

70A 100V N-Channel Enhancement Mode Power MOSFET

Description:

This MOSFETs uses advanced technology to achieve extremely low Static Drain-to-Source on-Resistance $R_{DS(on)}$ and fast switch. For this reason, This MOSFETs has low energy consumption during application which also enhances reliability and durability.

Features:

- Fast switching
- Low on-resistance
- Low gate charge
- Extended Safe Operating Area
- 100% Single Pulse avalanche energy test

Mechanical Data:

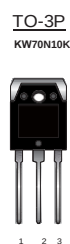
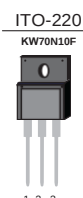
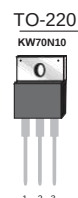
- Case: TO-220, ITO-220, TO-263, TO-3P Package

Applications:

- Switching applications

Ordering Information

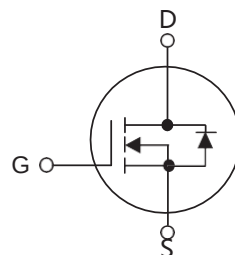
Part No.	Package Type	Package	Quantity(box)
KW70N10	TO-220	Tube	1000
KW 70N10F	ITO-220	Tube	1000
KW 70N10D	TO-263	Tape & Reel	800
KW 70N10K	TO-3P	Tube	600



Block Diagram

Pin Definition:

1. Gate
2. Drain
3. Source



Product Summary

V_{DS}	$R_{DS(on)}$ (m Ω) Typ	I_D (A)	Q_g (Typ)
100V	18@ 10V	70	83nc

Table1 Absolute Maximum Ratings($T_C=25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	TO-220/TO-263/TO-3P	ITO-220	Unit
Drain-Source Voltage	V_{DS}	100		V
Gate-Source Voltage	V_{GS}	± 25		V
Continuous Drain Current	I_D	70		A
		46		
Pulsed Drain Current	I_{DM}	180		A
Single Pulse Avalanche Energy	E_{AS}	1700		mJ
Power Dissipation $T_C=25^\circ\text{C}$	P_D	220	48	W
Operating Junction and Storage Temperature	T_J/T_{STG}	$-55 \sim +150$		$^\circ\text{C}$

