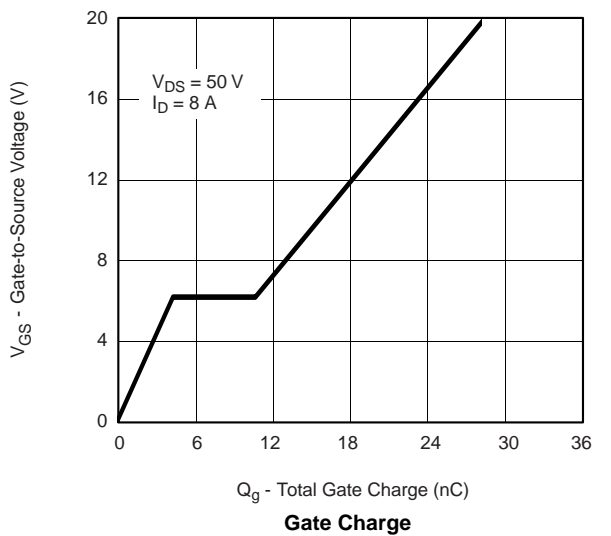
**Transconductance**



**On-Resistance vs. Drain Current**

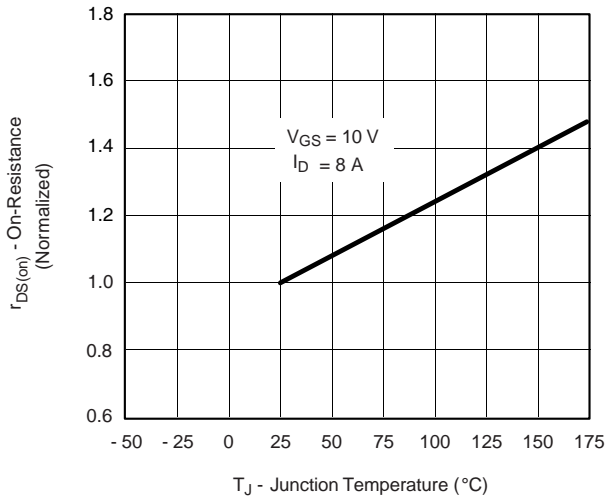


**Capacitance**

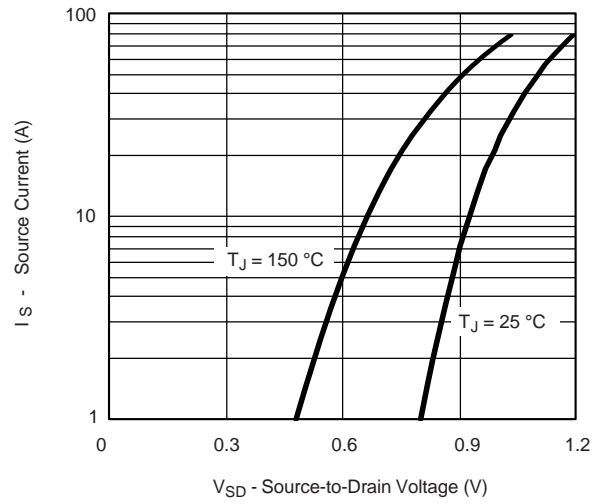


**Gate Charge**

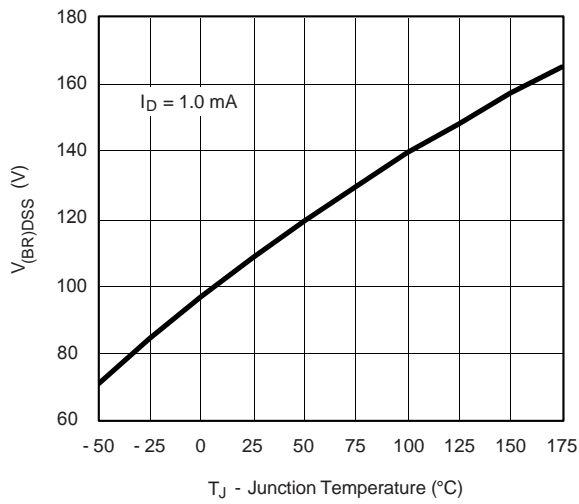
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



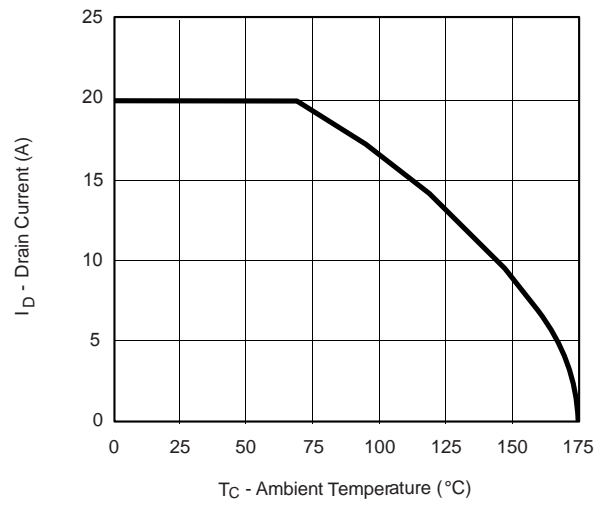
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**

