

General Description

These N-channel enhancement mode power MOSFET utilizes advanced split gate trench technology design, provided excellent $R_{DS(on)}$ and low gate charge. Which accords with the RoHS standard.

Features

- Uses advanced SGT technology
- Extremely low on-resistance $R_{DS(on)}$
- Low reverse transfer capacitances

Mechanical Data

• Case: ITO-220, TO-220, TO-263, TO-263-7L Package

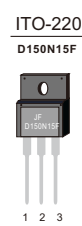
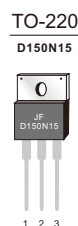
Application

- Motor control and drives
- Battery management
- UPS (Uninterruptible Power Supplies)

Ordering Information

Part No.	Package Type	Package	Quantity(box)
D150N15D7	TO-263-7L	Tape & Reel	800
D150N15	TO-220	Tube	1000
D150N15D	TO-263	Tape & Reel	800
D150N15F	ITO-220	Tube	1000

Product Summary			
V_{DS}	$R_{DS(on)}$ (m Ω) Typ	I_D (A)	Q_g (Typ)
150V	4.8 @ 10V 70A	150	124nc



Block Diagram

Pin Definition:

1. Gate
2. Drain
3/4/5/6/7/8/9. Source

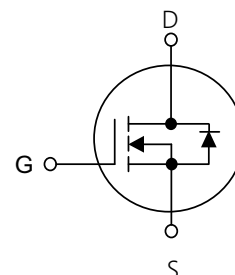


Table1 Absolute Maximum Ratings (Tc=25°C, unless otherwise specified)

Parameter	Symbol	D150N15/D150N15D/ D150N15D7	D150N15F	Unit
Drain-Source Voltage	V_{DS}	150		V
Gate-Source Voltage	V_{GS}	± 20		V
Continuous Drain Current	$T_c=25^\circ\text{C}$	150	150*	A
	$T_c=100^\circ\text{C}$	106	106*	
Pulsed Drain Current (Note 1)	I_{DM}	600		A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	1406		mJ
Power Dissipation $T_c=25^\circ\text{C}$	P_D	300	41	W
Operating Junction and Storage Temperature	T_J/T_{STG}	-55~+175		$^\circ\text{C}$

Table 2. Thermal Characteristics

Parameter	Symbol	D150N15/D150N15D/ D150N15D7	D150N15F	Unit
Thermal resistance Junction to Ambient.Max	$R_{\theta JA}$	50	50	$^{\circ}\text{C}/\text{W}$
Thermal resistance Junction to Case.Max	$R_{\theta JC}$	0.5	3.7	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =250μA	150	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =150V,V _{GS} =0V	-	-	1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V,V _{DS} =0V	-	-	100	nA
	Reverse		V _{GS} =-20V,V _{DS} =0V	-	-	-100	nA
On Characteristics(Note 3)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =250μA	2.0	-	4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =70A	-	4.8	5.7	mΩ
Gate Resisance		R _G	V _{DS} =0V,V _{GS} =0V,F=1MHz	-	2.8	-	Ω
Dynamic Characteristics(Note 4)							
Input Capacitance		C _{ISS}	V _{DS} =75V,V _{GS} =0V,f=1MHz	-	9850	-	pF
Output Capacitance		C _{OSS}		-	630	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	115	-	pF
Switching Characteristics (Note 4)							
Turn-On Delay Time		t _{d(on)}	V _{DS} =60V,I _D =60A V _{GS} =10V,R _G =3Ω,	-	38	-	ns
Turn-On Rise Time		t _R		-	106	-	ns
Turn-Off Delay Time		t _{d(off)}		-	80	-	ns
Turn-Off Fall Time		t _f		-	44	-	ns
Total Gate Charge		Q _G	V _{DS} =70V,I _D =70A, V _{GS} =10V	-	124	-	nC
Gate-Source Charge		Q _{GS}		-	54	-	nC
Gate-Drain Charge		Q _{GD}		-	22	-	nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _S =70A	-	-	1.2	V
Diode Forward Current		I _S		-	-	150	A
Reverse Recovery Time		t _{rr}	I _F =70A dI _F /dt=100A/μs	-	93	-	ns
Reverse Recovery Charge		Q _{RR}		-	304	-	nC

