

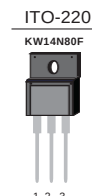
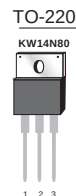
800V 14A Power MOSFET

Features:

- $R_{DS(ON)} < 0.40\Omega @ V_{GS} = 10V$
- 100% avalanche tested
- RoHS compliant

Mechanical Data:

- Case: TO-220, ITO-220, TO-263 package



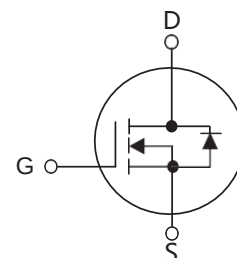
Ordering Information

Part No.	Package Type	Package	Quantity(box)
KW14N80	TO-220	Tube	1000
KW 14N80F	ITO-220	Tube	1000
KW 14N80D	TO-263	Tape & Reel	800

Pin Definition:

1. Gate
2. Drain
3. Source

Block Diagram



Product Summary

V_{DS}	$R_{DS(on)}$ (Ω) Typ	I_D (A)	Q_g (Typ)
800V	0.38@10V	14	43nc

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

Parameter	Symbol	TO-220/TO-263	ITO-220	Unit
Drain-Source Voltage	V_{DS}	800		V
Gate-Source Voltage	V_{GS}	± 30		V
Continuous Drain Current	$T_C = 25^\circ C$	14		A
	$T_C = 100^\circ C$	11		
Pulsed Drain Current (Note 1)	I_{DM}	30		A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	283		mJ
Avalanche Current (Note 1)	I_{AR}	2.4		A
Repetitive Avalanche Energy (Note 1)	E_{AR}	0.43		mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	15		V/ns
Drain Source voltage slope ($V_{DS} = 720V$)	dV_{DS}/dt	50		V/ns
Power Dissipation $T_C = 25^\circ C$	P_D	151	35	W
Operating Junction and Storage Temperature	T_J/T_{STG}	$-55 \sim +150$		$^\circ C$
Maximum Temperature for soldering	T_L	300		$^\circ C$

Table 2. Thermal Characteristics

Parameter	Symbol	TO-220/TO-263	ITO-220	Unit
Thermal resistance Junction to Ambient	$R_{\theta JA}$	62	62	$^{\circ}\text{C/W}$
Thermal resistance Junction to Case	$R_{\theta JC}$	0. 82	3. 57	$^{\circ}\text{C/W}$

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	800	--	--	V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =800V, V _{GS} =0V	--	--	1	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =30V, V _{DS} =0V	--	--	100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V	--	--	-100	nA
On Characteristics(Note 4)							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.5	--	4.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =7A	--	0.38	0.40	Ω
Dynamic Characteristics(Note 5)							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz	--	800	--	pF
Output Capacitance		C _{OSS}		--	340	--	pF
Reverse Transfer Capacitance		C _{RSS}		--	10	--	pF
Switching Characteristics (Note 5)							
Turn-On Delay Time		t _{d (on)}	V _{DD} =400V, I _D =5A, R _G =20Ω	--	13	--	ns
Turn-On Rise Time		t _r		--	11	--	ns
Turn-Off Delay Time		t _{d (off)}		--	10	--	ns
Turn-Off Fall Time		t _f		--	12	--	ns
Total Gate Charge		Q _G	V _{DS} =480V, I _D =7A, V _{GS} =10V	--	43	60	nC
Gate-Source Charge		Q _{GS}		--	5	--	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 =7A	--	1.0	1.5	V
Maximum Continuous Drain-Source Diode Forward Current		I _S		--	--	14	A
Reverse Recovery Time		trr	V _{GS} =0V, I _F =7A	--	345	--	ns
Reverse Recovery Charge		Q _{RR}	dI _F /dt=100A/μs (Note 1)	--	4.5	--	μC

Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature 2

$L=79\text{mH}, I_{AS}=3.5A, V_{DD}=50V$, Starting $T_J=25^{\circ}\text{C}$

3 $I_{SD} \leq I_D, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$

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

5 Guaranteed by design, not subject to production

Typical characteristics Diagrams

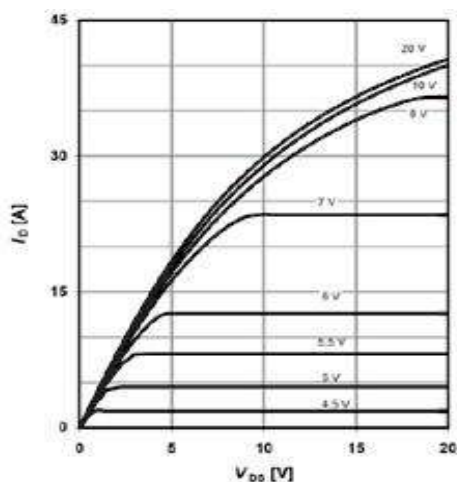


Figure 1: On-Region Characteristics @ 25°C

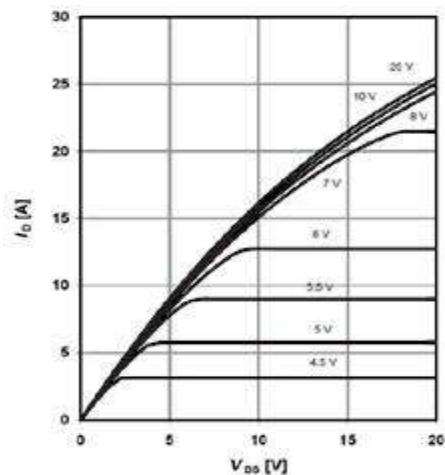