Table 2. Thermal Characteristics

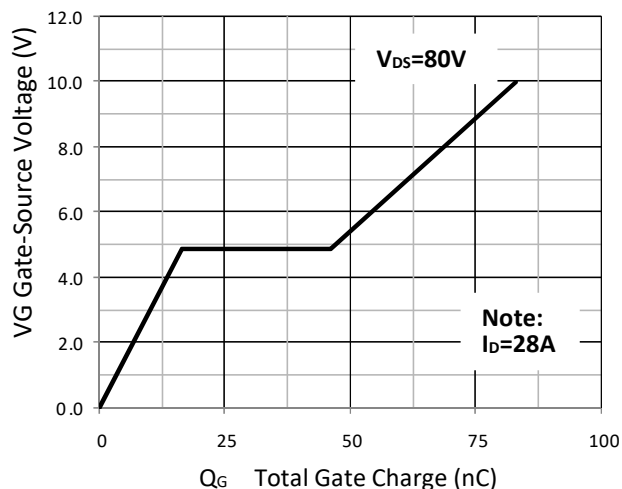
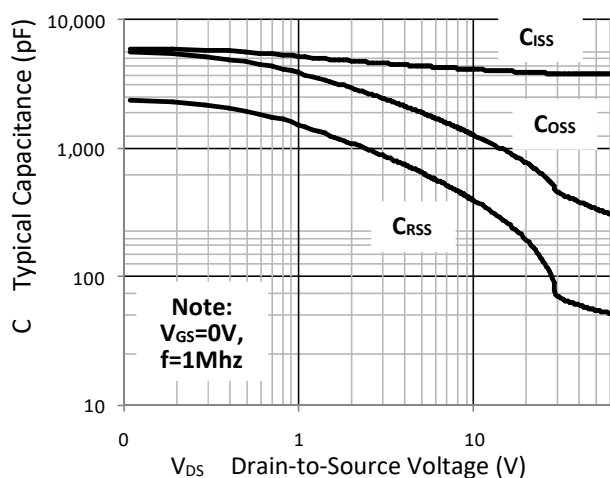
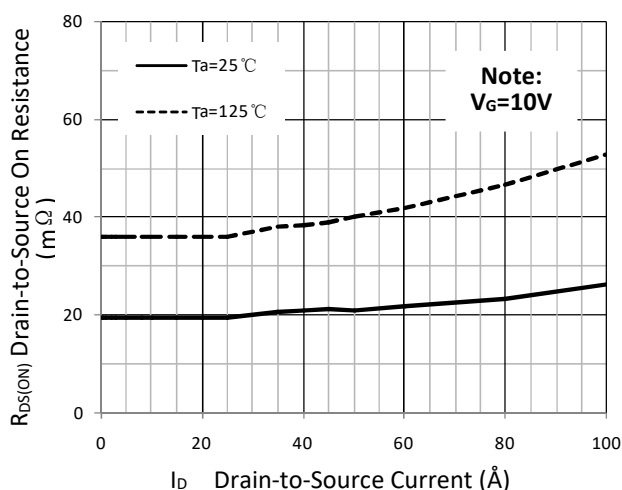
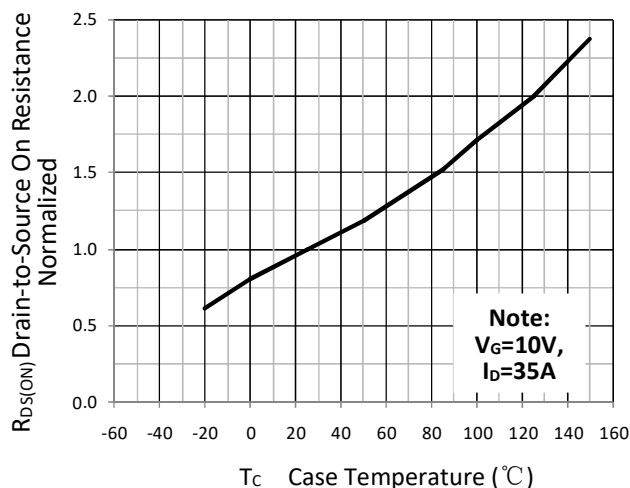
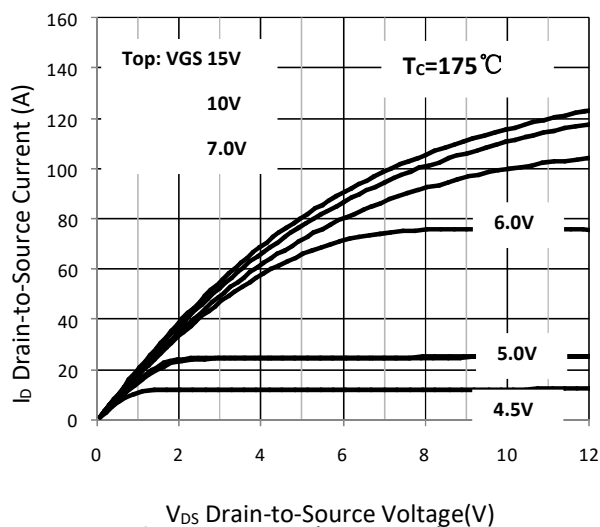
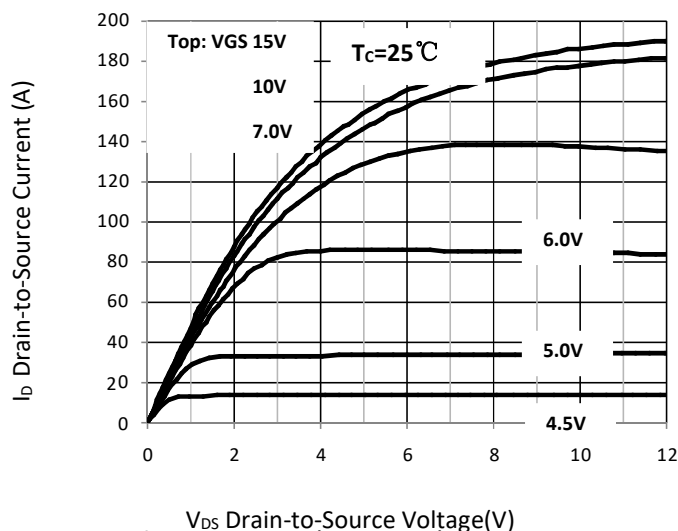
Parameter	Symbol	TO-220/TO-263/TO-3P	ITO-220	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62.5	62.5	C/W
Thermal resistance Junction to Case	$R_{\theta JC}$	0.80	2.5	C/W

