

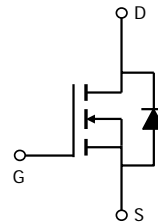
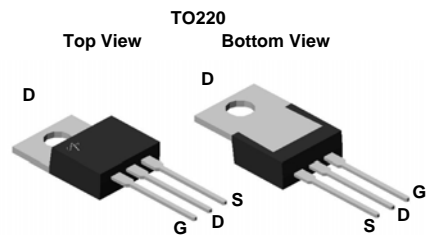
General Description

The AOT470 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

Product Summary

V_{DS}	75V
I_D (at $V_{GS}=10V$)	100A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 10.5m Ω

100% UIS Tested
100% R_g Tested



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	75	V
Gate-Source Voltage	V_{GS}	± 25	V
Continuous Drain Current ^G	I_D	$T_C=25^\circ\text{C}$	100
		$T_C=100^\circ\text{C}$	78
Pulsed Drain Current ^C	I_{DM}	200	A
Continuous Drain Current	I_{DSM}	$T_A=25^\circ\text{C}$	10
		$T_A=70^\circ\text{C}$	8
Avalanche Current ^C	I_{AS}, I_{AR}	45	A
Avalanche energy $L=0.3\text{mH}$ ^C	E_{AS}, E_{AR}	300	mJ
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$	268
		$T_C=100^\circ\text{C}$	134
Power Dissipation ^A	P_{DSM}	$T_A=25^\circ\text{C}$	2.1
		$T_A=70^\circ\text{C}$	1.3
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	10	12	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}		Steady-State	45	60
Maximum Junction-to-Case	$R_{\theta JC}$	0.45	0.56	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	75			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =75V, V _{GS} =0V T _J =55°C			1	μA
					5	
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±25V			1	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2	2.7	4	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	200			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =30A T _J =125°C		8.3	10.5	mΩ
					13.7	
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =30A		90		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Maximum Body-Diode Continuous Current				100	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, f=1MHz	3760	4700	5640	pF
C _{oss}	Output Capacitance		280	400	520	pF
C _{rss}	Reverse Transfer Capacitance		110	180	250	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	1.5	3	4.5	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =30A	90	114	136	nC
Q _{gs}	Gate Source Charge		26	33	40	nC
Q _{gd}	Gate Drain Charge		11	18	25	nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =30V, R _L =1Ω, R _{GEN} =3Ω		21		ns
t _r	Turn-On Rise Time			39		ns
t _{D(off)}	Turn-Off DelayTime			70		ns
t _f	Turn-Off Fall Time			24		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =30A, dI/dt=100A/μs	37	53	70	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =30A, dI/dt=100A/μs	100	143	185	nC

- A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.
- B. The power dissipation P_D is based on T_{J(MAX)}=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=175°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.
- D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.
- E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
- F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=175°C. The SOA curve provides a single pulse rating.
- G. The maximum current rating is limited by bond-wires.
- H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C.

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

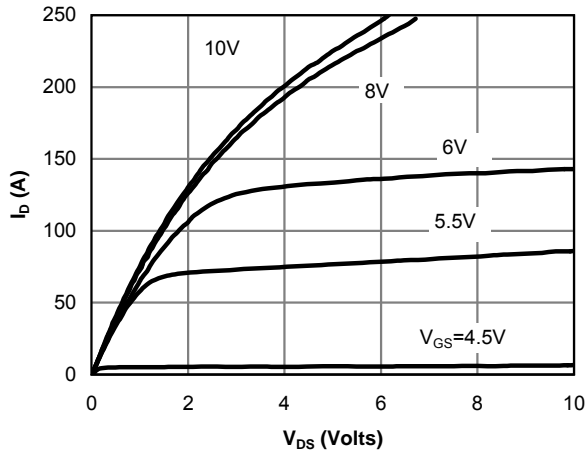


Fig 1: On-Region Characteristics (Note E)