Figure 2: On-Region Characteristics @ 125°C

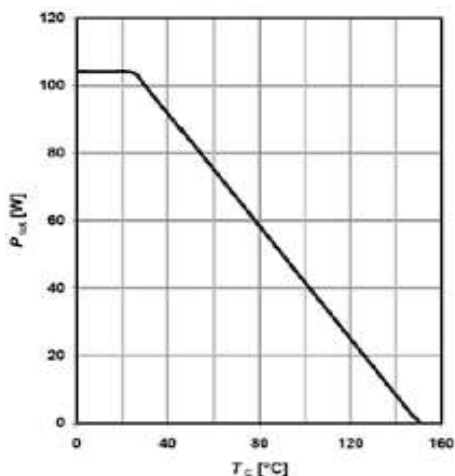


Figure 3: Power Dissipation
TO-220

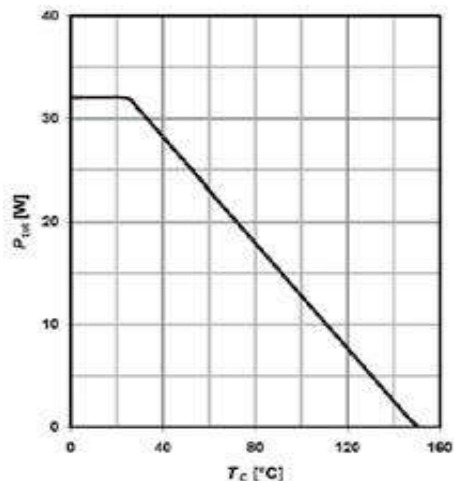


Figure 4 : Power dissipation
TO-220 FullPAK

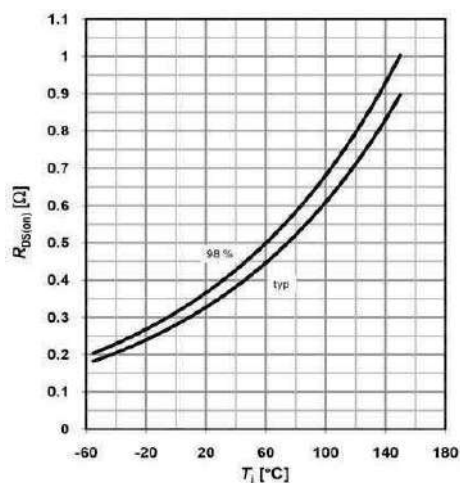


Figure 5: On-Resistance vs. Junction Temperature

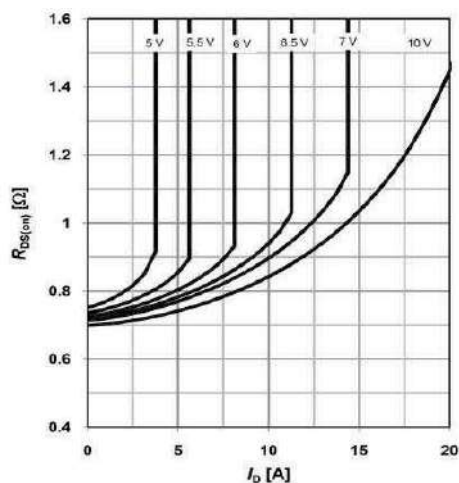


Figure 6: On-Resistance vs. Drain Current, $T_J=125^\circ\text{C}$

Typical characteristics Diagrams

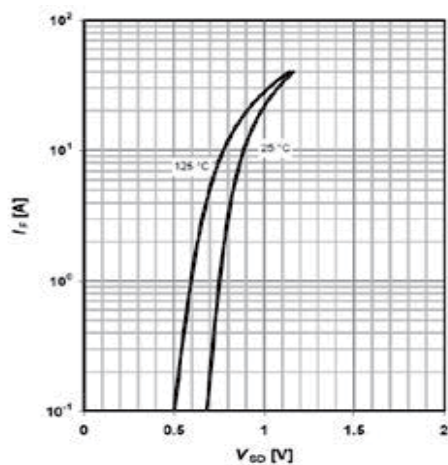


Figure 7: Body-Diode Characteristics

