

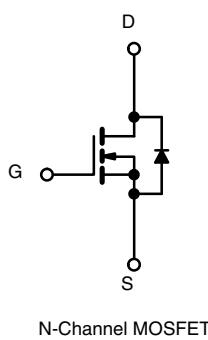
AGM20T09AT-VB Datasheet

N-Channel 200 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) MAX.	I _D (A)	Q _g (TYP.)
200	0.010 at V _{GS} = 10 V	110	75nC

FEATURES

- SGT technology Power MOSFET
- 100 % R_g and UIS tested
- Maximum 175 °C junction temperature



Top View

APPLICATIONS

- Power supplies:
 - Uninterruptible power supplies
 - AC/DC switch-mode power supplies
 - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V _{DS}	200	V
Gate-Source Voltage		V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	110	A
	T _C = 70 °C		90	
Pulsed Drain Current (t = 100 μs)		I _{DM}	330	
Avalanche Current	L = 0.5 mH	I _{AS}	780	
Single Avalanche Energy ^a		E _{AS}	110	mJ
Maximum Power Dissipation ^a	T _C = 25 °C	P _D	300 ^b	W
	T _C = 100 °C		150 ^b	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^c		R _{thJA}	40	°C/W
Junction-to-Case (Drain)		R _{thJC}	0.5	

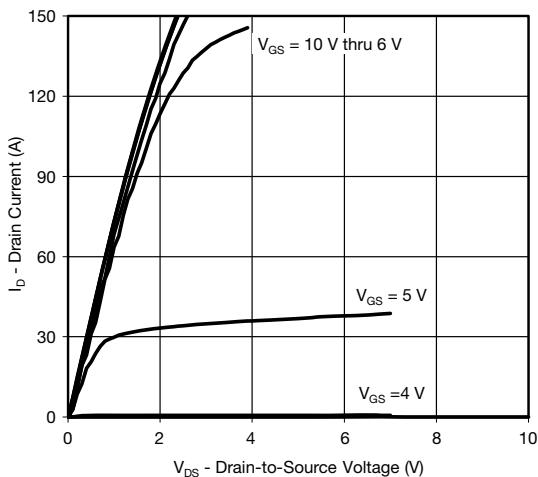
Notes

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).

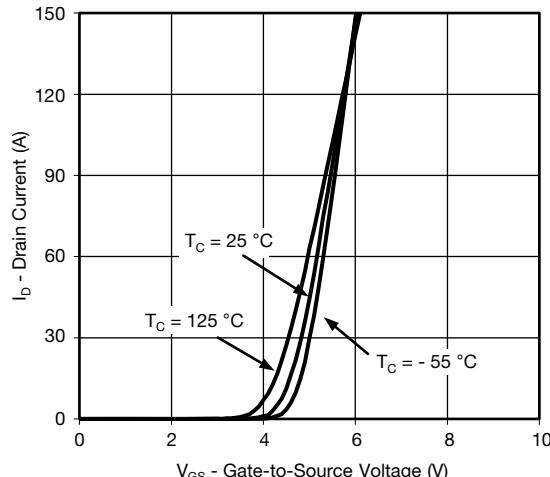
SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	200	-	-	V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	2.5	-	4.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$	-	-	± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 200 \text{ V}$, $V_{GS} = 0 \text{ V}$	-	-	1	μA
		$V_{DS} = 160 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$	-	-	150	
		$V_{DS} = 160 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$	-	-	5	mA
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 10 \text{ V}$, $V_{GS} = 10 \text{ V}$	90	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 30 \text{ A}$	-	0.010	-	Ω
		$V_{GS} = 7.5 \text{ V}$, $I_D = 30 \text{ A}$	-	0.015	-	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 30 \text{ A}$	-	75	-	S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 60 \text{ V}$, $f = 1 \text{ MHz}$	-	6800	-	pF
Output Capacitance	C_{oss}		-	246	-	
Reverse Transfer Capacitance	C_{rss}		-	21	-	
Total Gate Charge ^c	Q_g	$V_{DS} = 60 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 60 \text{ A}$	-	75	96	nC
Gate-Source Charge ^c	Q_{gs}		-	16.7	-	
Gate-Drain Charge ^c	Q_{gd}		-	16.9	-	
Gate Resistance	R_g	$f = 1 \text{ MHz}$	1.5	3	6	Ω
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 60 \text{ V}$, $R_L = 1.66 \Omega$ $I_D = 60 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$	-	21	33	ns
Rise Time ^c	t_r		-	115	220	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$		-	33	71	
Fall Time ^c	t_f		-	90	134	
Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25^\circ\text{C}$)						
Pulsed Current ($t = 100 \mu\text{s}$)	I_{SM}		-	-	330	A
Forward Voltage ^a	V_{SD}	$I_F = 10 \text{ A}$, $V_{GS} = 0 \text{ V}$	-	0.8	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 30 \text{ A}$, $\text{di}/\text{dt} = 100 \text{ A}/\mu\text{s}$	-	170	340	ns
Peak Reverse Recovery Charge	$I_{RM(\text{REC})}$		-	11	20	A
Reverse Recovery Charge	Q_{rr}		-	0.9	1.8	μC

