

AP20N15GH-VB Datasheet

N-Channel 150 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
150	0.074 at V _{GS} = 10 V	25.4	23 nC
	0.077 at V _{GS} = 8 V	22.5	

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Extremely Low Q_{gd} for Switching Losses
- 100 % R_g Tested
- 100 % Avalanche Tested
- Compliant to RoHS Directive 2002/95/EC

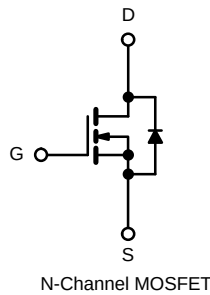
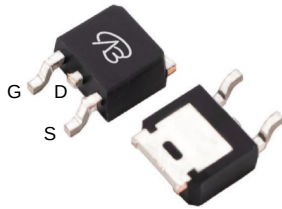


RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Primary Side Switch

TO-252



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	150	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	I _D	25.4	A
		23.1	
		15.5 ^{b, c}	
		14.5 ^{b, c}	
Pulsed Drain Current	I _{DM}	50	
Continuous Source-Drain Diode Current	I _S	4.5	
		2.6 ^{b, c}	
Single Pulse Avalanche Current	I _{AS}	20	mJ
Single Pulse Avalanche Energy	E _{AS}	20	
Maximum Power Dissipation	P _D	5.9	W
		3.8	
		3.1 ^{b, c}	
		2 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R _{thJA}	33	40	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	17	21	

Notes:

