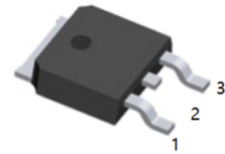


### General Description

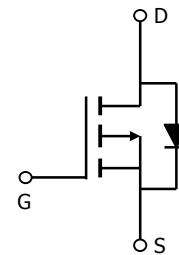
The AOD417 uses advanced technology to provide excellent  $R_{DS(ON)}$ , low gate charge and low gate resistance. Excellent thermal resistance of the DPAK package, this device is well suited for high current load applications.



1.G 2.D 3.S  
TO-252(DPAK) top view

### Features

- $V_{DS}(V) = -30V$
- $I_D = -25A$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 34m\Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 55m\Omega$  ( $V_{GS} = -4.5V$ )
- RoHS Compliant
- Halogen Free\*



### Absolute Maximum Ratings $T_A = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>B,G</sup>	$T_A = 25^\circ C$	-25	A
	$T_A = 100^\circ C$	-20	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	-60	
Avalanche Current <sup>C</sup>	$I_{AR}$	-14	A
Repetitive avalanche energy $L=0.3mH$ <sup>C</sup>	$E_{AR}$	30	mJ
Power Dissipation <sup>B</sup>	$T_C = 25^\circ C$	50	W
	$T_C = 100^\circ C$	25	
Power Dissipation <sup>A</sup>	$T_A = 25^\circ C$	2.5	W
	$T_A = 70^\circ C$	1.6	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 175	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	16.7	25	$^\circ C/W$
Maximum Junction-to-Ambient <sup>A</sup>		40	50	
Maximum Junction-to-Case <sup>D</sup>	$R_{\theta JC}$	2.5	3	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V			-1	μA
		T <sub>J</sub> =55°C			-5	
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250μA	-1	-1.9	-3	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V	-60			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A		27	34	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-7A		40	55	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-20A		18		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V		-0.75	-1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				-6	A
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz		920		pF
C <sub>oss</sub>	Output Capacitance			140		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			90		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		6	9	Ω
Q <sub>g(10V)</sub>	Total Gate Charge (10V)	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-20A		16.2		nC
Q <sub>g(4.5V)</sub>	Total Gate Charge (4.5V)			8.2		nC
Q <sub>gs</sub>	Gate Source Charge			2.9		nC
Q <sub>gd</sub>	Gate Drain Charge			3.6		nC
t <sub>D(on)</sub>	Turn-On DelayTime				8	
t <sub>r</sub>	Turn-On Rise Time	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =0.75Ω,		30		ns
t <sub>D(off)</sub>	Turn-Off DelayTime	R <sub>GEN</sub> =0.75Ω		22		ns
t <sub>f</sub>	Turn-Off Fall Time			26		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =-20A, dI/dt=100A/μs		23		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =-20A, dI/dt=100A/μs		14		nC

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The Power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub> (<10s) 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<sub>D</sub> is based on T<sub>J(MAX)</sub>=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<sub>J(MAX)</sub>=175°C.

D: The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> and case to ambient.

E: The static characteristics in Figures 1 to 6 are obtained using <300 μs 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<sub>J(MAX)</sub>=175°C.

G: The maximum current rating is limited by bond-wires.

H: These tests are performed with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