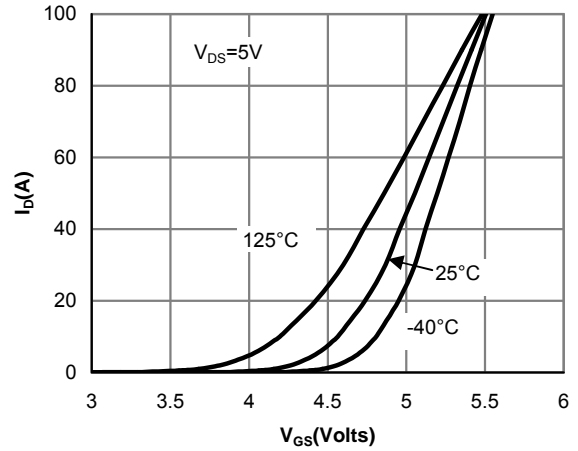


Figure 2: Transfer Characteristics (Note E)

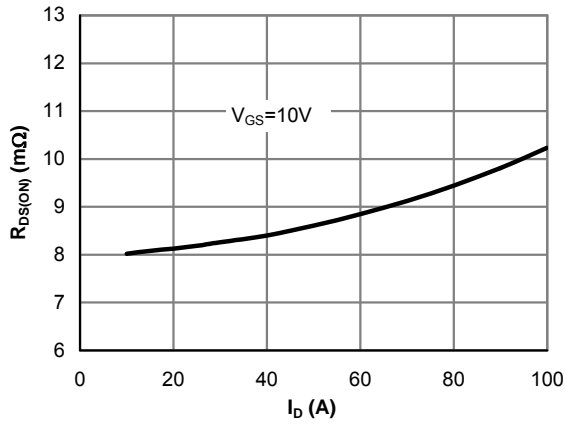


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

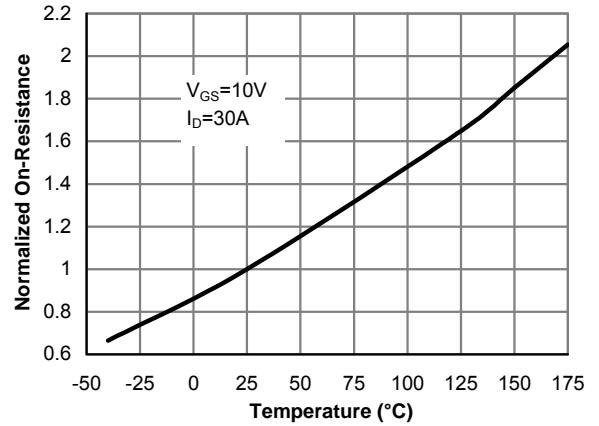


Figure 4: On-Resistance vs. Junction Temperature (Note E)