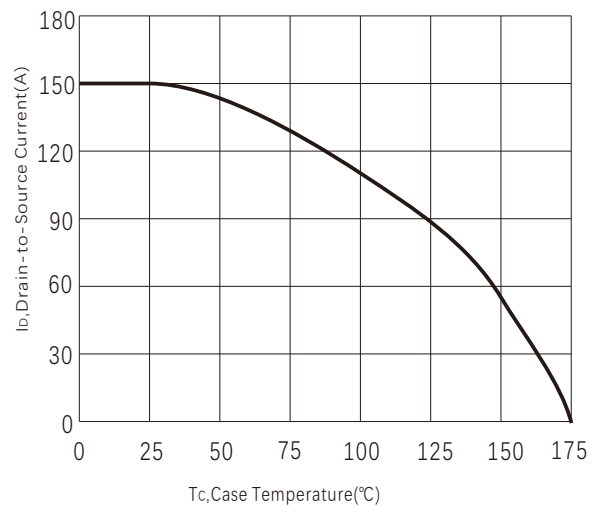
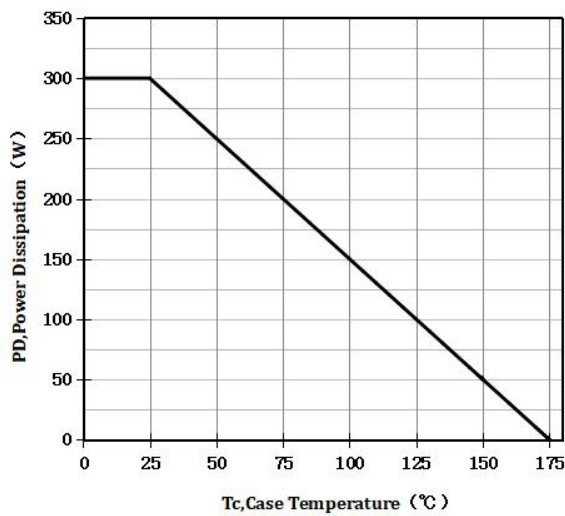
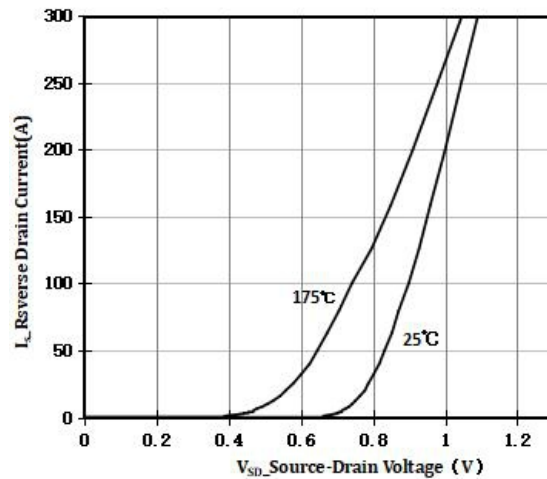
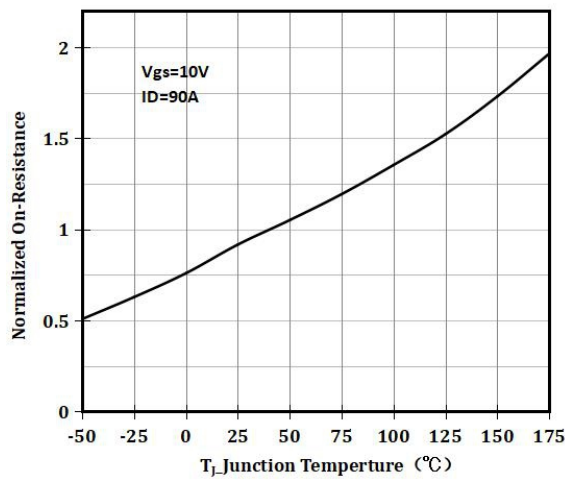
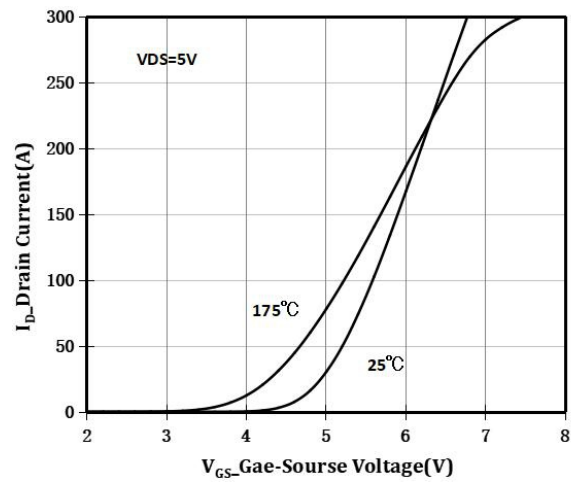
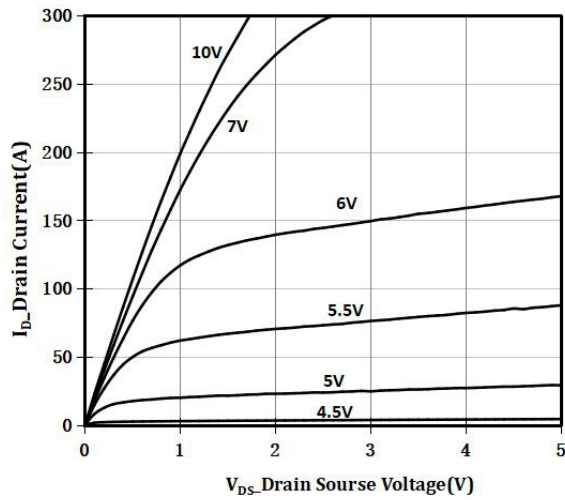
Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature

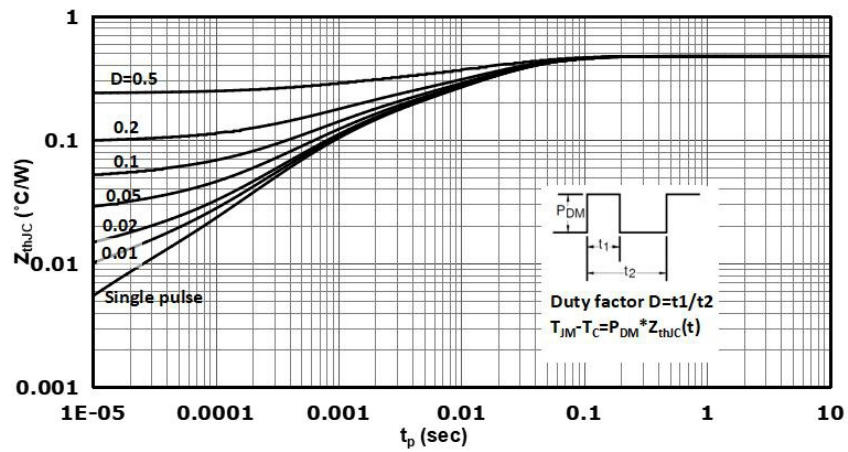
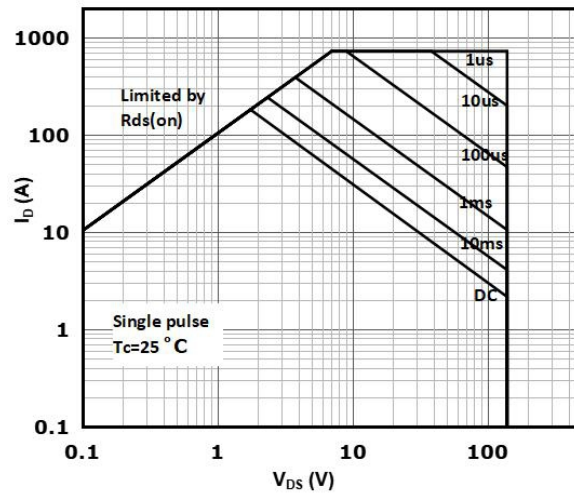
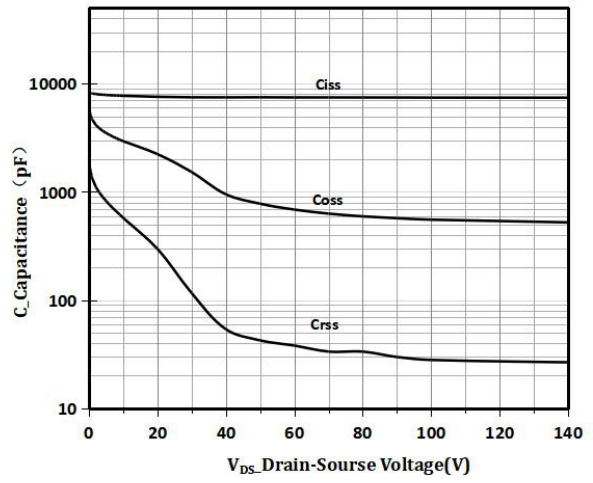
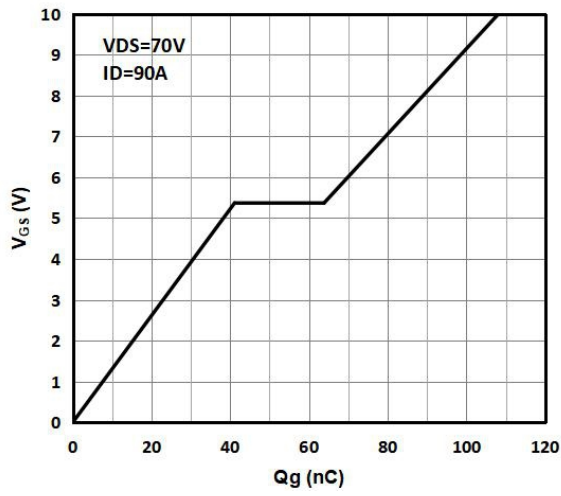
2 $L = 0.5\text{mH}$, $V_{DD} = 80V$, $V_G = 120V$, Starting $T_J=25^{\circ}\text{C}$