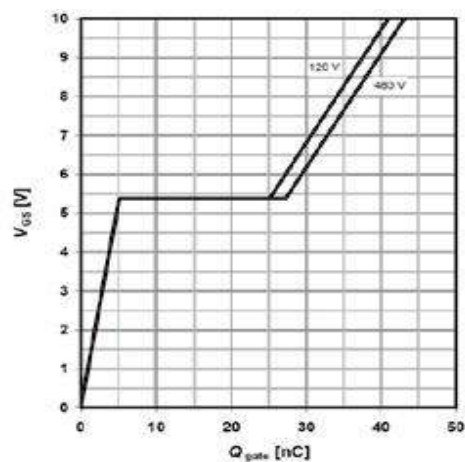


Figure 8: Gate-Charge Characteristics

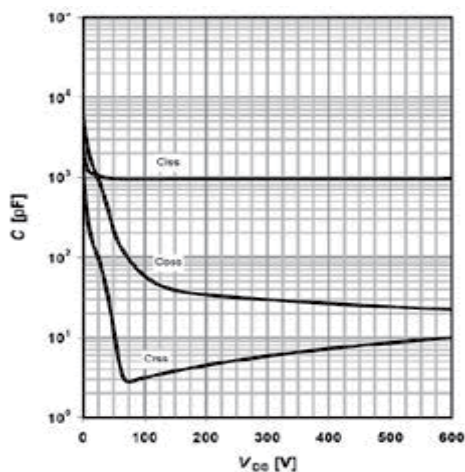


Figure 9: Capacitance Characteristics

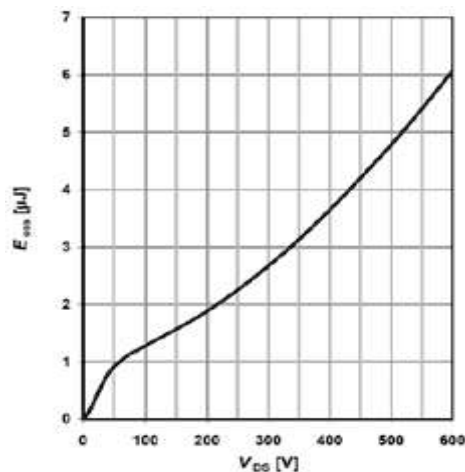


Figure 10: C_{oss} stored Energy

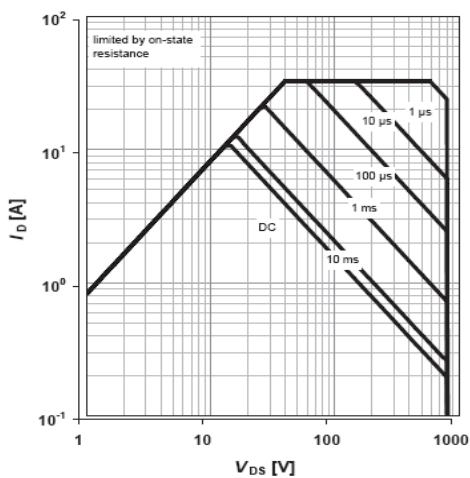


Figure 11: Maximum Forward Biased Safe Operating Area
 TO-220, T_c=25 °C

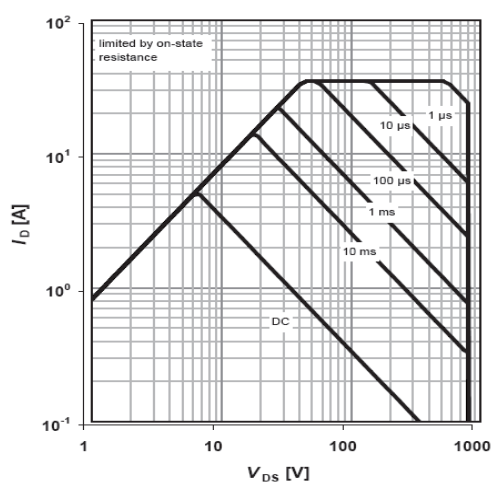


Figure 12: Maximum Forward Biased Safe Operating Area
 TO-220 FullPAK, T_c=25 °C