Notes

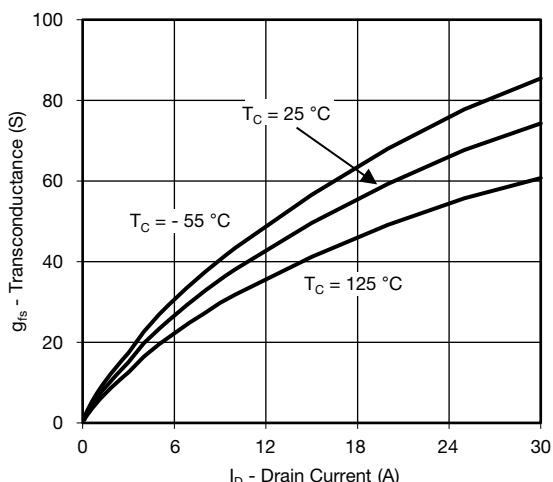
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2 \%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)


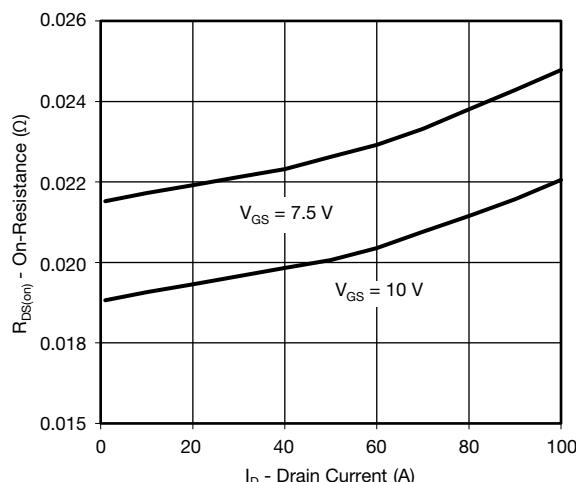
Output Characteristics



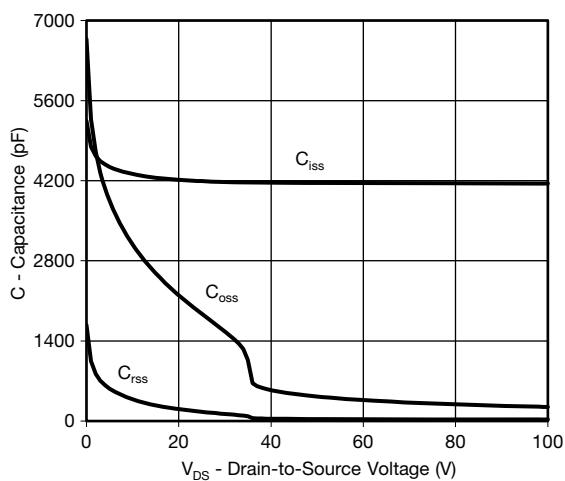
Transfer Characteristics