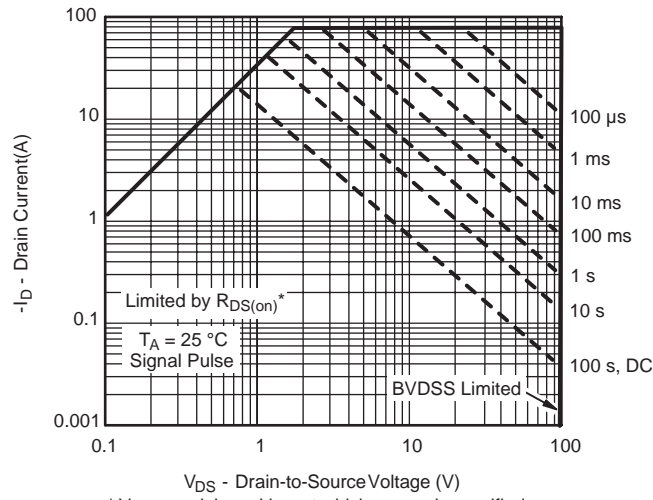


**Drain Source Breakdown vs. Junction Temperature**



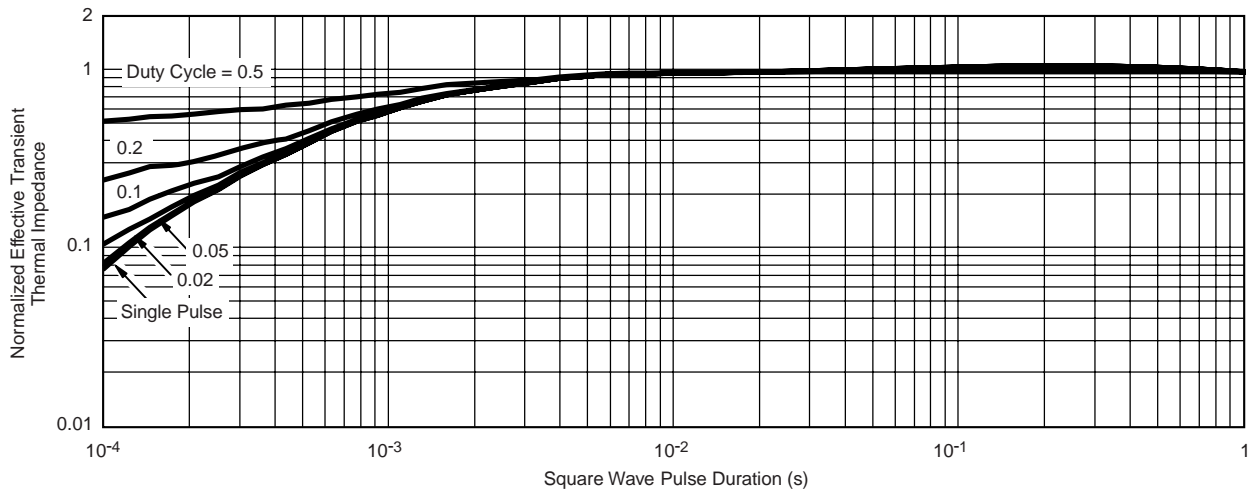
**Maximum Avalanche and Drain Current vs. Case Temperature**