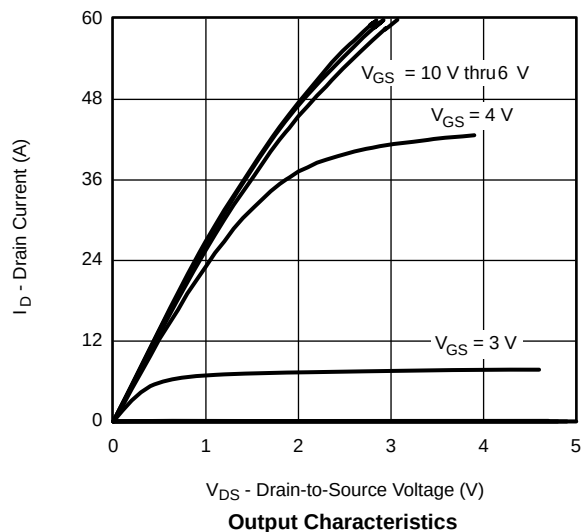
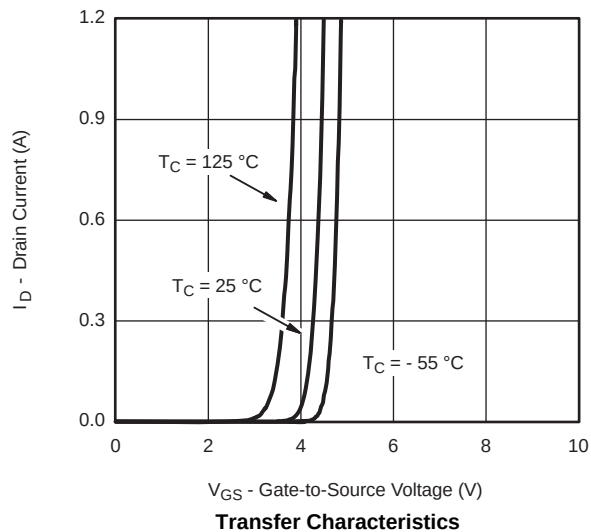
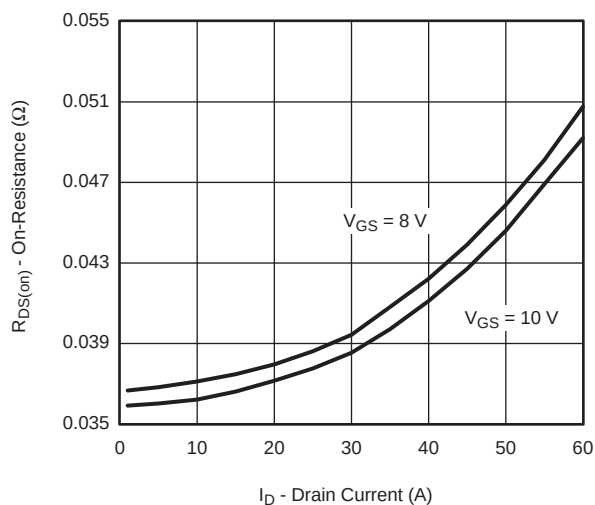
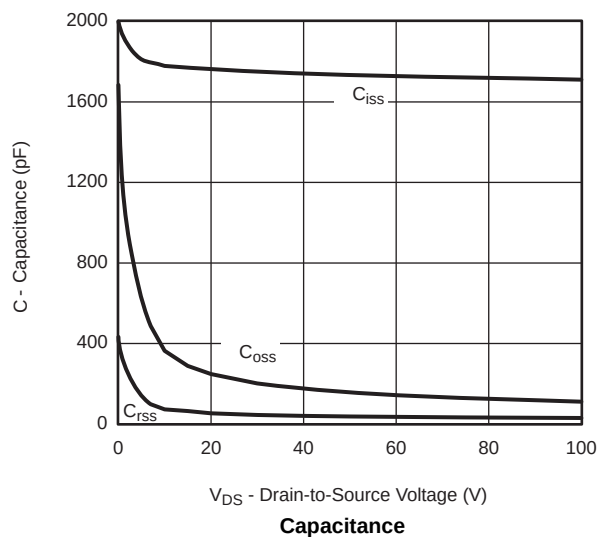
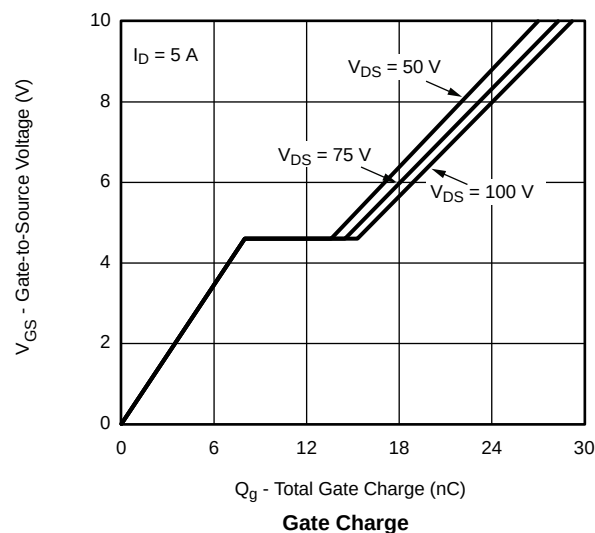
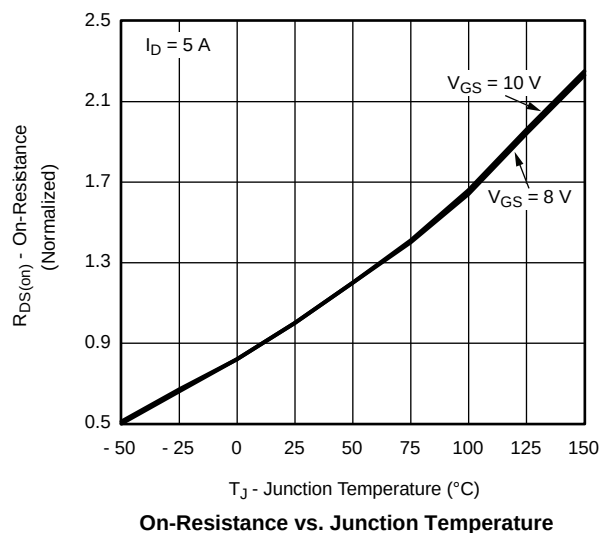
- Based on T_C = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 80 °C/W.