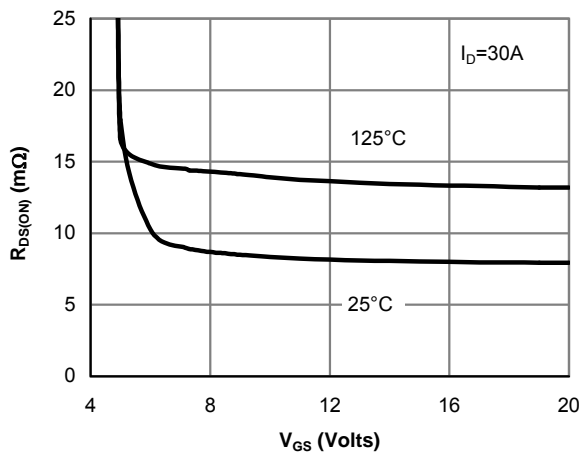


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

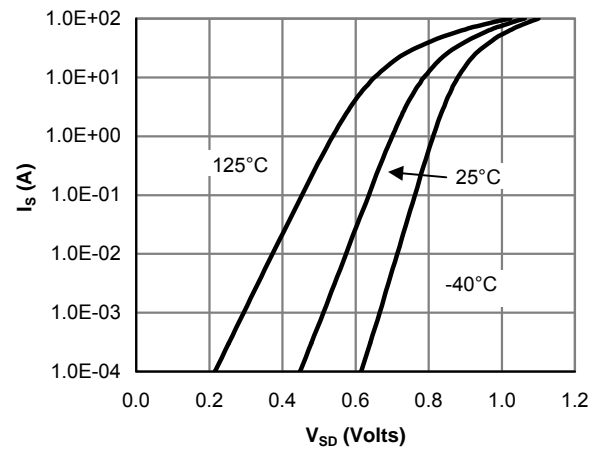


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

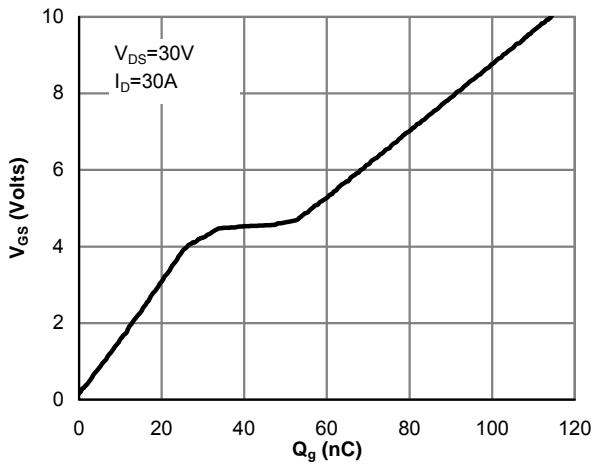


Figure 7: Gate-Charge Characteristics

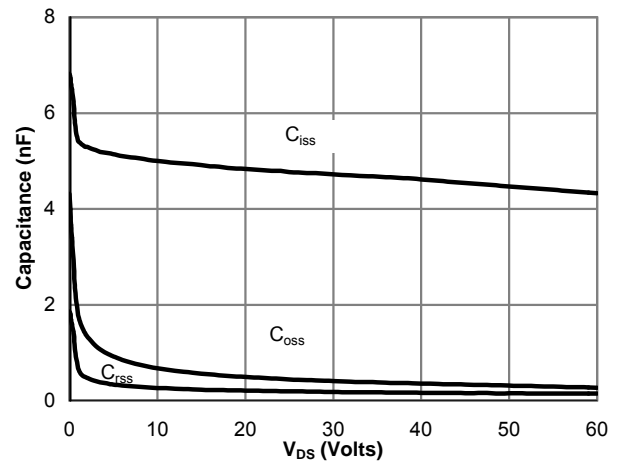


Figure 8: Capacitance Characteristics

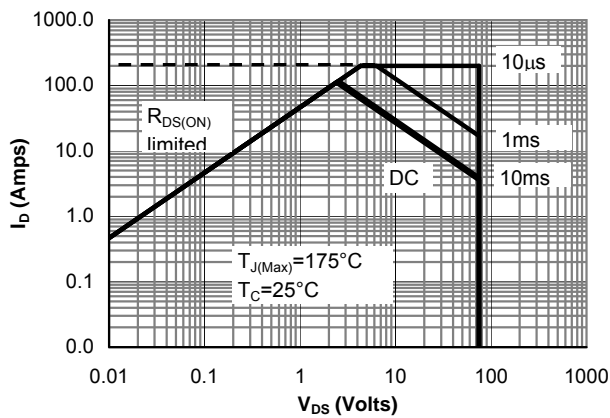


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