3 Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

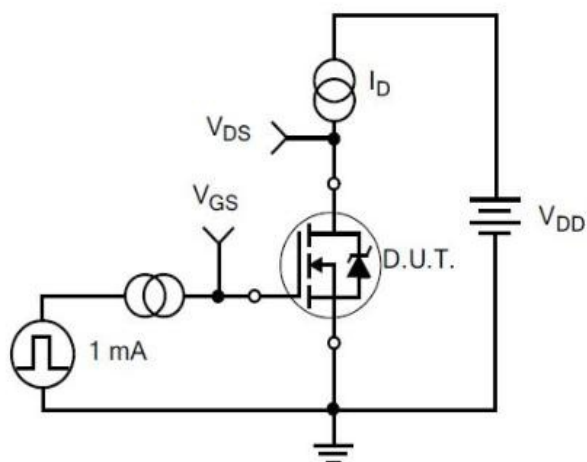
4 Guaranteed by design, not subject to production

Typical Characteristics Diagrams

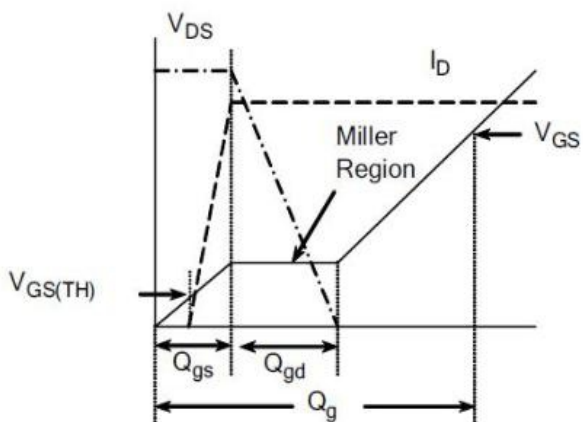




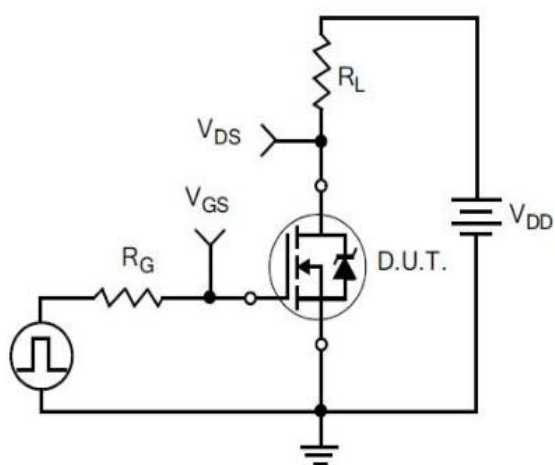
Typical Test Circuit



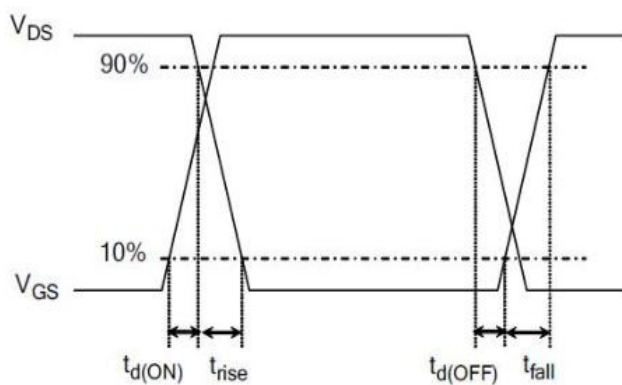