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	100			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =100V,V _{GS} =0V			3.0	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =25V,V _{DS} =0V			100	nA
	Reverse		V _{GS} =-25V,V _{DS} =0V			-100	nA
On Characteristics							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} ,I _D =250μA	2.0	3.0	4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D =20A		18	23	Ω
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{DS} =25V,V _{GS} =0V,f=1MHz		3819		pF
Output Capacitance		C _{OSS}			614		pF
Reverse Transfer Capacitance		C _{RSS}			132		pF
Switching Characteristics							
Turn-On Delay Time		t _{d(on)}	V _{DD} =50V,I _D =28A, V _{GS} =10V,R _G =2.5Ω		20		ns
Turn-On Rise Time		t _r			28.5		ns
Turn-Off Delay Time		t _{d(off)}			48.1		ns
Turn-Off Fall Time		t _f			8		ns
Total Gate Charge		Q _G	V _{DS} =80V,I _D =28A, V _{GS} =10V		83		nC
Gate-Source Charge		Q _{GS}			16.3		nC
Gate-Drain Charge		Q _{GD}			29.8		nC
Drain-Source Diode Characteristics and Maximum Ratings							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V, I _S =35A		0.88	1.3	V
Maximum Continuous Drain-Source Diode Forward Current		I _S			70		A
Reverse Recovery Time		t _{rr}	V _{GS} =0V, I _F =28A		86.3		ns
Reverse Recovery Charge		Q _{RR}	dI _F /dt=100A/μs (Note 1)		321		nC