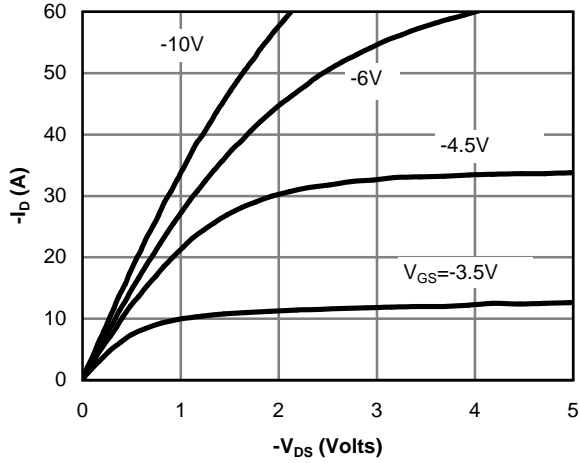


Figure 1: On-Region Characteristics

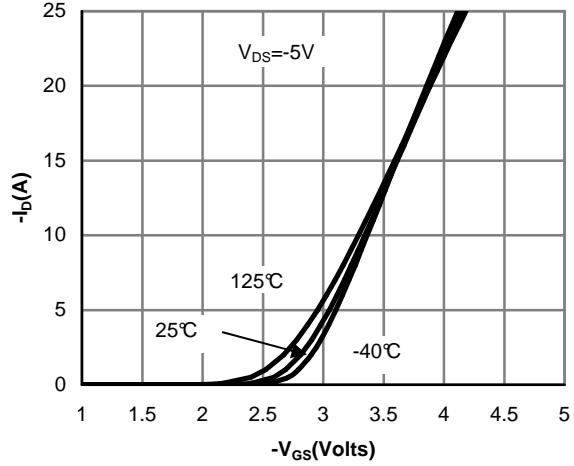


Figure 2: Transfer Characteristics

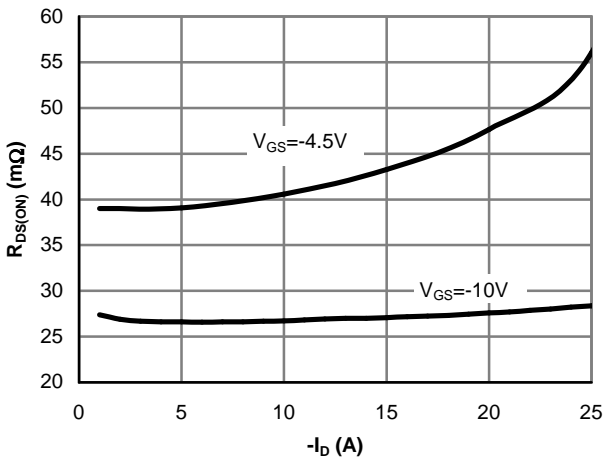


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

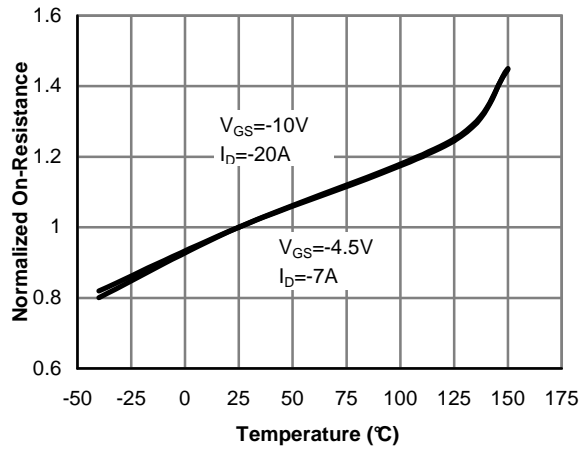


Figure 4: On-Resistance vs. Junction Temperature

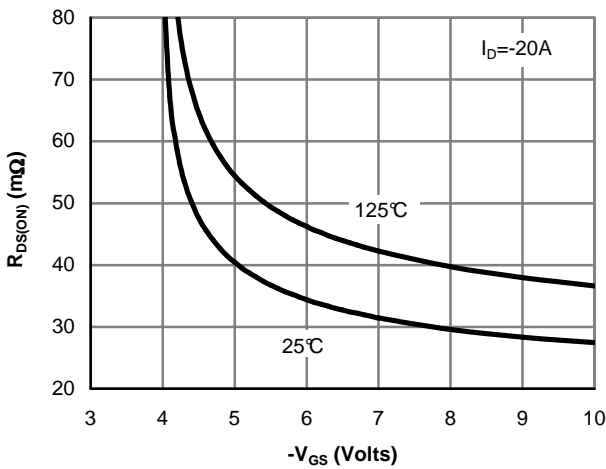


