

IPB64N25S320ATMA1-VB Datasheet

N-Channel 250 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) MAX.	I _D (A)	Q _g (TYP.)
250	0.016at V _{GS} = 10 V	80	75nC

FEATURES

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

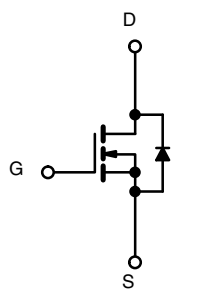


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TO-263



Top View



N-Channel MOSFET

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}	250	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	80
		T _C = 70 °C	60
Pulsed Drain Current (t = 100 μs)	I _{DM}	240	A
Avalanche Current	I _{AS}	L = 0.5 mH	790
Single Avalanche Energy ^a			E _{AS}
Maximum Power Dissipation ^a	P _D	T _C = 25 °C	300 ^b
		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

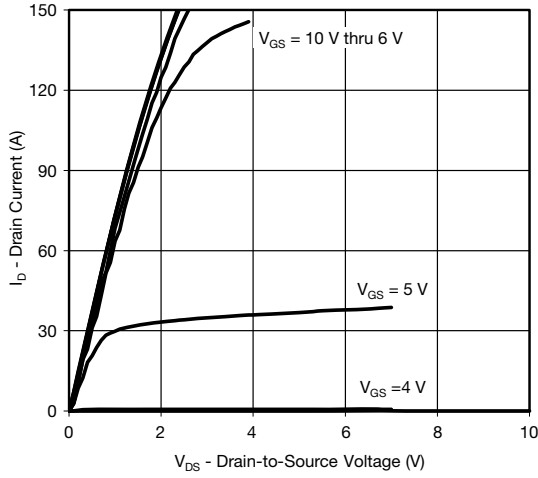
- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	250	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	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}	$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	150	
		$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	5	mA
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 10\text{ V}$	90	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	-	0.016	-	Ω
		$V_{GS} = 7.5\text{ V}, I_D = 30\text{ A}$	-	0.018	-	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}$	-	75	-	S
Dynamic ^b						
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, V_{DS} = 60\text{ V}, f = 1\text{ MHz}$	-	8000	-	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	$t_{d(on)}$	$V_{DD} = 60\text{ V}, R_L = 1.66\text{ }\Omega$ $I_D \cong 60\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$	-	21	35	ns
Rise Time ^c	t_r		-	118	220	
Turn-Off Delay Time ^c	$t_{d(off)}$		-	33	76	
Fall Time ^c	t_f		-	94	134	
Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25\text{ }^\circ\text{C}$)						
Pulsed Current ($t = 100\text{ }\mu\text{s}$)	I_{SM}		-	-	240	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}	$I_F = 30\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	-	200	400	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$		-	11	20	A
Reverse Recovery Charge	Q_{rr}		-	0.9	1.8	μC