**THERMAL RATINGS**



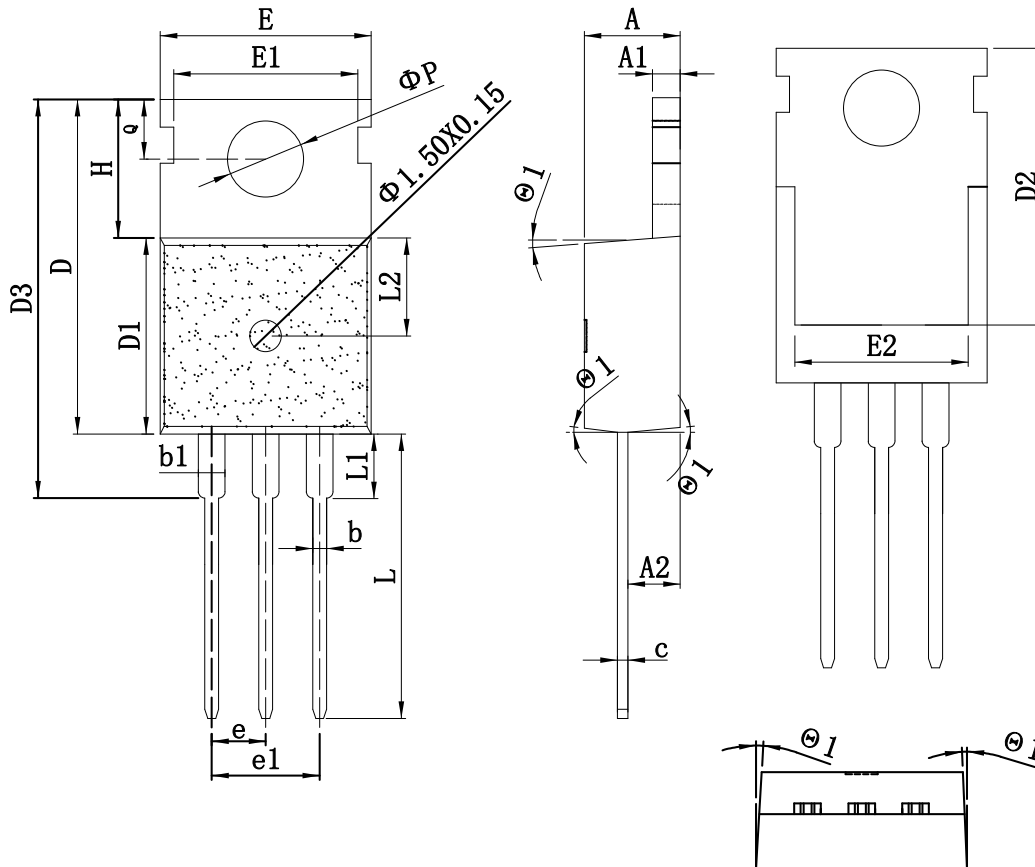
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $r_{DS(on)}$  is specified

**Safe Operating Area**



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

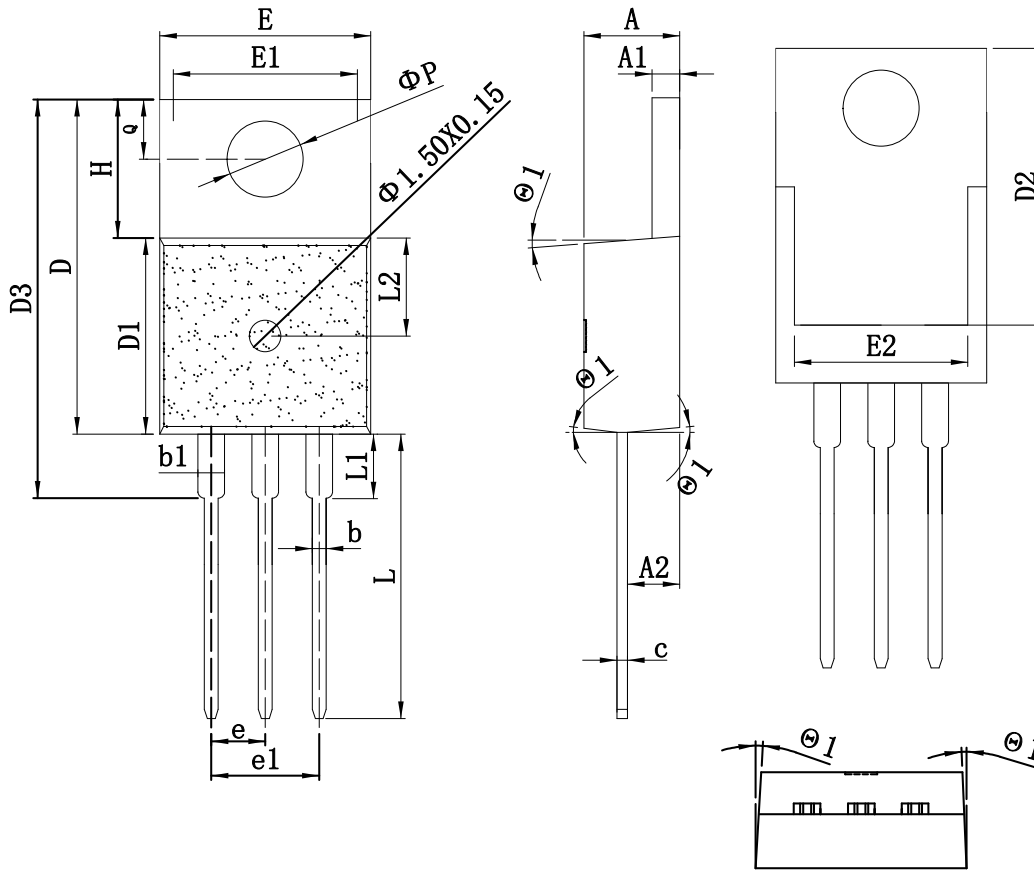
## TO-220\_3L-A PACKAGE OUTLINE



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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