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	150			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		172		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 10		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.5		4.5	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 150 V, V _{GS} = 0 V			1	μA
		V _{DS} = 120 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	30			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 5 A		0.074		Ω
		V _{GS} = 8 V, I _D = 5 A		0.077		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 5 A		23		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		1000		pF
Output Capacitance	C _{oss}			160		
Reverse Transfer Capacitance	C _{rss}			37		
Total Gate Charge	Q _g	V _{DS} = 75 V, V _{GS} = 10 V, I _D = 5 A		28.5	43	nC
Gate-Source Charge	Q _{gs}	V _{DS} = 75 V, V _{GS} = 8 V, I _D = 5 A		23	35	
Gate-Drain Charge	Q _{gd}			8		
Gate Resistance	R _g	f = 1 MHz		6.5		
Turn-on Delay Time	t _{d(on)}	V _{DD} = 50 V, R _L = 10 Ω I _D ≡ 5 A, V _{GEN} = 10 V, R _g = 1 Ω		0.85	1.3	Ω
Rise Time	t _r			14	21	ns
Turn-Off Delay Time	t _{d(off)}			12	18	
Fall Time	t _f			22	33	
Turn-On Delay Time	t _{d(on)}		6	10		
Rise Time	t _r	V _{DD} = 50 V, R _L = 10 Ω I _D ≡ 5 A, V _{GEN} = 8 V, R _g = 1 Ω	16	24		
Turn-Off Delay Time	t _{d(off)}			12	18	
Fall Time	t _f			20	30	
				7	12	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			7.7	A
Pulse Diode Forward Current ^a	I _{SM}				50	
Body Diode Voltage	V _{SD}	I _S = 2.6 A		0.77	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 5 A, di/dt = 100 A/μs, T _J = 25 °C		63	95	ns
Body Diode Reverse Recovery Charge	Q _{rr}			110	165	nC
Reverse Recovery Fall Time	t _a			49		ns
Reverse Recovery Rise Time	t _b			14		

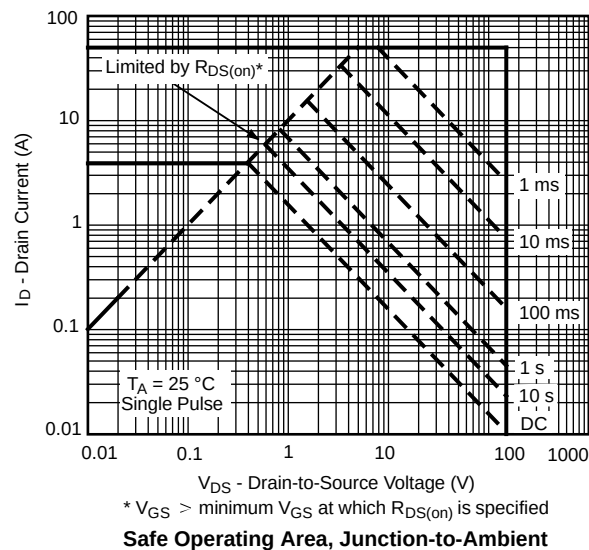
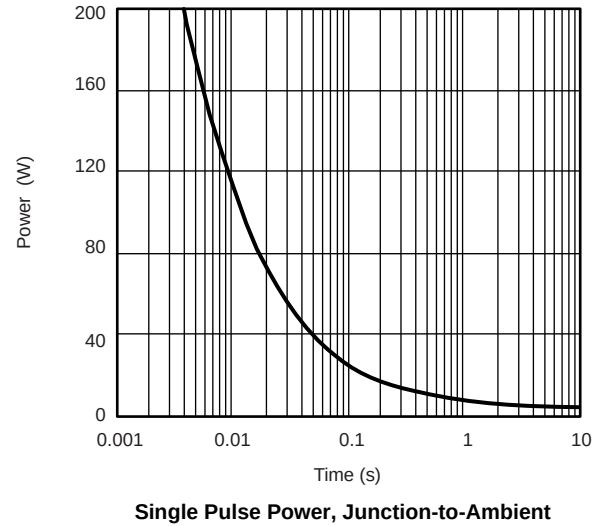
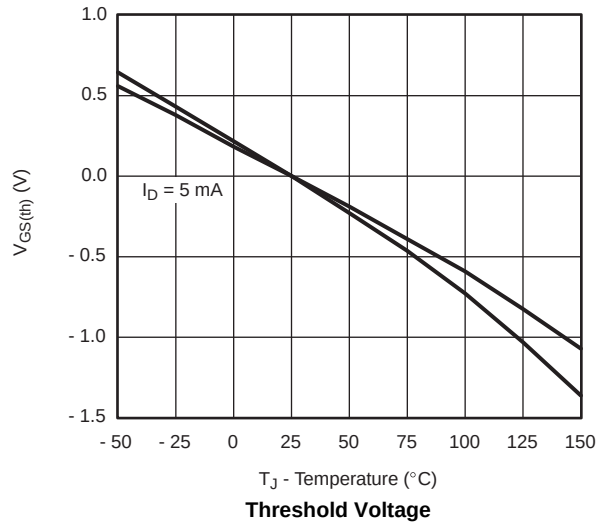
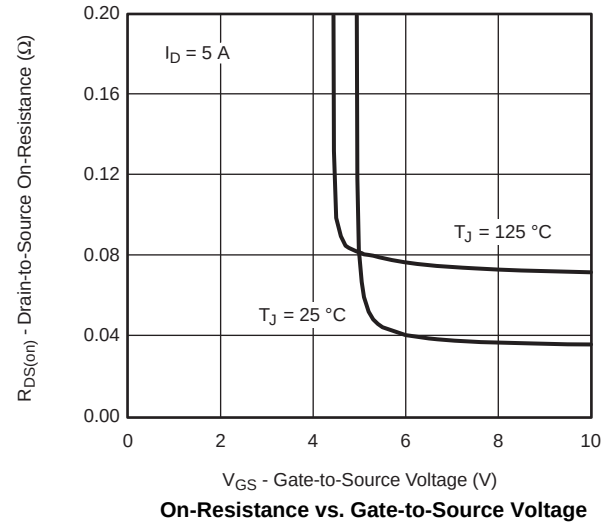
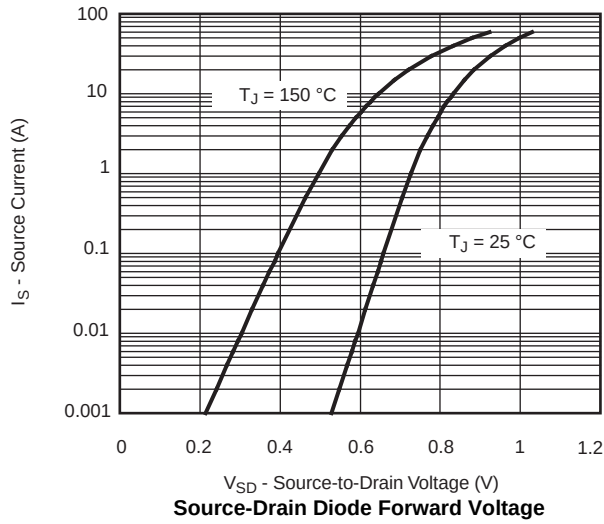
Notes:

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
 a. Guaranteed by design, not subject to production testing.

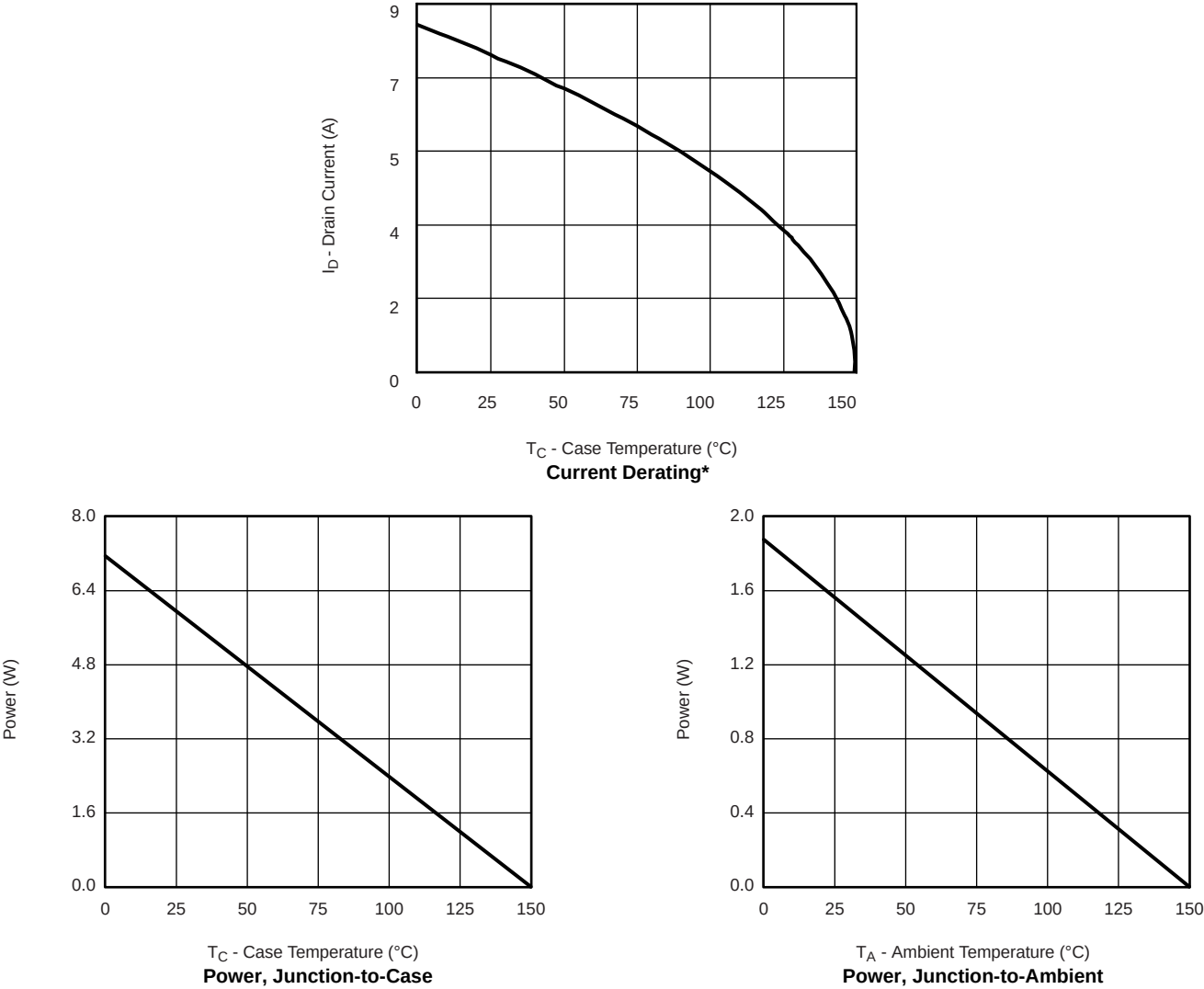
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current and Gate Voltage