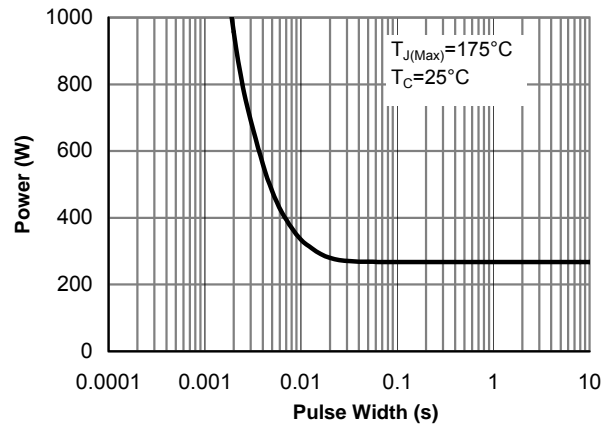


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

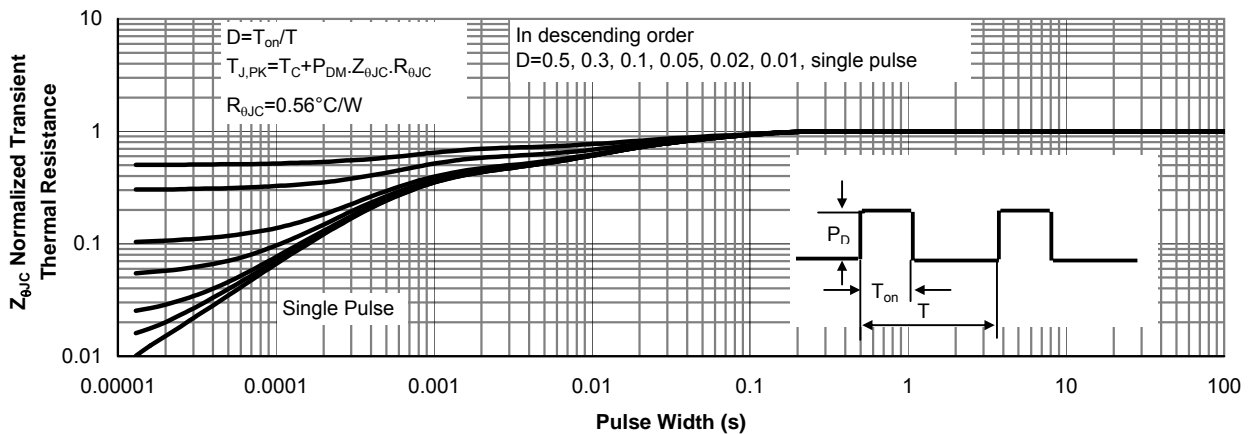


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

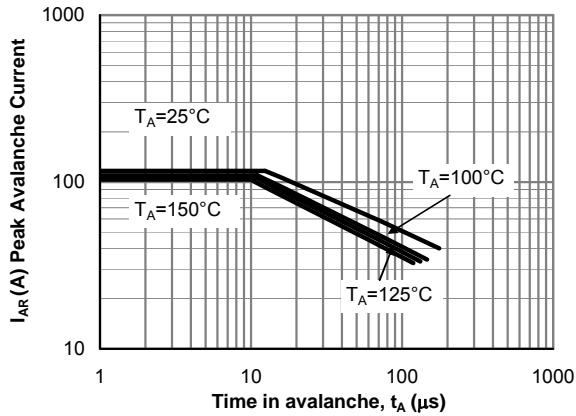


Figure 12: Single Pulse Avalanche capability (Note C)

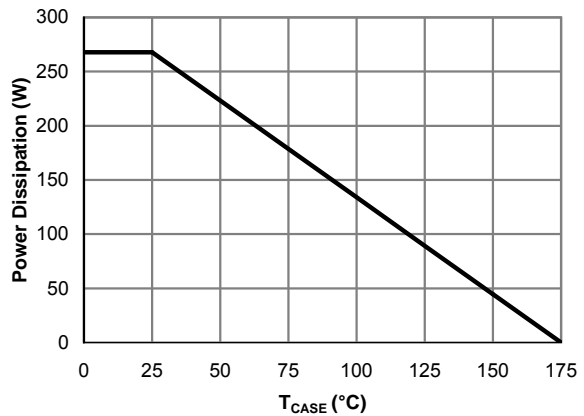


Figure 13: Power De-rating (Note F)

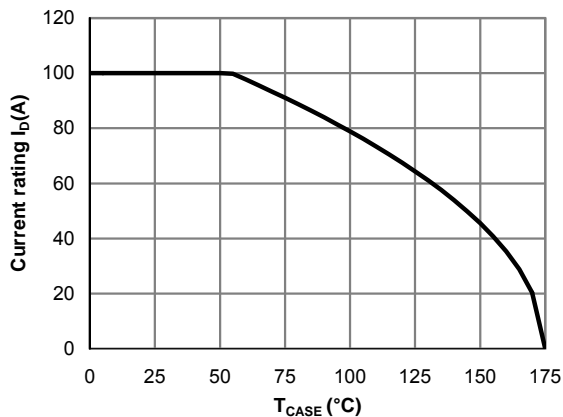


Figure 14: Current De-rating (Note F)