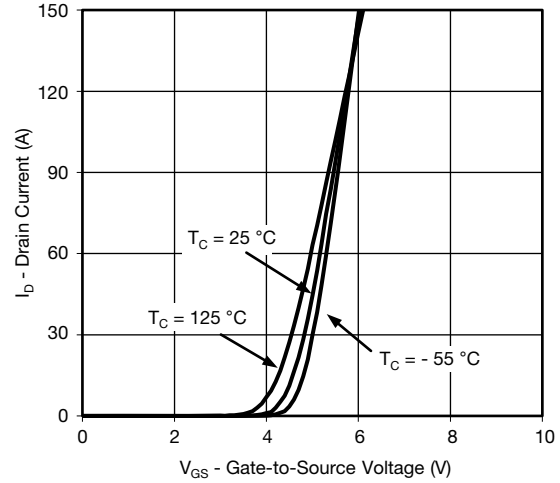
Notes

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

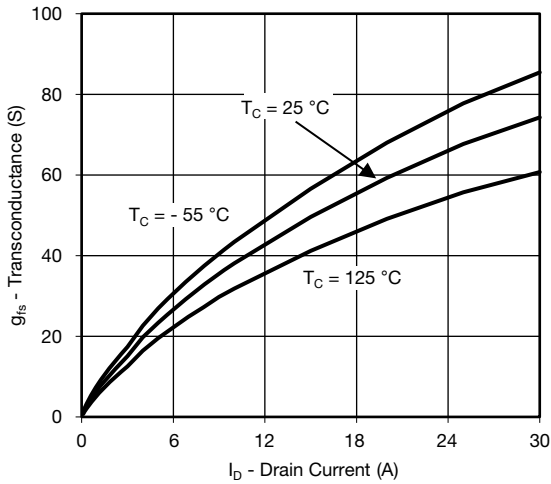
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