Typical characteristics Diagrams

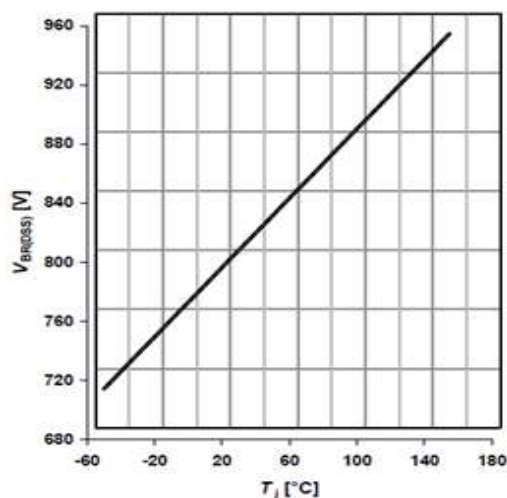


Figure 13: Break Down vs. Junction Temperature

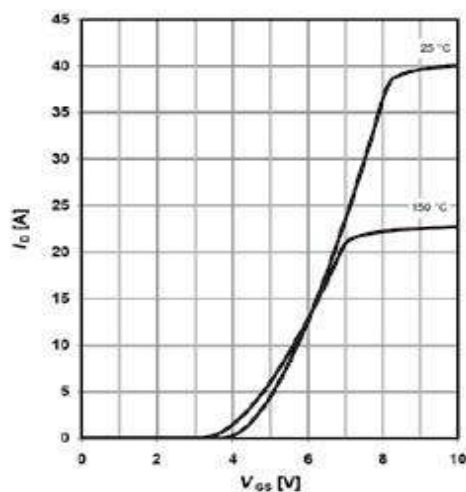


Figure 14: Typical transfer characteristics

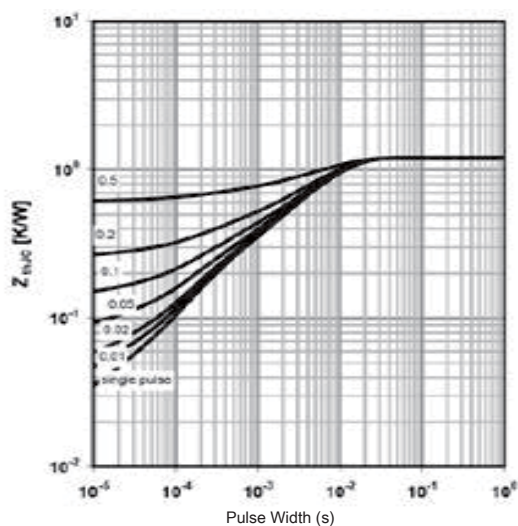


Figure 15: Maximum Transient Thermal Impedance
TO-220

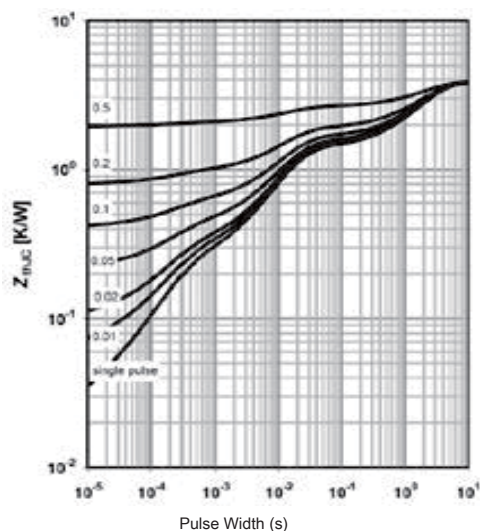


Figure 16: Maximum Transient Thermal Impedance
TO-220 FullPAK

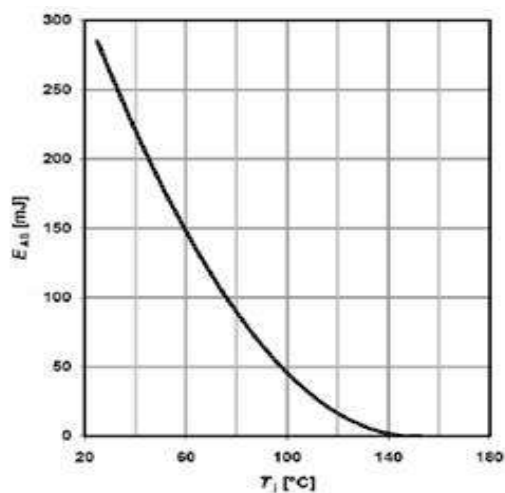
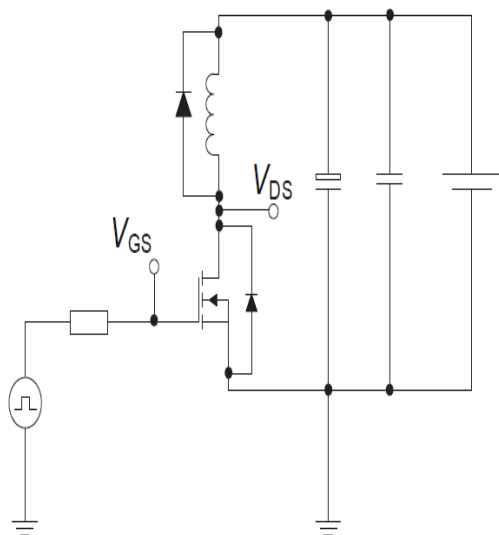