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

Typical Characteristics Diagrams



Typical Characteristics Diagrams

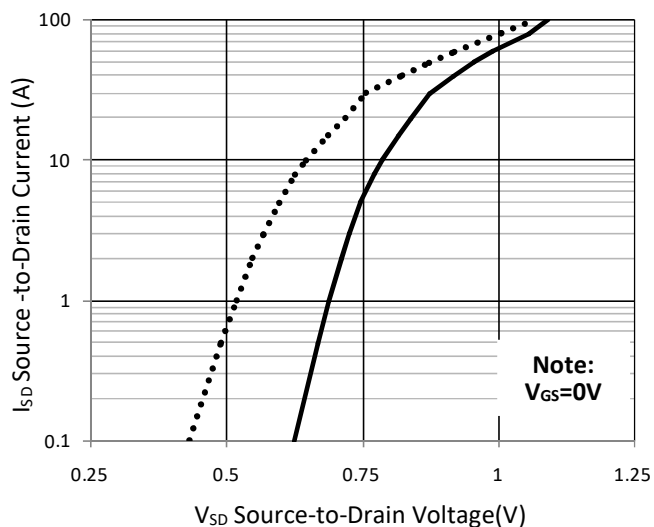


Figure 7. Typical Source-Drain Diode Forward Voltage

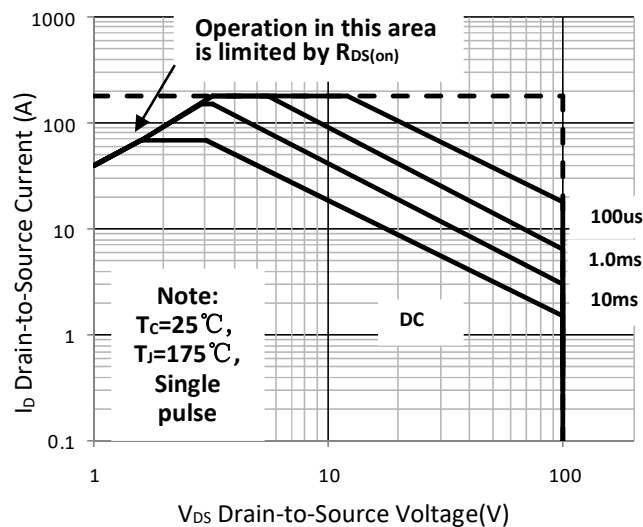


Figure 8. Maximum Safe Operating Area

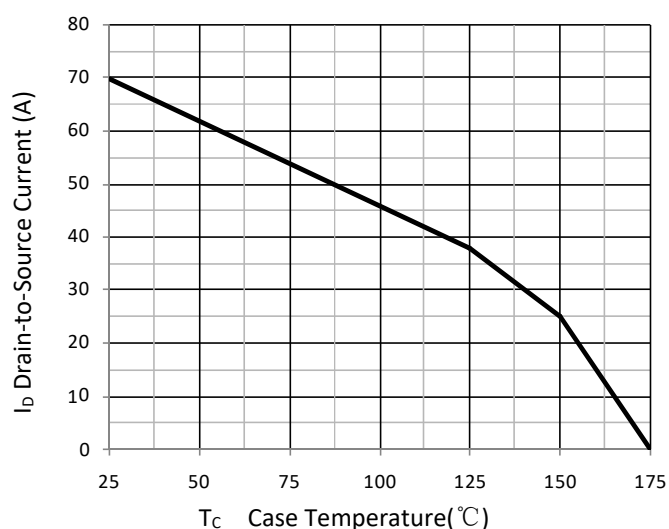


Figure 9. Maximum Drain Current Vs Temperature

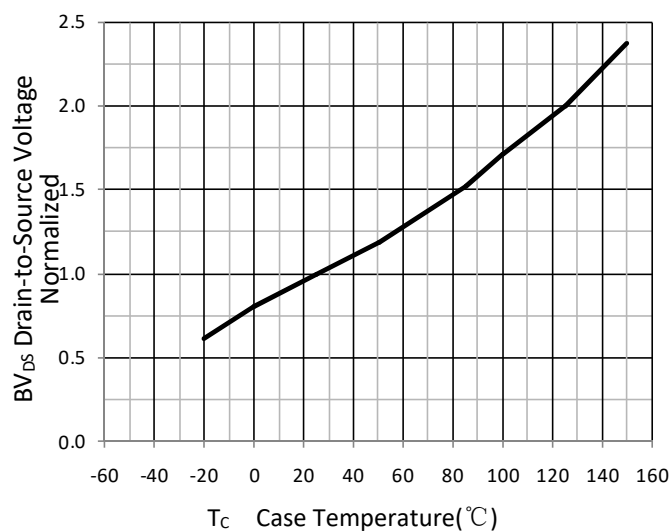
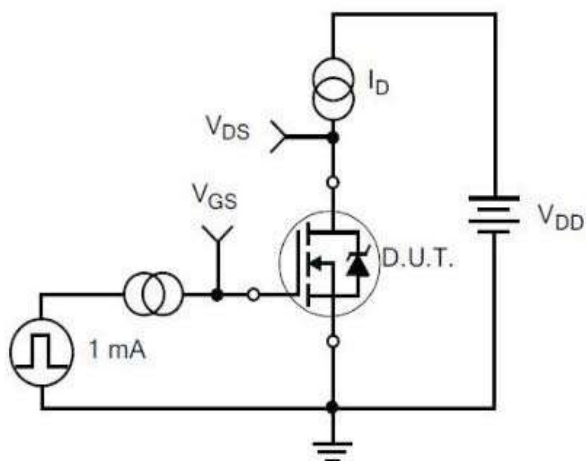
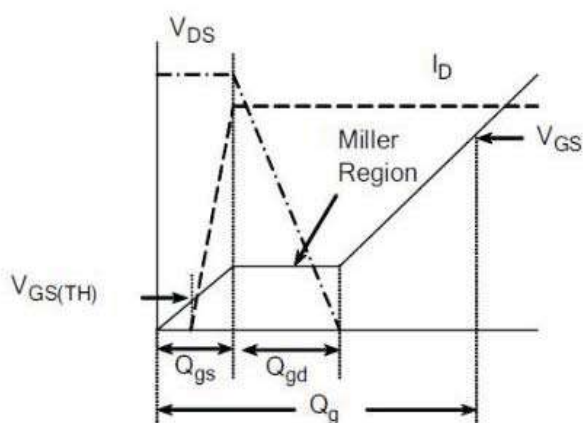