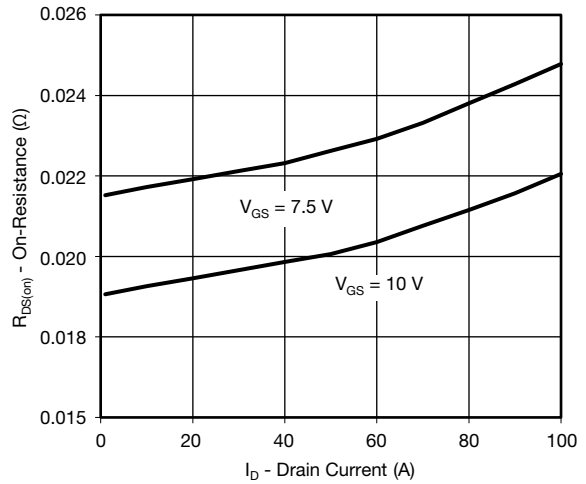
Output Characteristics



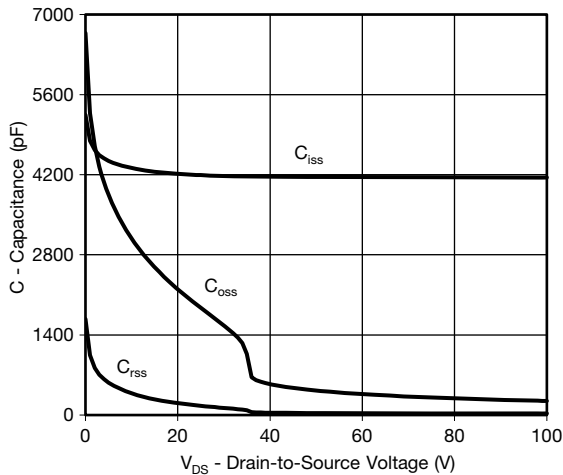
Transfer Characteristics



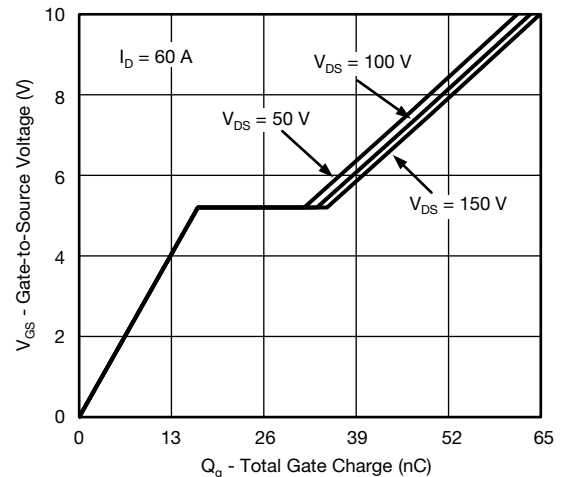
Transconductance



On-Resistance vs. Drain Current

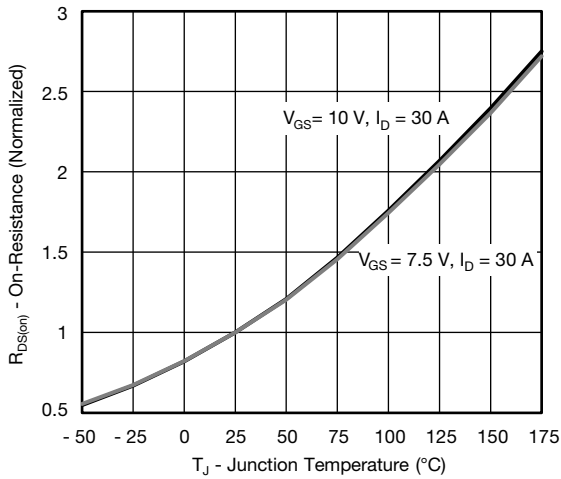


Capacitance

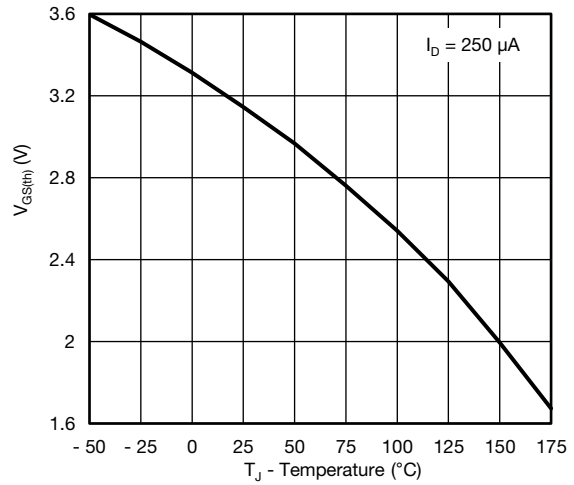


Gate Charge

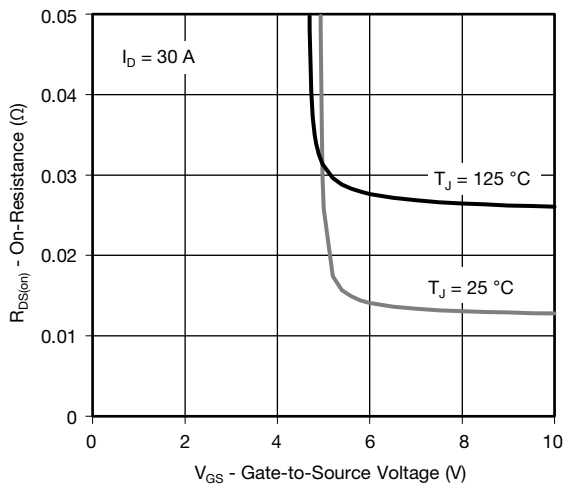
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