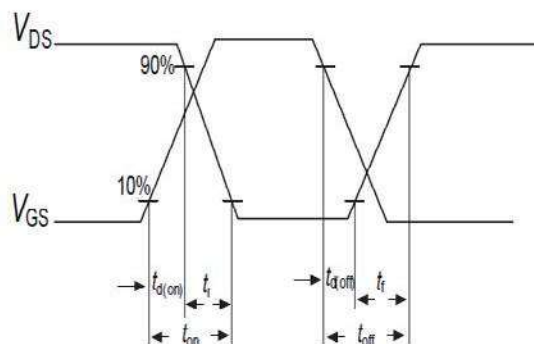
Figure 17: Avalanche energy

Typical characteristics Diagrams

Switching times test circuit for inductive load

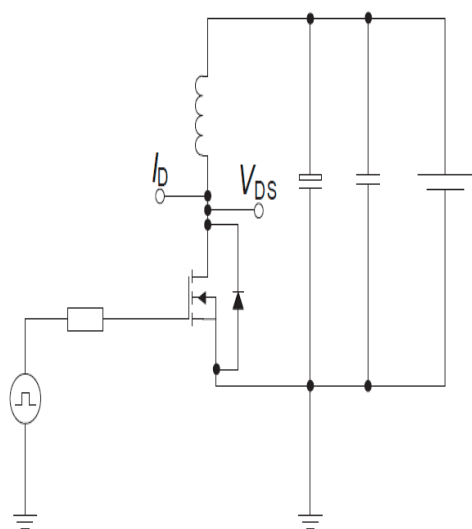


Switching time waveform

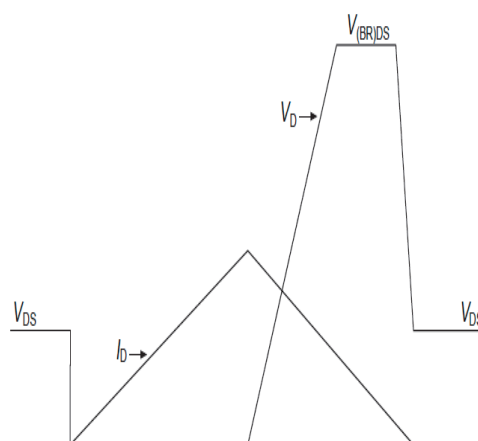


Unclamped inductive load test circuit and waveform

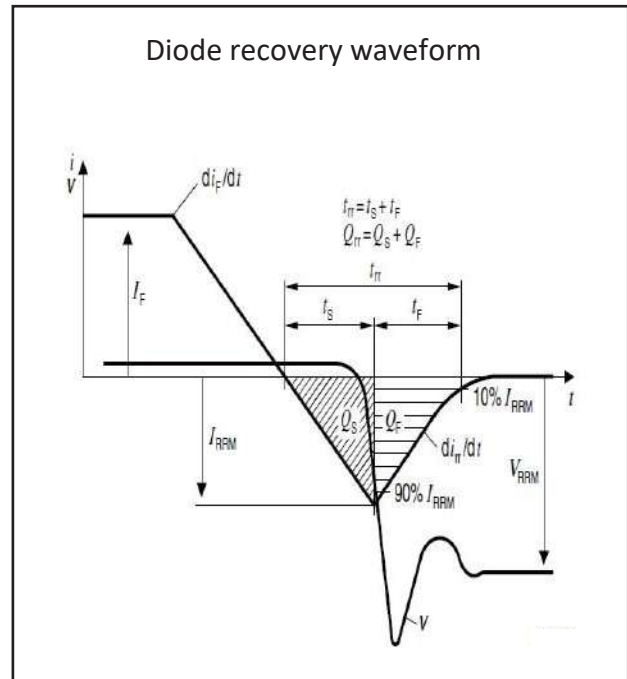
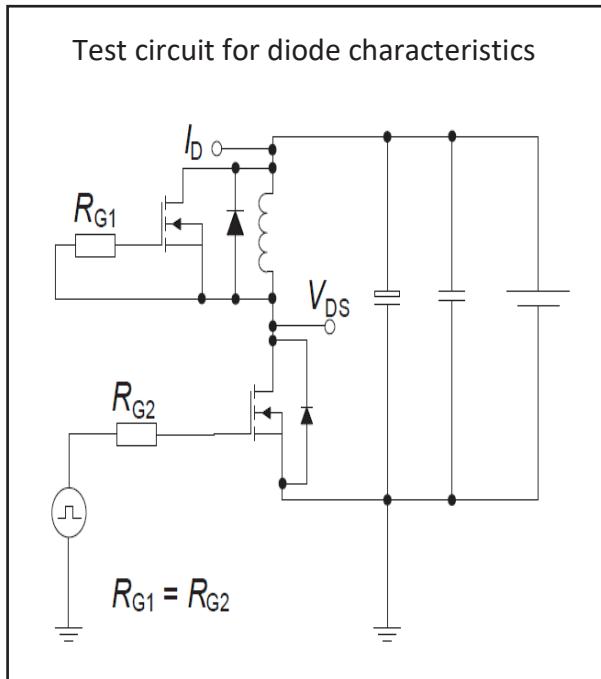
Unclamped inductive load test circuit