1) Gate Charge Test Circuit



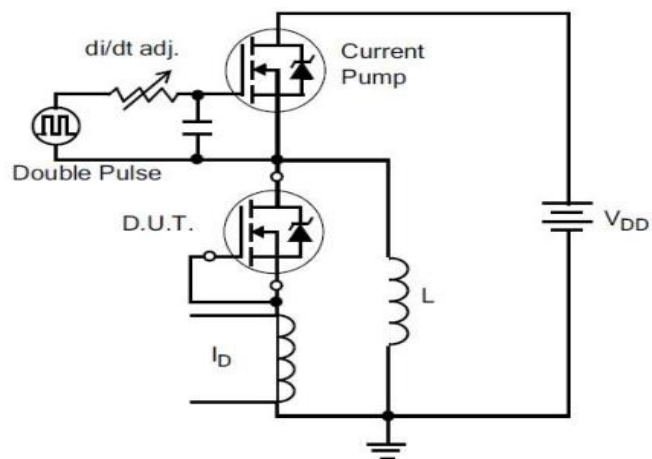
2) . Gate Charge Waveform



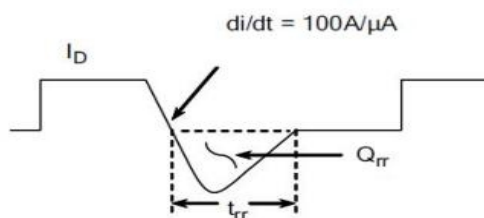
3) Resistive Switching Test Circuit



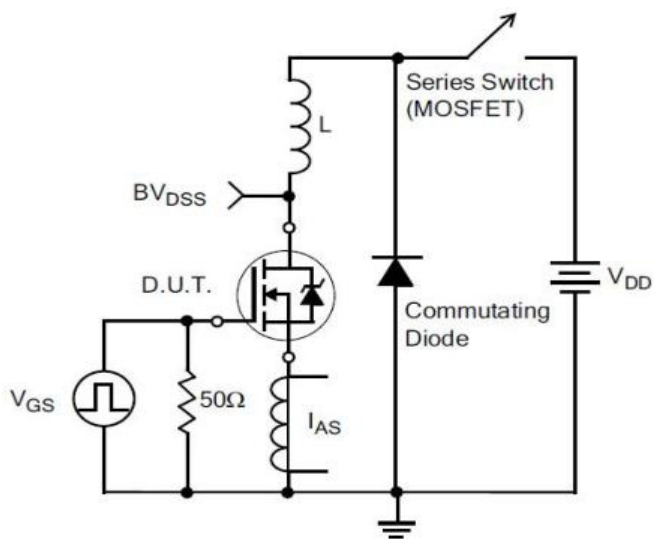
4) Resistive Switching Waveforms



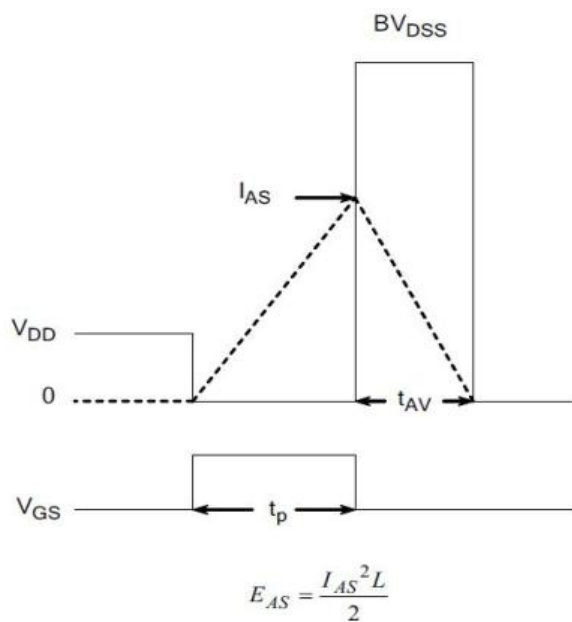
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