Figure 5: On-Resistance vs. Gate-Source Voltage

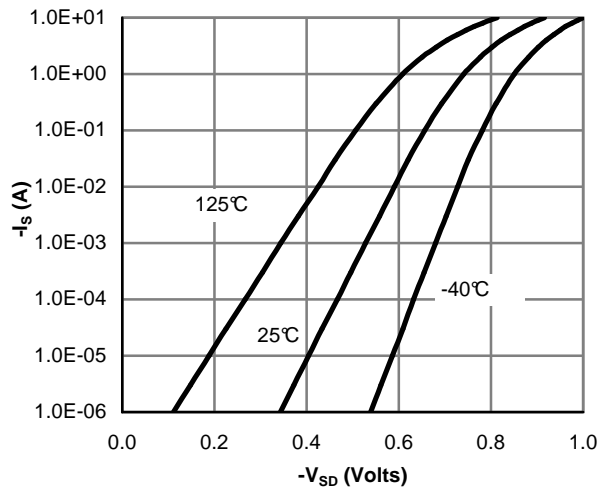


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

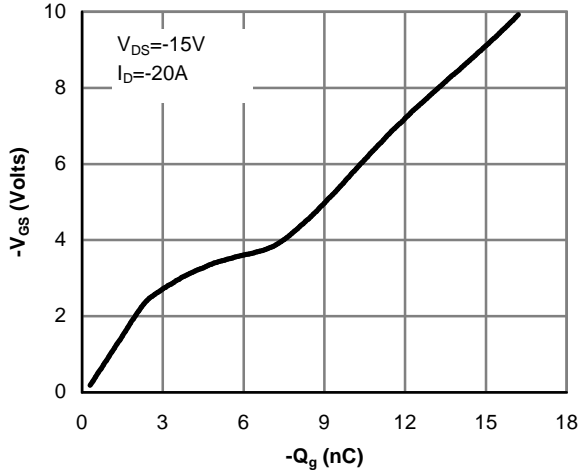


Figure 7: Gate-Charge Characteristics

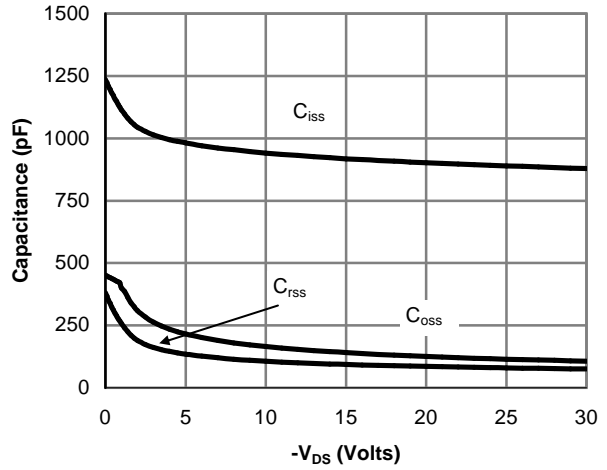


Figure 8: Capacitance Characteristics

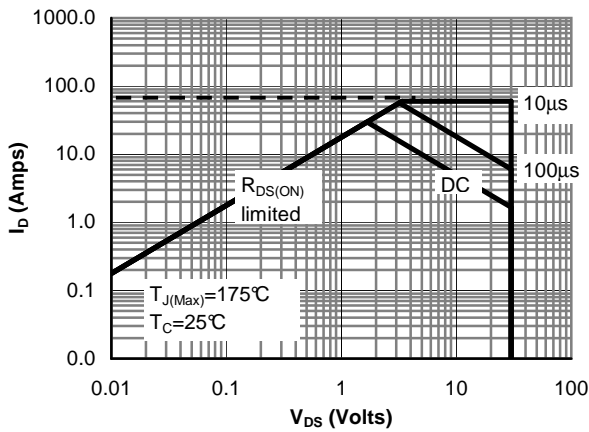


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

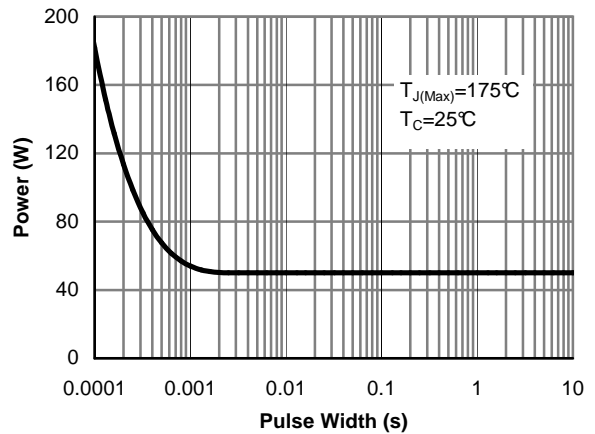