Unclamped inductive waveform

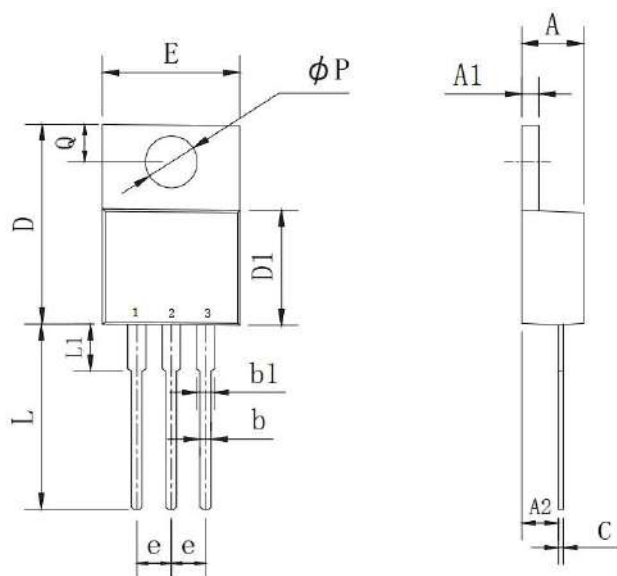


Typical characteristics Diagrams



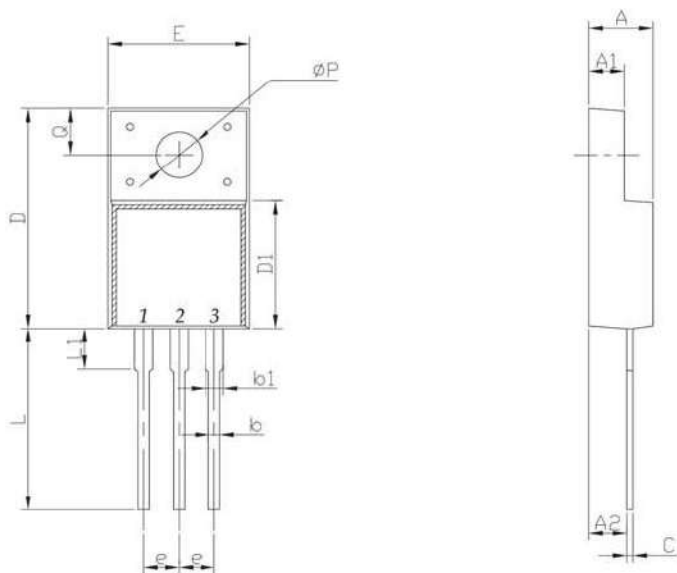
Dimensions

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

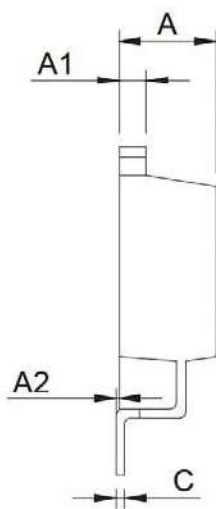
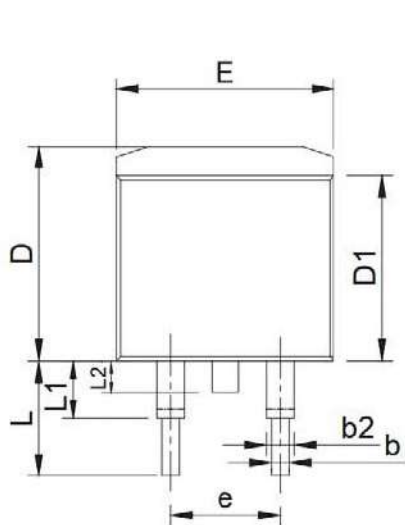
ITO-220 PACKAGE OUTLINE DIMENSIONS



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