Product Names Rules

X X X N E X X X-X X X

Process Type:
VDMOS:default
Super junction:SJ
Low Voltage trench:D

Rdson Code
2Ω :2D0
9.5mΩ :9M5

Rated Current Code
With 1-2 Digital,
For Example:
4A:4,
10A:10,
0.8A:08

Package Code
TO-220:Default
ITO-220:F
TO-262:E
TO-263:D
TO-252:M
TO-251:N
TO-263-7L:D7
TOLL:T

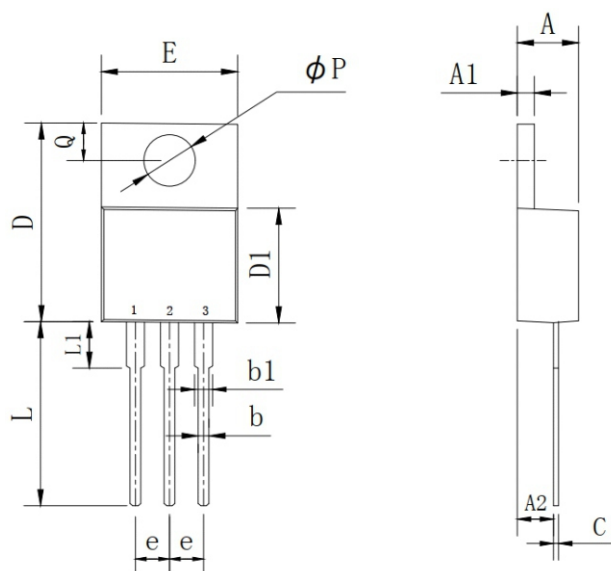
Channel Code
N channel:N
P channel:P

Rated Voltage Code
With 2 Digital,For Example:
600V:60
60V:06

Special Function Code
G-S ESD Protection:E
No Protection:Default

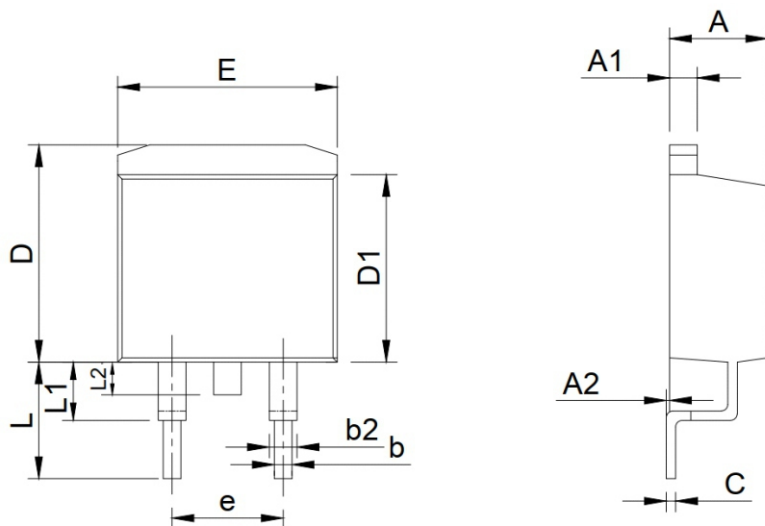
Product Names Rules

TO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	2.03	2.92	0.080	0.115
b	0.51	1.11	0.020	0.044
b1	0.97	1.6	0.038	0.063
C	0.3	0.7	0.012	0.028
D	14.6	15.9	0.575	0.626
D1	8.04	9.3	0.317	0.366
E	9.57	10.57	0.377	0.416
e	2.34	2.74	0.092	0.108
L	12.58	14.3	0.495	0.563
L1	2.8	4.2	0.110	0.165
P	3.4	4.14	0.134	0.163
Q	2.45	3	0.096	0.118