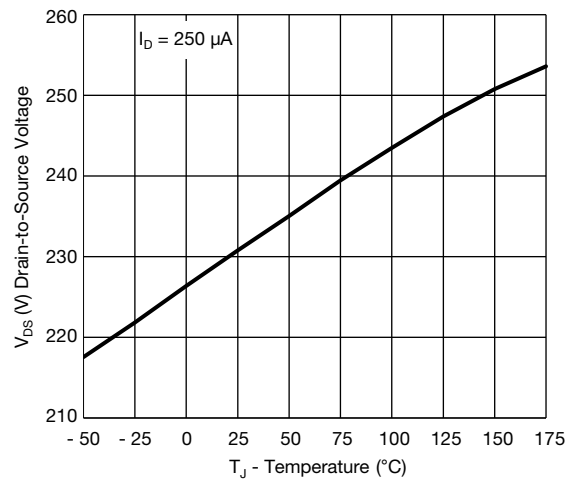
On-Resistance vs. Junction Temperature



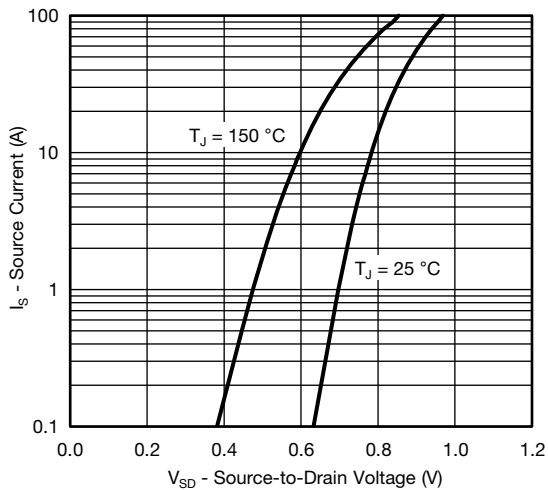
Threshold Voltage



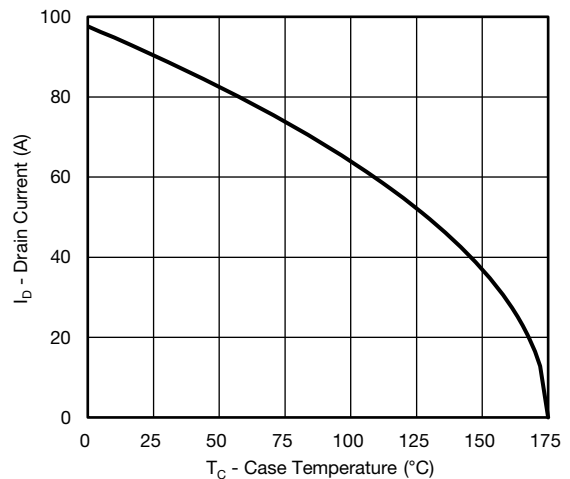
On-Resistance vs. Gate-to-Source Voltage