Figure 10. Normalized Drain-Source Voltage Vs Temperature

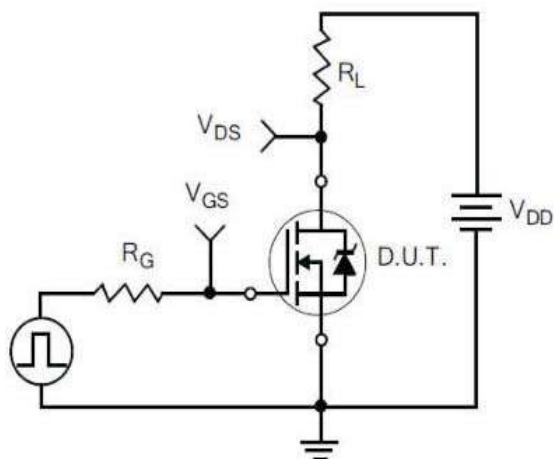
Typical Test Circuit



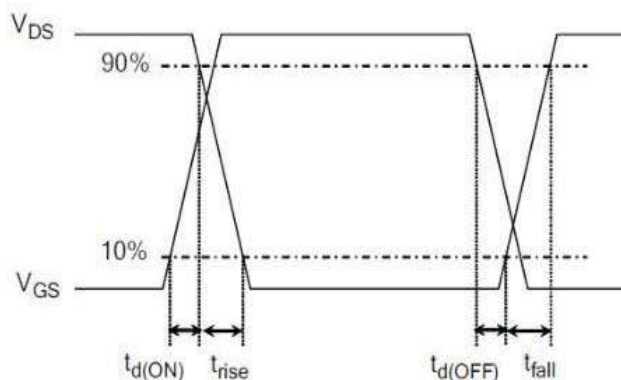
1) Gate Charge Test Circuit



2) . Gate Charge Waveform

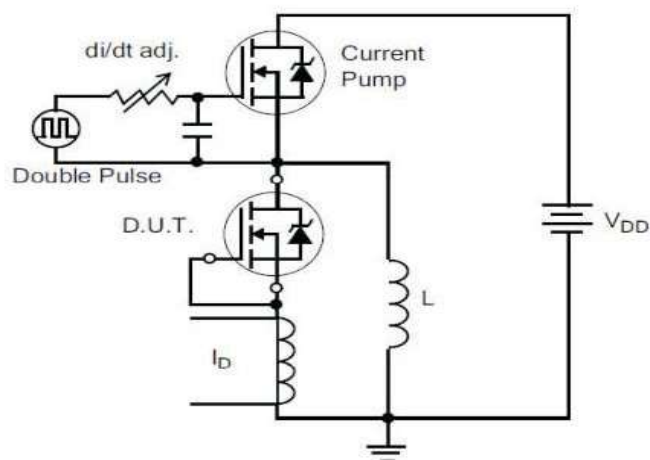


3) Resistive Switching Test Circuit