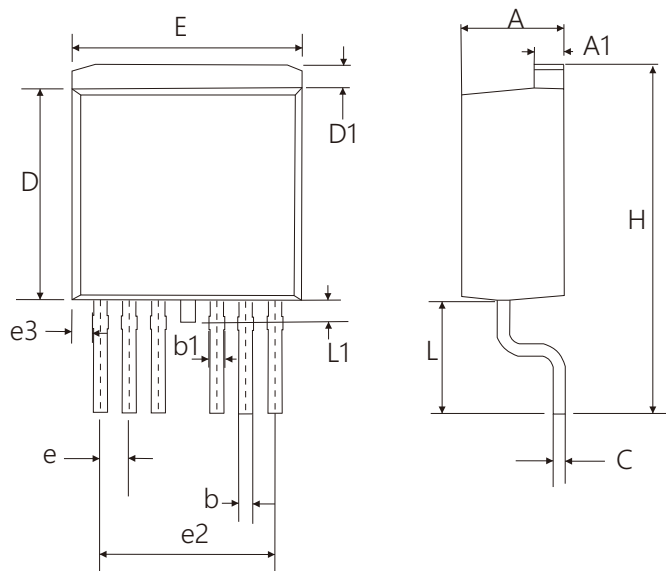
TO-263 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.87	0.167	0.192
A1	1.07	1.47	0.042	0.058
A2	0	0.25	0.000	0.010
b	0.61	1.01	0.024	0.040
b1	1.2	1.34	0.047	0.053
C	0.3	0.6	0.012	0.024
D	9.48	10.84	0.373	0.427
D1	8.49	9.3	0.334	0.366
E	9.7	10.31	0.382	0.406
e	4.88	5.28	0.192	0.208
L	4.46	5.85	0.176	0.230
L1	1.33	2.33	0.052	0.092
L2	0	2.2	0.000	0.087

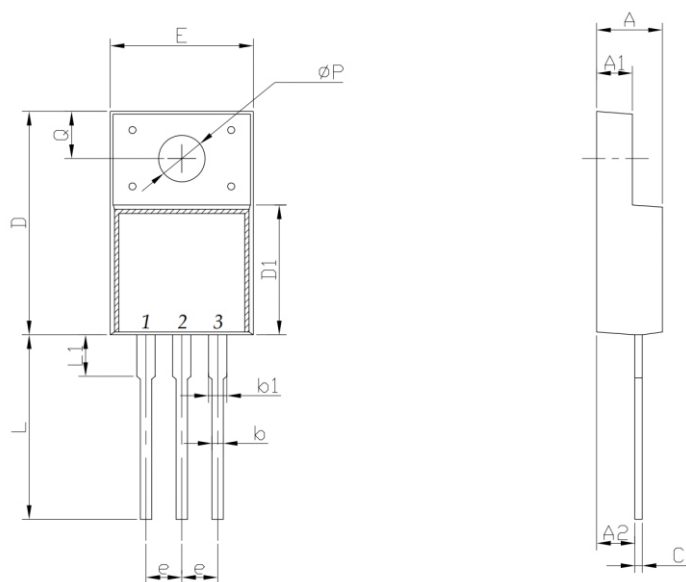
Dimensions

TO-263-7L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.25	4.75	0.167	0.187
A1	1.2	1.4	0.047	0.055
b	0.5	0.7	0.020	0.028
b1	0.5	0.9	0.020	0.035
C	0.4	0.6	0.016	0.024
D	9.05	9.45	0.356	0.372
D1	0.7	1.3	0.028	0.051
E	9.8	10.2	0.386	0.402
e	1.07	1.47	0.042	0.058
e2	7.32	7.92	0.288	0.312
e3	0.64	1.04	0.025	0.041
H	14.65	15.65	0.577	0.616
L	4.47	5.47	0.176	0.215
L1	0.90	1.50	0.035	0.059

ITO-220 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	4.24	4.9	0.167	0.193
A1	2.3	2.92	0.091	0.115
A2	2.61	2.81	0.103	0.111
b	0.3	1	0.012	0.039
b1	0.9	1.55	0.035	0.061
C	0.3	0.7	0.012	0.028
D	14.5	16.36	0.571	0.644
D1	8.8	9.41	0.346	0.370
E	9.5	10.5	0.374	0.413
e	2.3	2.75	0.091	0.108
L	12.6	14	0.496	0.551
L1	2.45	4.3	0.096	0.169
P	2.9	3.8	0.114	0.150
Q	2.5	3.55	0.098	0.140

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