Drain Source Breakdown vs. Junction Temperature

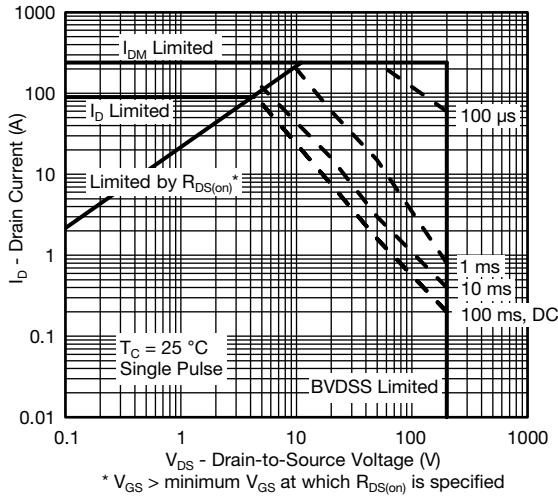


Source Drain Diode Forward Voltage

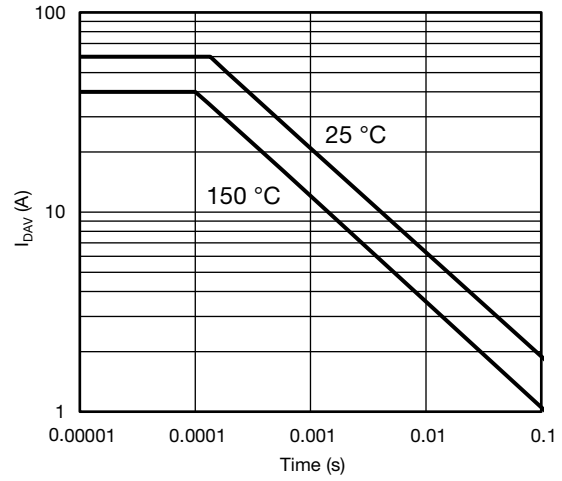


Current De-rating

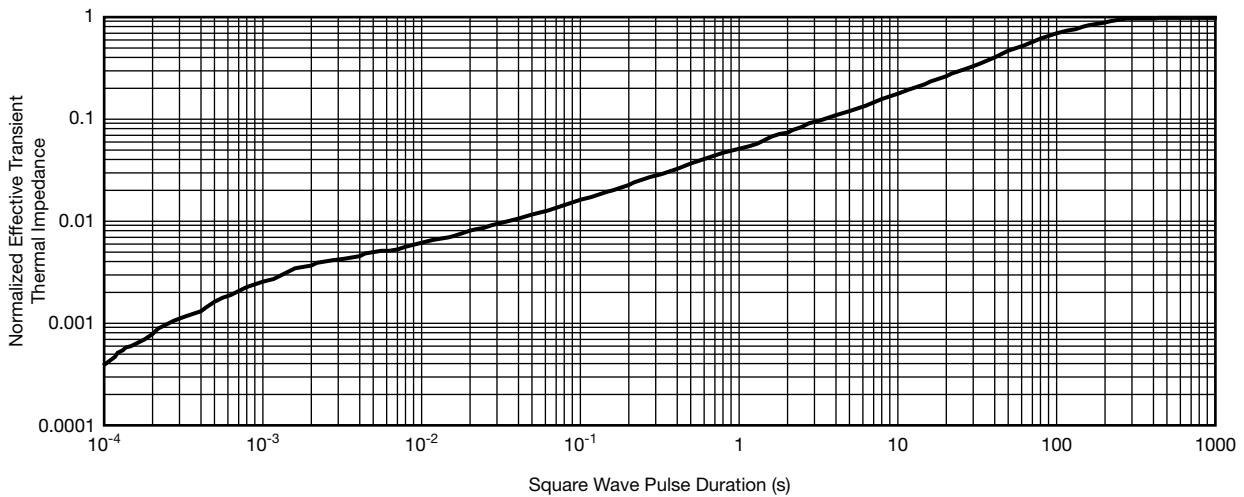
THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Safe Operating Area