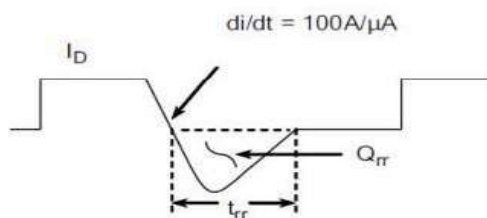


4) Resistive Switching Waveforms

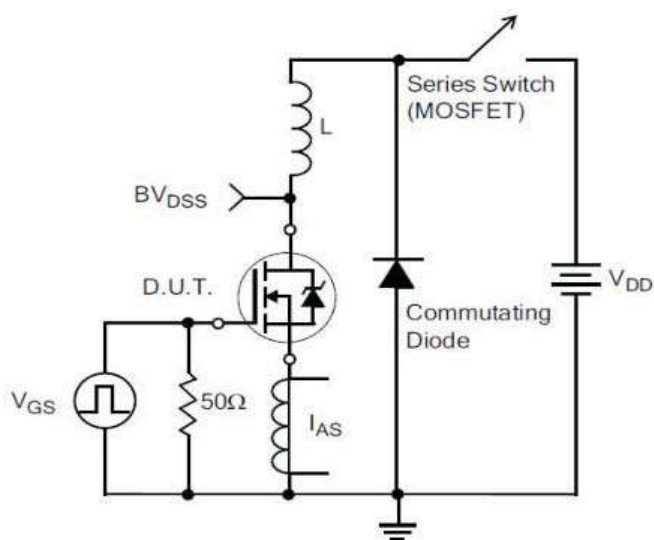
Typical Test Circuit



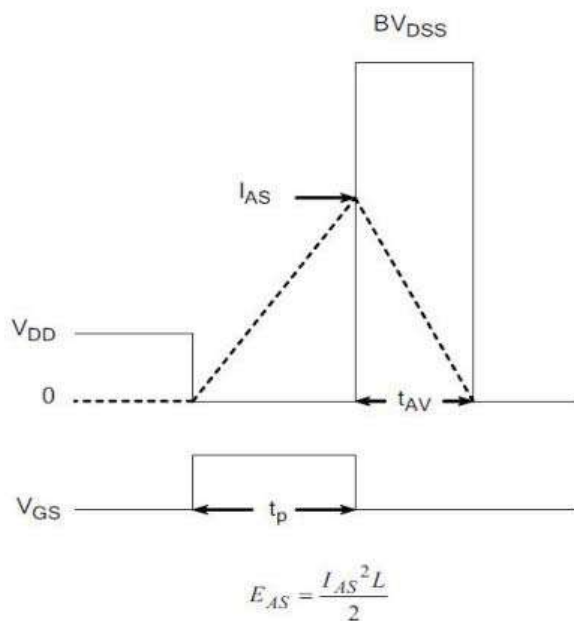
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



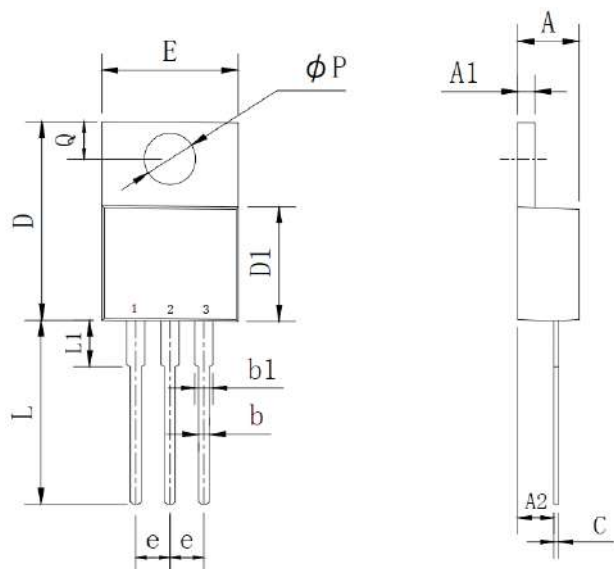
7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