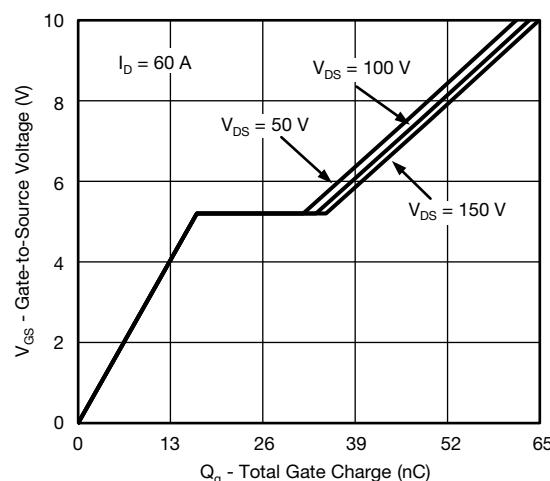
Transconductance



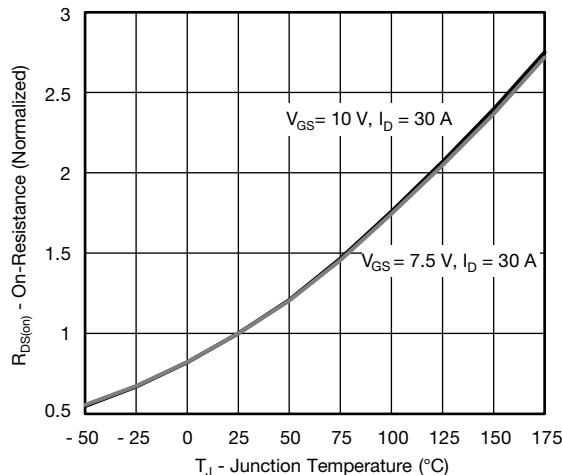
On-Resistance vs. Drain Current



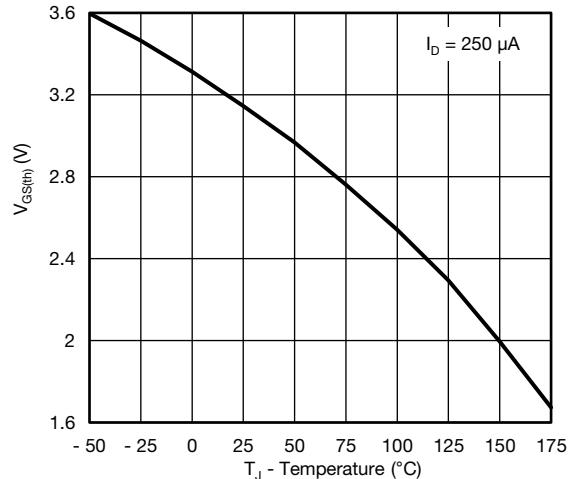
Capacitance



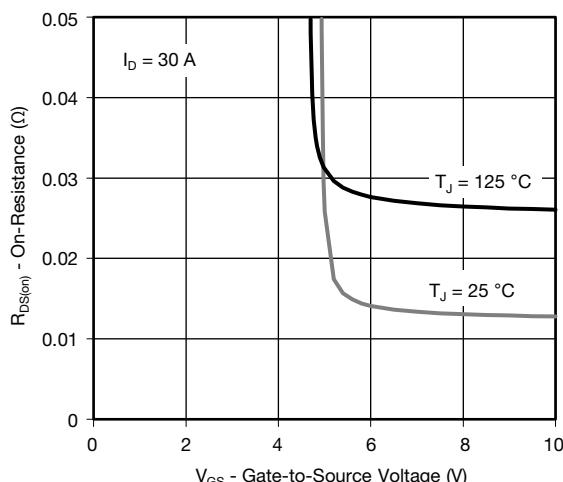
Gate Charge

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)