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

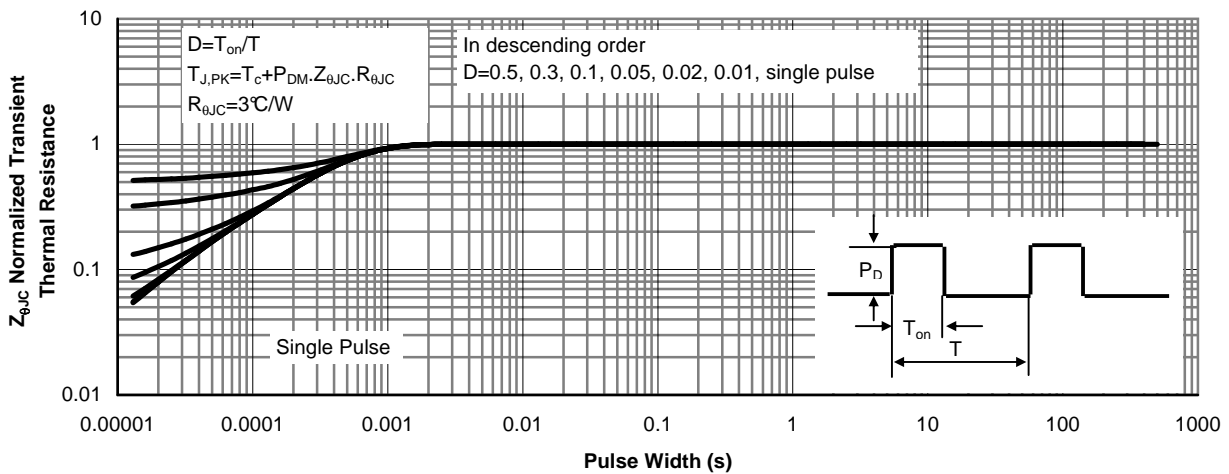


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

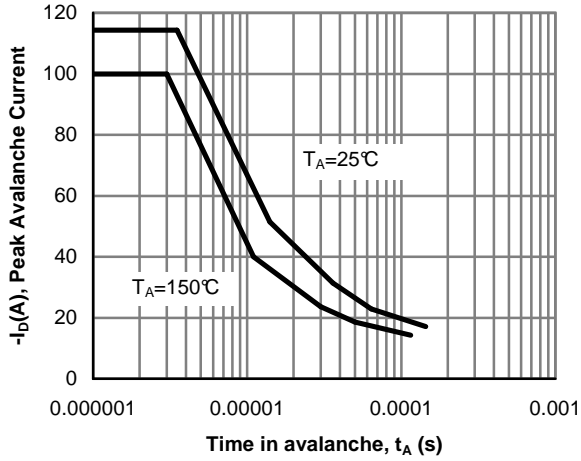


Figure 12: Single Pulse Avalanche capability

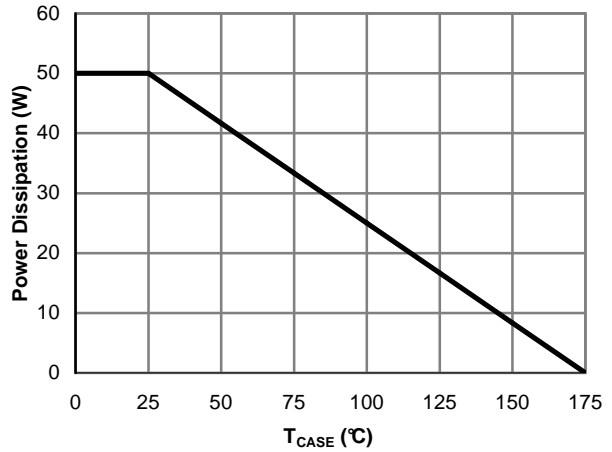


Figure 13: Power De-rating (Note B)

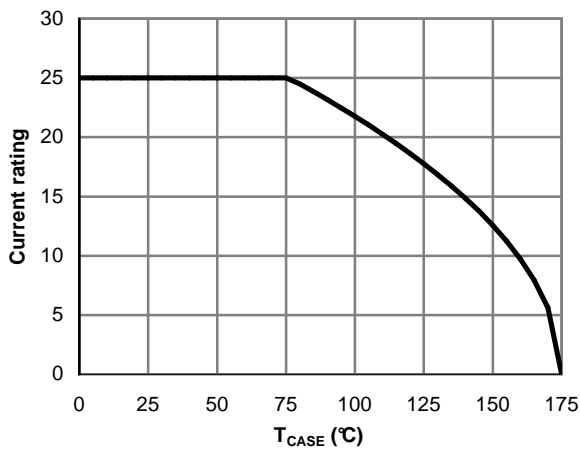


Figure 14: Current De-rating (Note B)