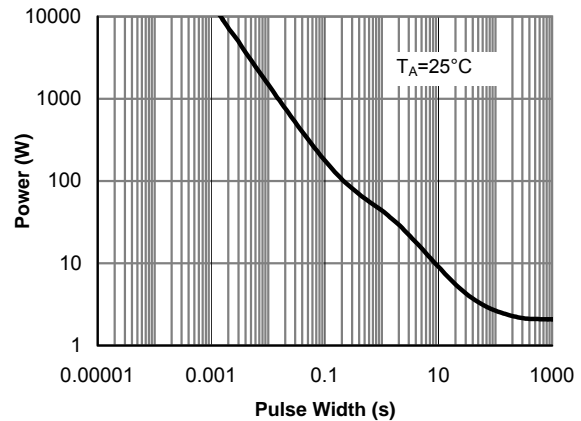


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

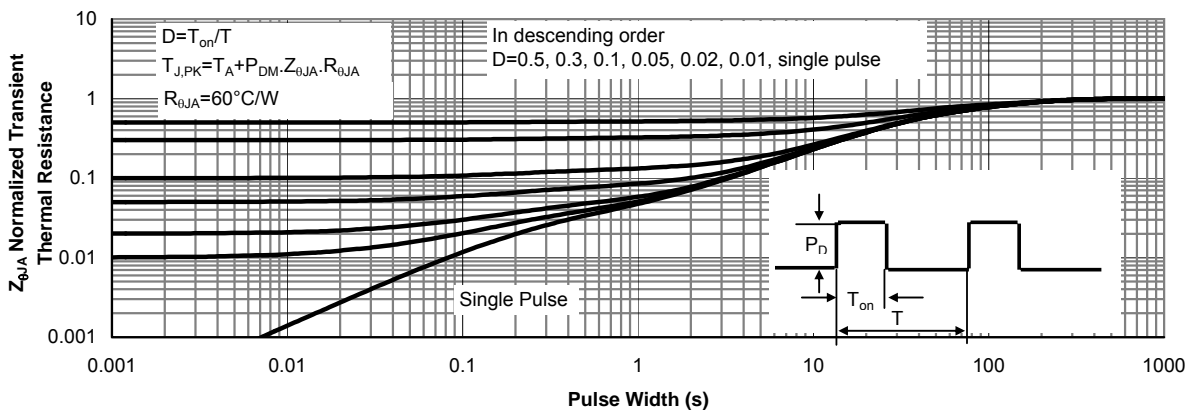
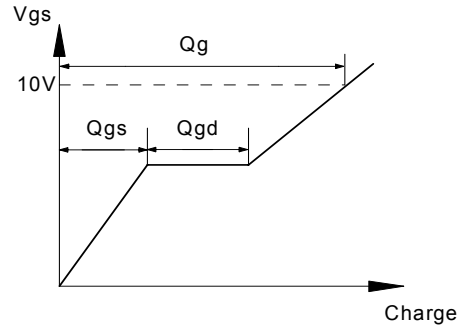
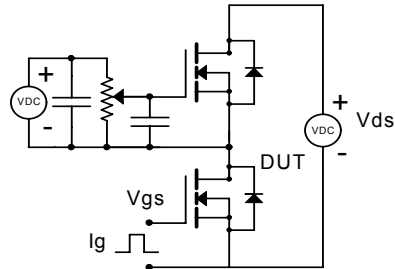
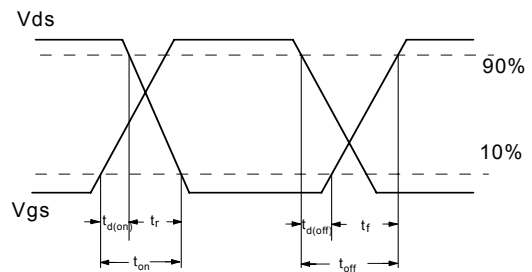
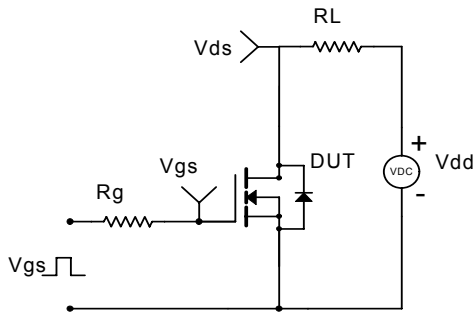