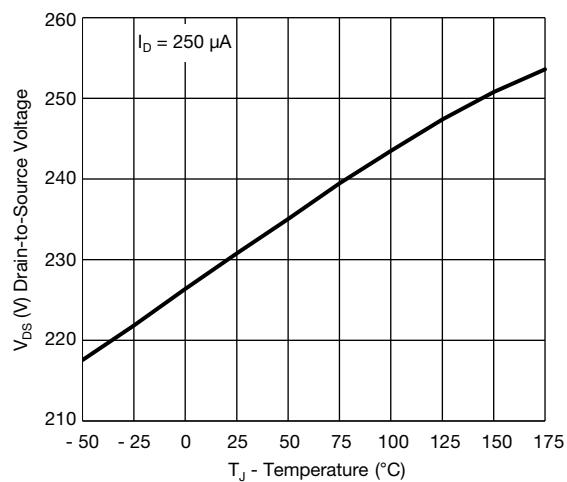
On-Resistance vs. Junction Temperature



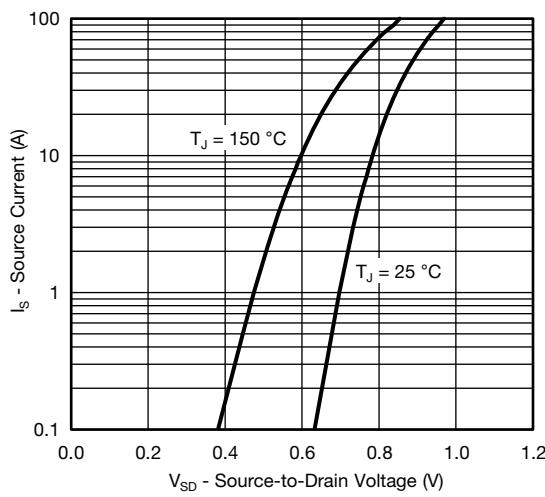
Threshold Voltage



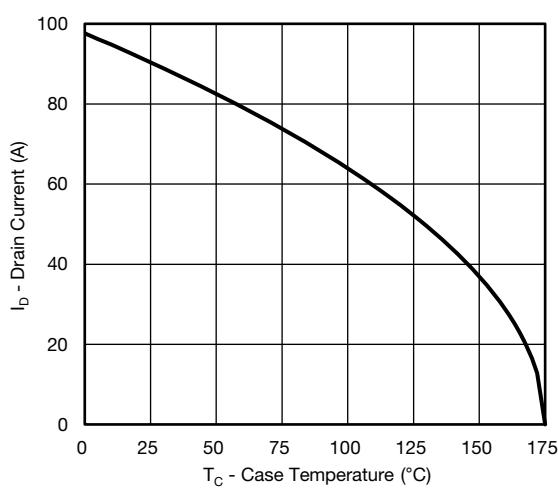
On-Resistance vs. Gate-to-Source Voltage