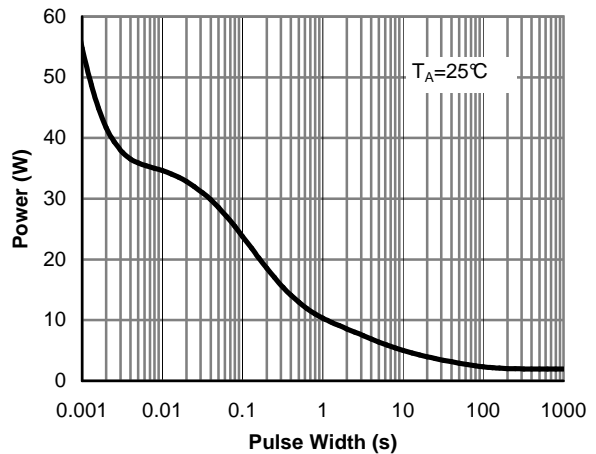


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

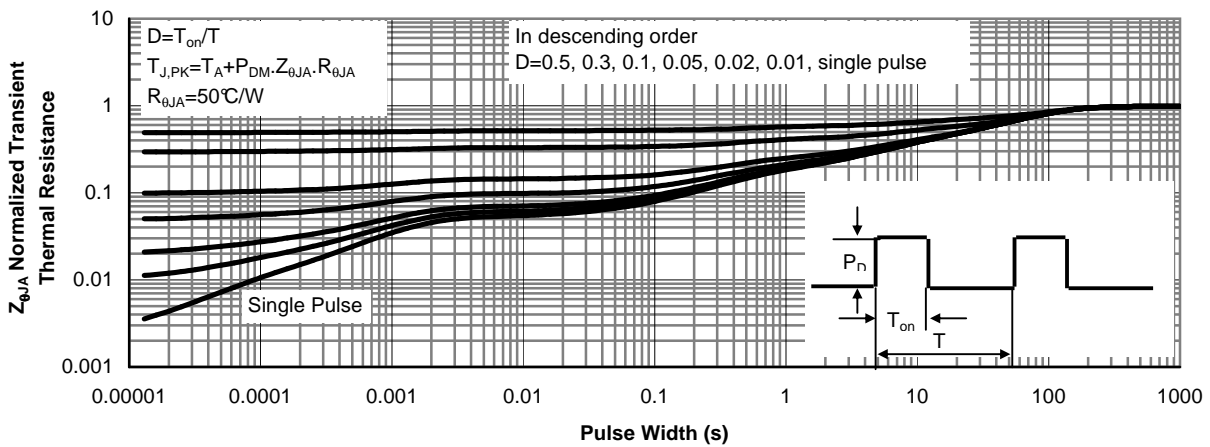
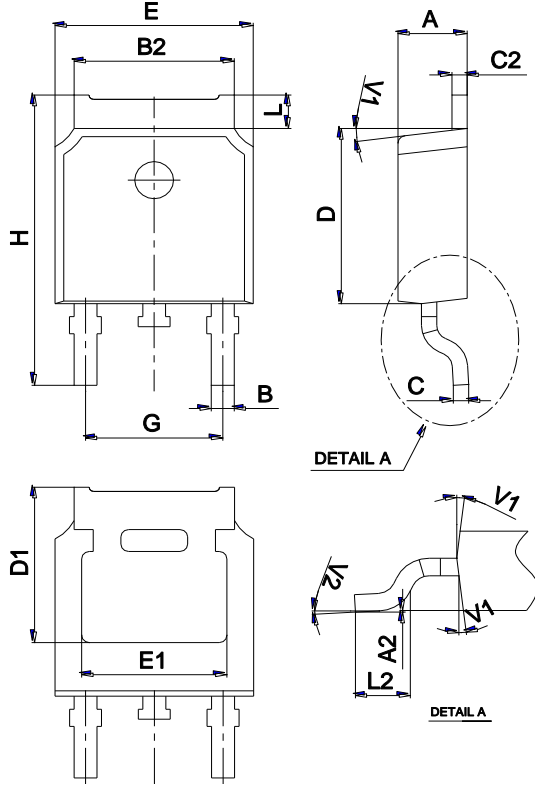


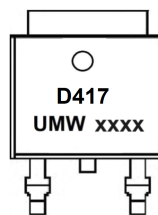
Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Package Mechanical Data TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW AOD417	TO-252	2500	Tape and reel