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

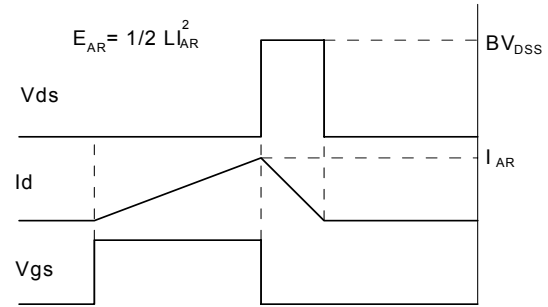
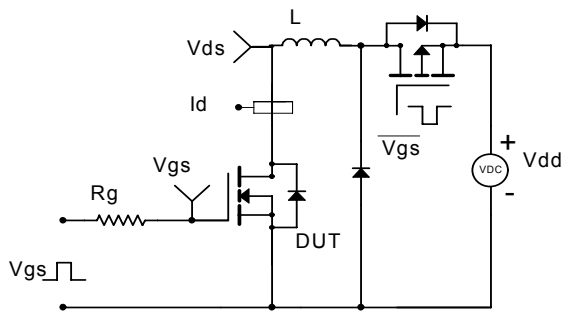
Gate Charge Test Circuit & Waveform



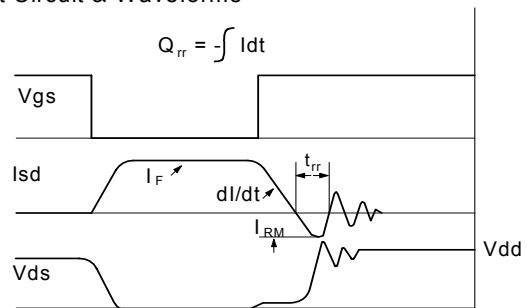
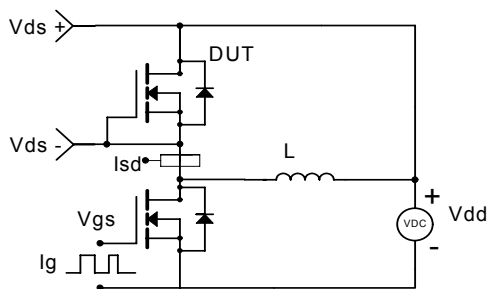
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



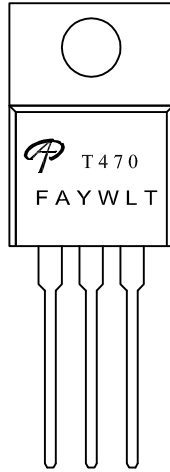
Diode Recovery Test Circuit & Waveforms



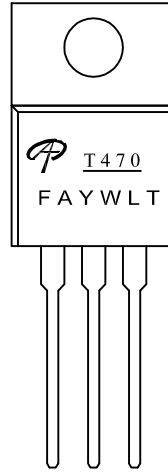


Document No.	PD-01089
Version	A
Title	AOT470 Marking Description

TO220 PACKAGE MARKING DESCRIPTION



Standard product



Green product

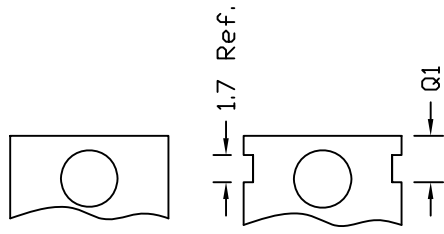
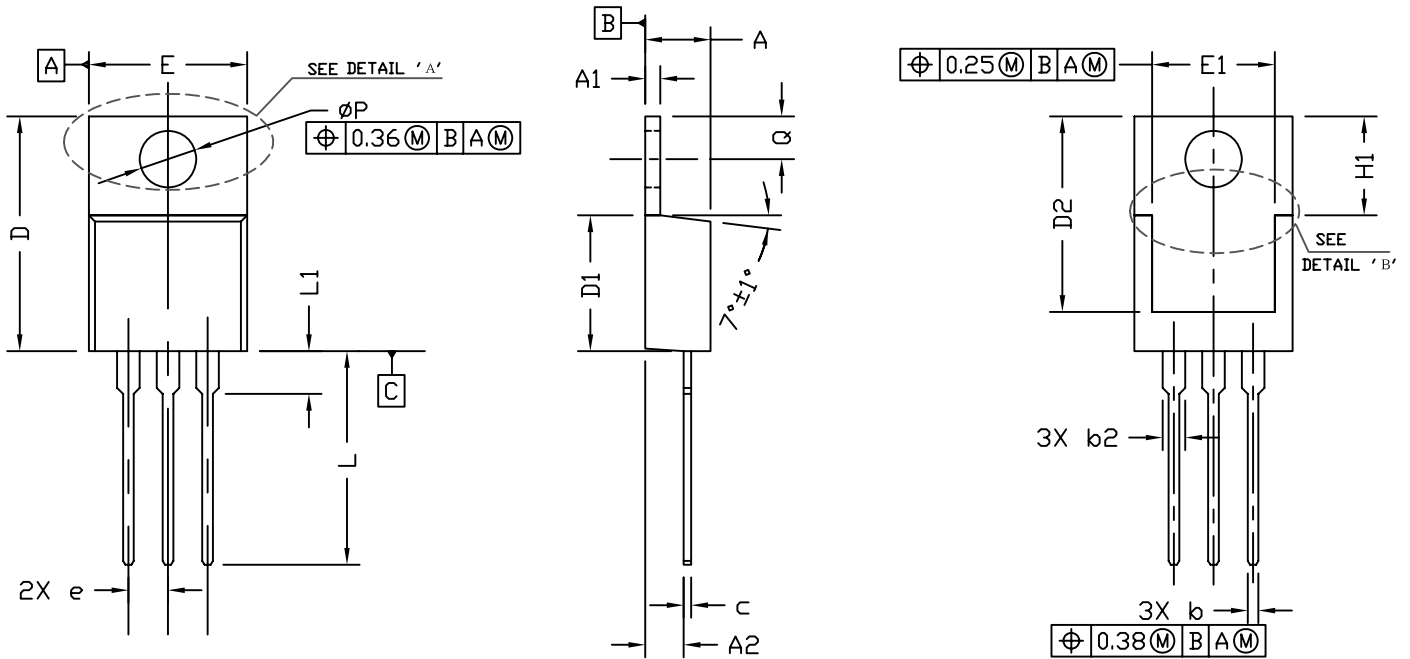
NOTE:

- LOGO - AOS Logo
- T470 - Part number code
- F - Fab code
- A - Assembly location code
- Y - Year code
- W - Week code
- L&T - Assembly lot code

PART NO.	DESCRIPTION	CODE
AOT470	Standard product	T470
AOT470L	Green product	<u>T470</u>

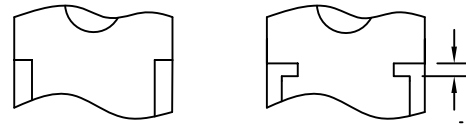


TO220 PACKAGE OUTLINE



OPTION 1 OPTION 2

DETAIL 'A'

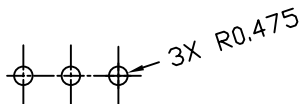


OPTION 1 OPTION 2

DETAIL 'B'

0.8 Ref.

RECOMMENDATION OF HOLE PATTERN



UNIT: mm

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.45	4.72	0.169	0.175	0.186
A1	1.15	1.27	1.40	0.045	0.050	0.055
A2	2.20	2.67	2.90	0.087	0.105	0.114
b	0.69	0.81	0.95	0.027	0.032	0.037
b2	1.17	1.27	1.72	0.046	0.050	0.068
c	0.36	0.38	0.60	0.014	0.015	0.024
D	14.50	15.44	15.80	0.571	0.608	0.622
D1	8.59	9.14	9.65	0.338	0.360	0.380
D2	11.43	11.73	12.48	0.450	0.462	0.491
e	2.54 BSC			0.100 BSC.		
E	9.66	10.03	10.54	0.380	0.395	0.415
E1	6.22	---	---	0.245	---	---
H1	6.10	6.30	6.50	0.240	0.248	0.256
L	12.27	12.82	14.27	0.483	0.505	0.562
L1	2.47	---	3.90	0.097	---	0.154
Q	2.59	2.74	2.89	0.102	0.108	0.114
ØP	3.50	3.84	3.89	0.138	0.151	0.153
Q1	2.70	---	2.90	0.106	---	0.114

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MIL.
2. TOLERANCE 0.100 MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.



TO-220-3L Tube Packing Data

➤ Packaging Description

AOS TO-220 parts are normally shipped in tubes. The tube is made of PVC plastic treated with an anti-static agent. Each tube contains 50 units.

Upto 25 such tubes are packed into an anti-static inner box, and an inner label is affixed on this inner box. Ten (10) such inner boxes are further packed into a carton box, and an outer label is affixed on the carton box. Thus, a carton may contain 250 individual tubes, and upto 12500 units. Both the inner and outer labels show the AOS part Number, Assembly lot Number, Assembly Date Code and Quantity.

➤ Packing Configuration