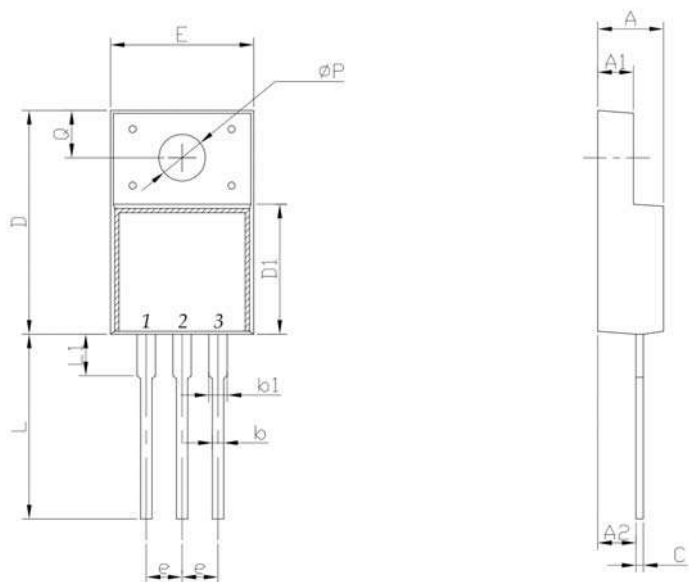
Dimensions

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

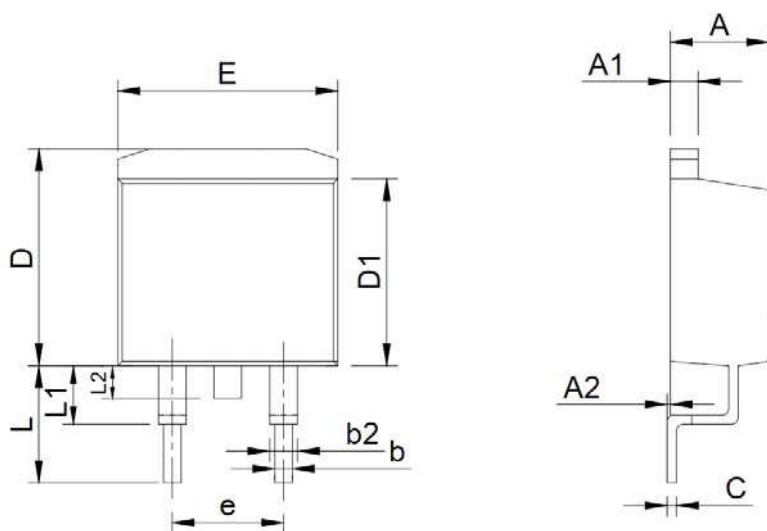
ITO-220 PACKAGE OUTLINE DIMENSIONS



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

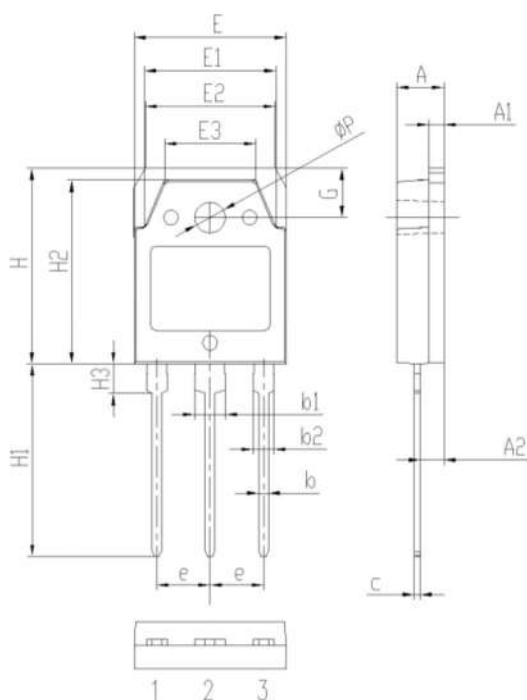
Dimensions

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

TO-3P PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions(millimeters)	
	Min.	Max.
A	4.60	5.00
A1	1.30	1.70
A2	2.20	2.60
b	0.80	1.20
b1	2.90	3.30
b2	1.90	2.30
c	0.40	0.80
e	5.25	5.65
E	15.3	15.7
E1	13.2	13.6
E2	13.1	13.5
E3	9.10	9.50
H	19.7	20.1
H1	19.1	20.1
H2	18.3	18.7
H3	2.80	3.20
G	4.80	5.20
ΦP	3.00	3.40