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

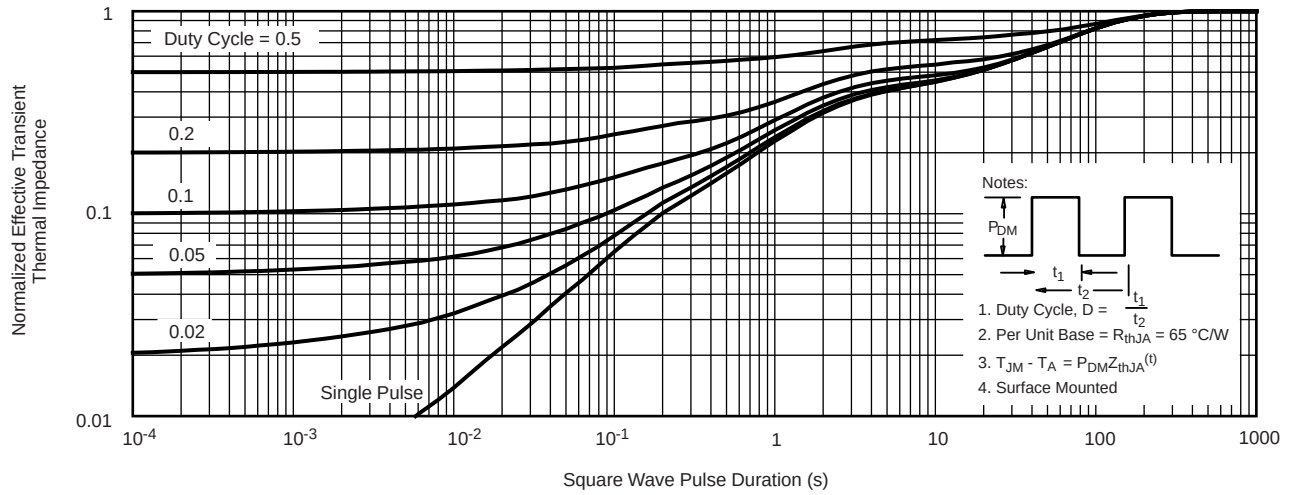


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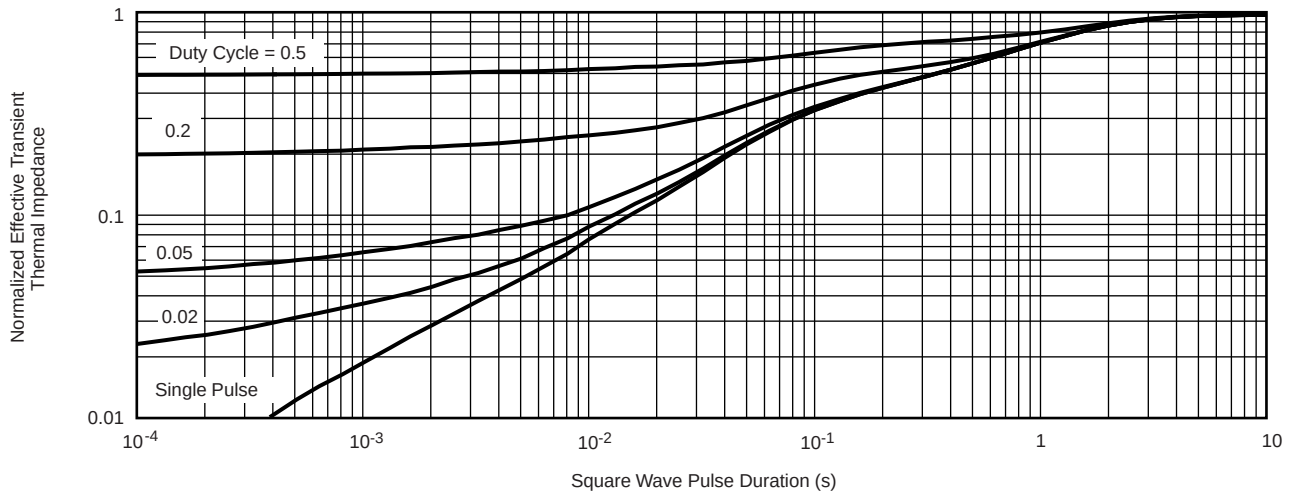


* The power dissipation P_D is based on $T_{J(max)} = 150\text{ °C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

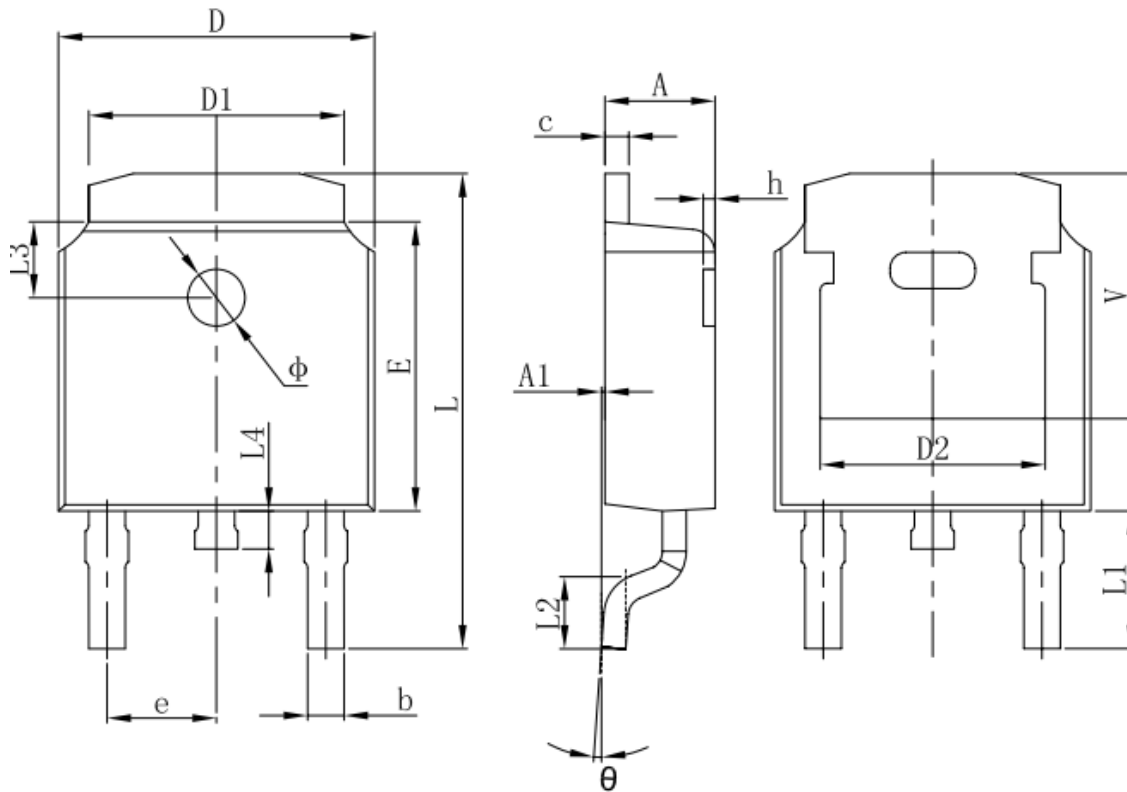


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

TO252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

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