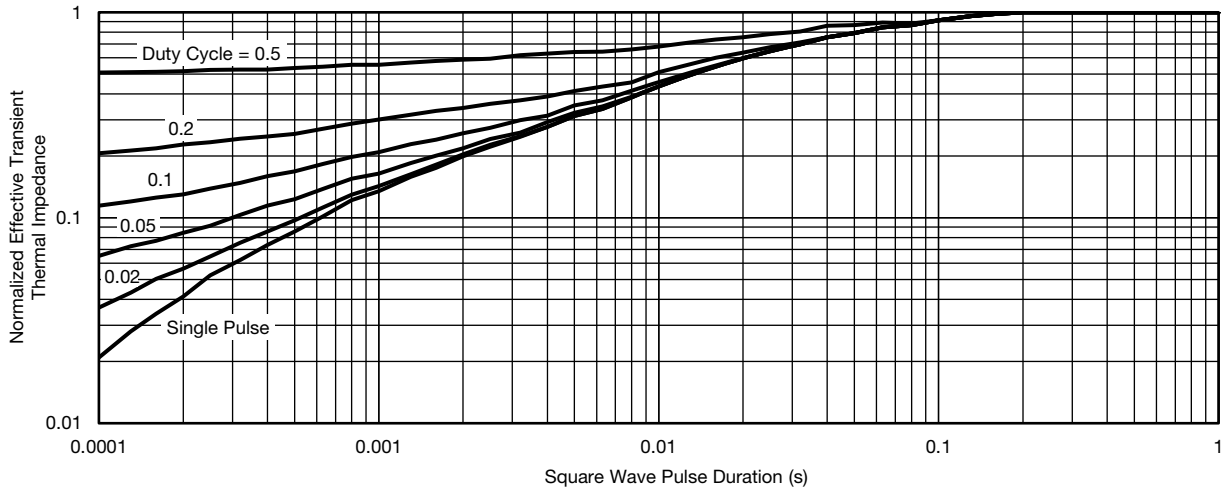


Single Pulse Avalanche Current Capability vs. Time



Normalized Thermal Transient Impedance, Junction-to-Ambient

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

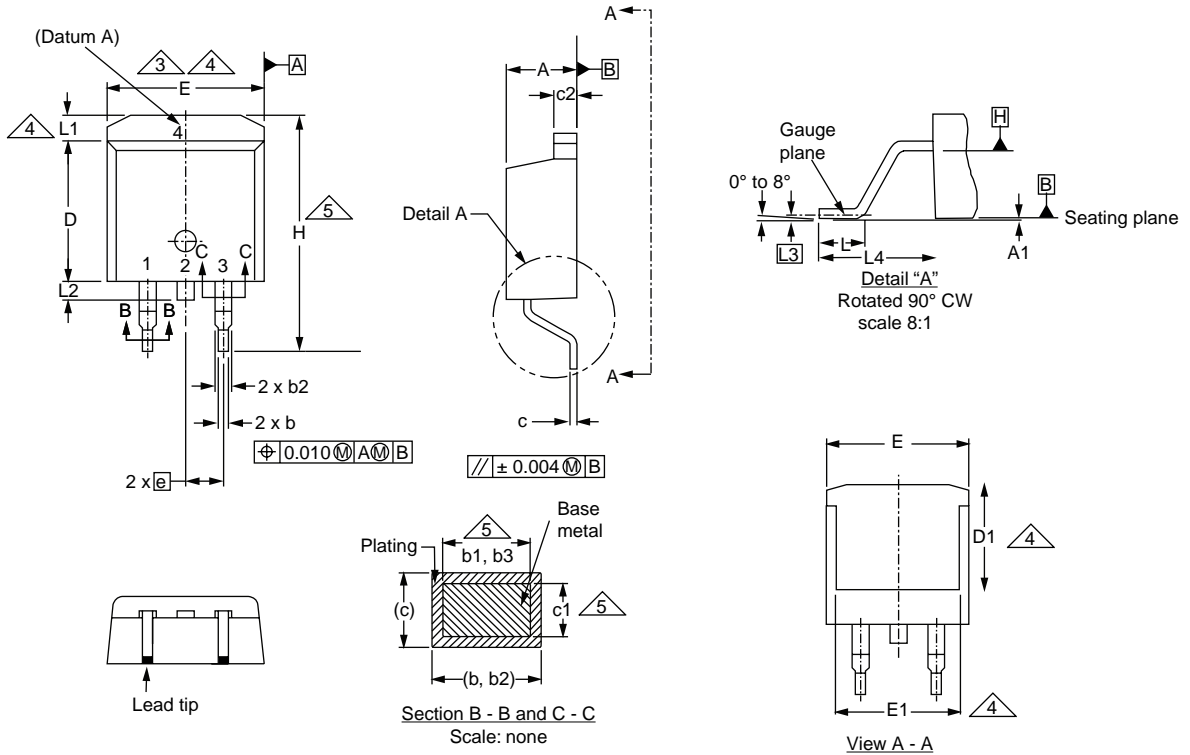


Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction to Ambient ($25\text{ }^\circ\text{C}$)
 - Normalized Transient Thermal Impedance Junction to Case ($25\text{ }^\circ\text{C}$)
- 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-263AB (HIGH VOLTAGE)



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b1	0.51	0.89	0.020	0.035
b2	1.14	1.78	0.045	0.070
b3	1.14	1.73	0.045	0.068
c	0.38	0.74	0.015	0.029
c1	0.38	0.58	0.015	0.023
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

ECN: S-82110-Rev. A, 15-Sep-08
DWG: 5970

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Dimensions are shown in millimeters (inches).
3. Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body at datum A.
4. Thermal PAD contour optional within dimension E, L1, D1 and E1.
5. Dimension b1 and c1 apply to base metal only.
6. Datum A and B to be determined at datum plane H.
7. Outline conforms to JEDEC outline to TO-263AB.

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