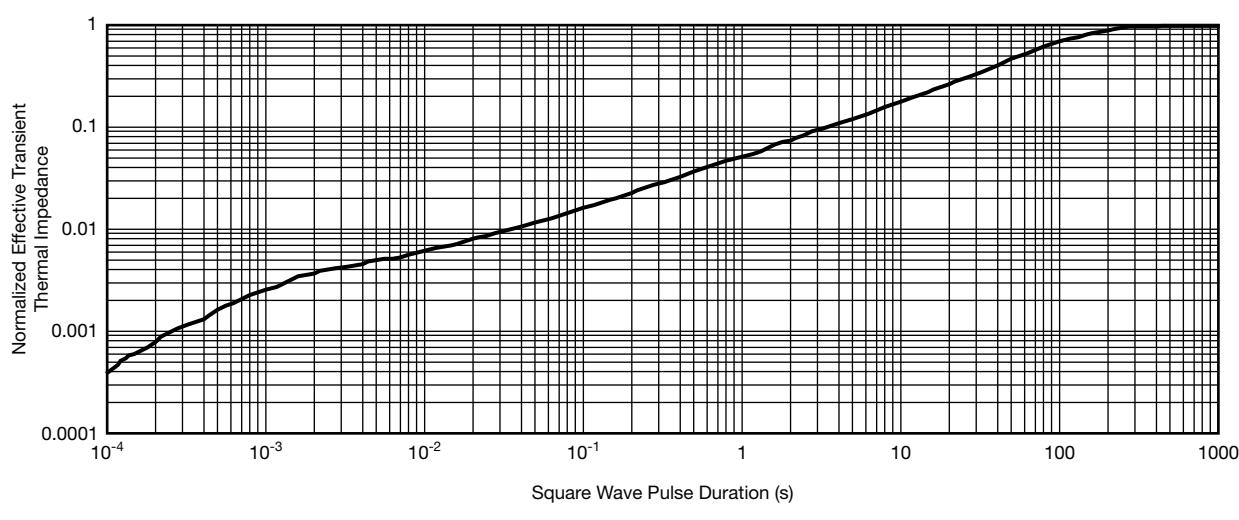
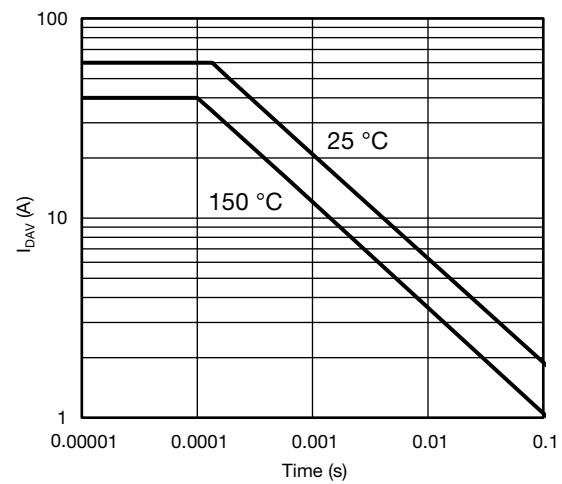
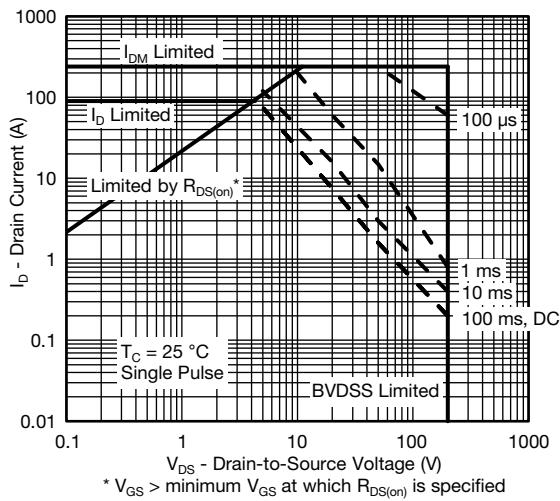
Drain Source Breakdown vs. Junction Temperature

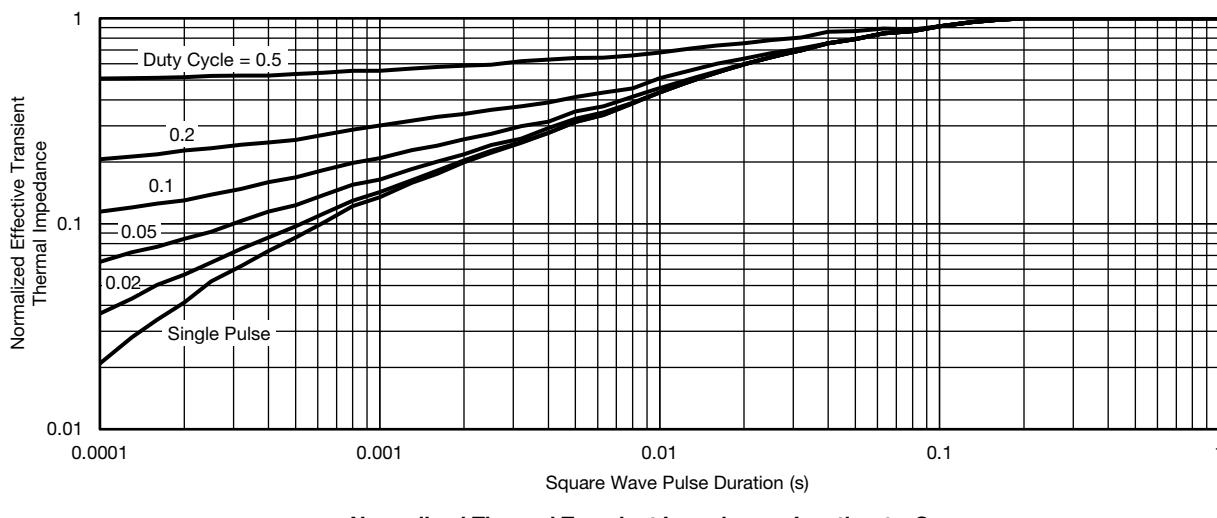


Source Drain Diode Forward Voltage



Current De-rating

THERMAL RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)


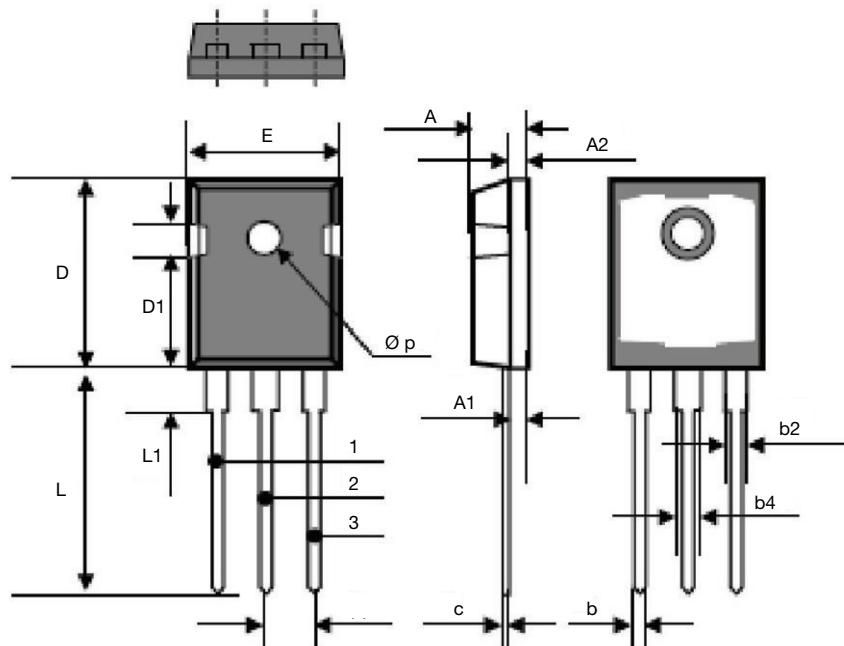
THERMAL RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Normalized Thermal Transient Impedance, Junction-to-Case
Note

- The characteristics shown in the two graphs

- Normalized Transient Thermal Impedance Junction to Ambient (25°C)
- Normalized Transient Thermal Impedance Junction to Case (25°C)

are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

TO-247



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.70	5.31	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	0.99	1.40	0.039	0.055
b2	1.65	2.41	0.065	0.095
b4	2.59	3.43	0.102	0.135
c	0.61 BSC		0.024 BSC	
D	20.80	21.46	0.819	0.845
D1	3.68	5.49	0.145	0.216
(e)	5.46 BSC		0.215 BSC	
E	15.49	16.26	0.610	0.640
L	19.81	20.32	0.780	0.800
L1	4.06	4.50	0.160	0.177
Øp	3.51	3.66	0.138	0.144

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