

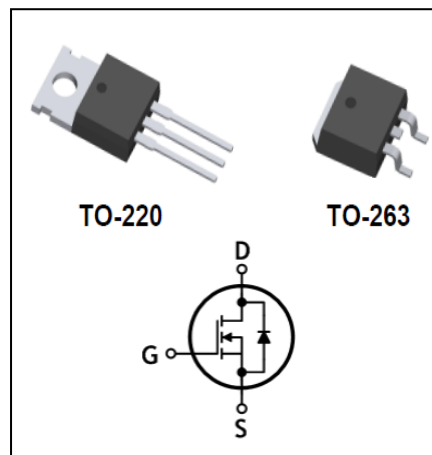
85V 120A N-Ch Power MOSFET

FEATURES

- Ultra-low $R_{DS(ON)}$: max 5.5m Ω
- Low reverse transfer capacitance : C_{rss} =46pF(Typ.)
- Low gate charge : Q_g =56nC(Typ.)
- 100% UIS Tested, 100% Rg tested

Application

- Motor Driving in Power tool, E-vehicle, Robotics
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Power management in Telecom., Industrial Automation, CE



Ordering Information

Part No	Package	Packing	Finish	Halogen	Packing Unit
AM120N085	TO-220	Tube	Sn	Free	1,000ea
AM120N085D	TO-263	Reel	Sn	Free	800ea

Maximum Ratings (T_c=25 °C, unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V _{DS}		85	V
Gate-source voltage	V _{GS}		±20	V
Drain current (DC)	I _D	T _C = 25°C ⁽¹⁾	120	A
		T _C = 100°C ⁽¹⁾	76	
Drain current (Pulsed)	I _{DM} ⁽²⁾		465	A
Power Dissipation	P _D	T _C = 25°C ⁽⁴⁾	208	W
		T _C = 100°C ⁽⁴⁾	83	W
Single pulsed avalanche energy ⁽³⁾	E _{AS}		338	mJ
Junction temperature	T _J		150	°C
Storage temperature range	T _{stg}		-55~150	

*Limited only maximum junction temperature

Thermal Characteristic

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	R _{th(j-c)}	Max. 0.78	°C/W
Thermal resistance, junction to ambient	R _{th(j-a)}	Max. 55	

Electrical Characteristics ($T_C=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$I_D = 250\mu\text{A}$, $V_{GS} = 0$	85	92	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D = 250\mu\text{A}$, $V_{DS} = V_{GS}$	2	3	4	V
Drain-source cut-off current	I_{DSS}	$V_{DS} = 64\text{V}$, $V_{GS} = 0\text{V}$	-	-	1	μA
Gate leakage current	I_{GSS}	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
Drain-source on-resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$, $I_D = 40\text{A}$	-	4.6	5.5	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=5\text{V}$, $I_D=20\text{A}$		31		S
Input capacitance	C_{iss}	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$	-	2000	-	pF
Output capacitance	C_{oss}		-	164	-	
Reverse transfer capacitance	C_{rss}		-	7.4	-	
Turn-on delay time	$T_{d(on)}$	$V_{GS}=10\text{V}$, $V_{DS} = 40\text{V}$, $R_L=2.0\Omega$, $R_{GEN} = 3\Omega$	-	17.6	-	ns
Rise time	T_r		-	27	-	
Turn-off delay time	$t_{d(off)}$		-	31	-	
Fall time	t_f		-	10.8	-	
Total gate charge(@ $V_{GS}=10\text{V}$)	Q_g	$V_{DS} = 40\text{V}$, $V_{GS} = 0$ to 10V $I_D = 20\text{A}$	-	56	-	nC
Total gate charge(@ $V_{GS}=6.0\text{V}$)	Q_g			37		
Gate-source charge	Q_{gs}		-	18.3	-	
Gate-drain charge	Q_g		-	15.0	-	

Source-Drain Diode Ratings and Characteristics ($T_C=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Diode Continuous current (DC)	I_S	Integral reverse diode	-	-	120	A
Diode forward voltage	V_{SD}	$V_{GS} = 0\text{V}$, $I_S = 1\text{A}$	-	0.7	1.0	V
Reverse recovery time	t_{rr}	$I_S = 20\text{A}$, $V_R = 40\text{V}$ $dI_F/dt = 100\text{A}/\mu\text{s}$	-	58	-	ns
Reverse recovery charge	Q_{rr}		-	95	-	nC

Note :

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_Max} = 150^{\circ}\text{C}$.
3. EAS of 338 mJ is based on starting $T_J = 25^{\circ}\text{C}$, $L = 3.0\text{mH}$, $I_{AS} = 15\text{A}$, $V_{GS} = 10\text{V}$, $V_{DD} = 40\text{V}$; 100% test at $L = 0.1\text{mH}$, $I_{AS} = 59\text{A}$.
4. The power dissipation P_D is based on $T_{J_Max} = 150^{\circ}\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristic

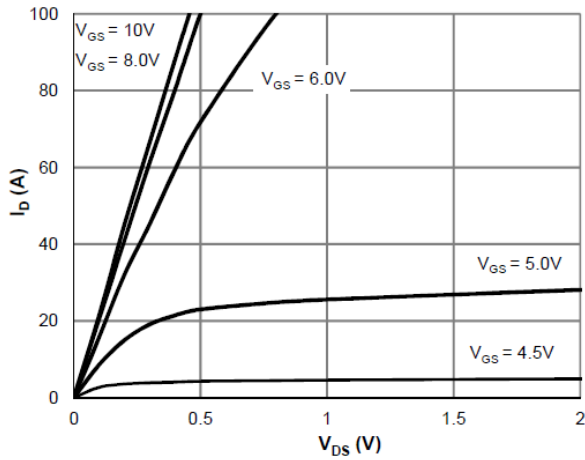


Figure 1: Saturation Characteristics

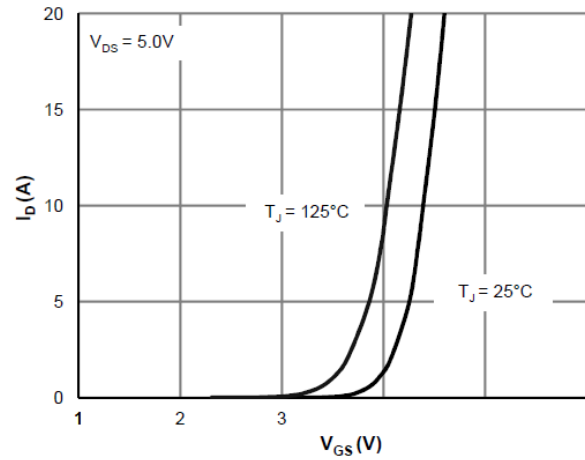


Figure 2: Transfer Characteristics

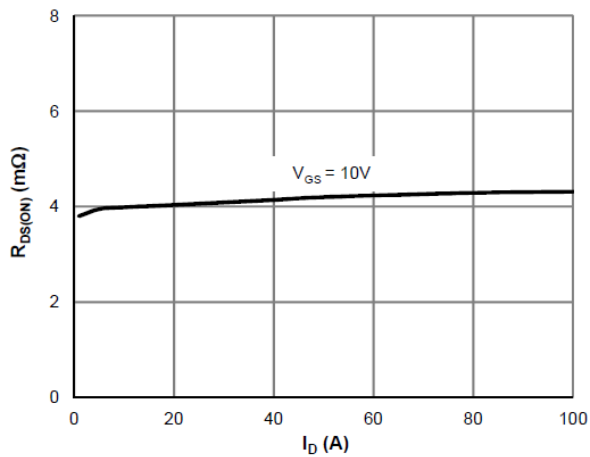


Figure 3: $R_{DS(ON)}$ vs. Drain Current

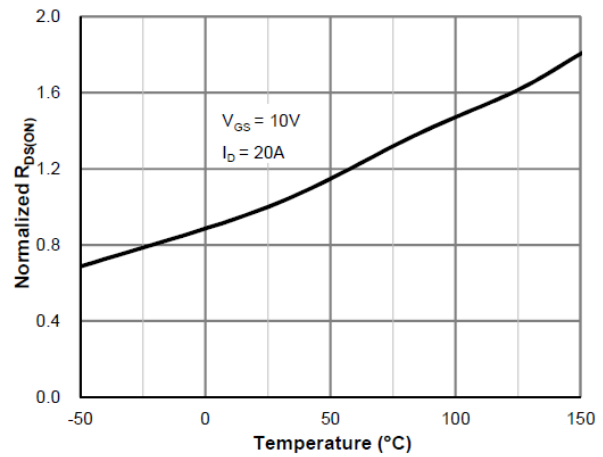


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

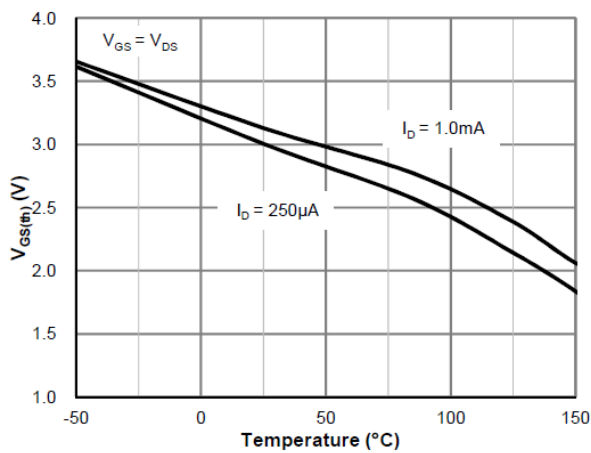


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

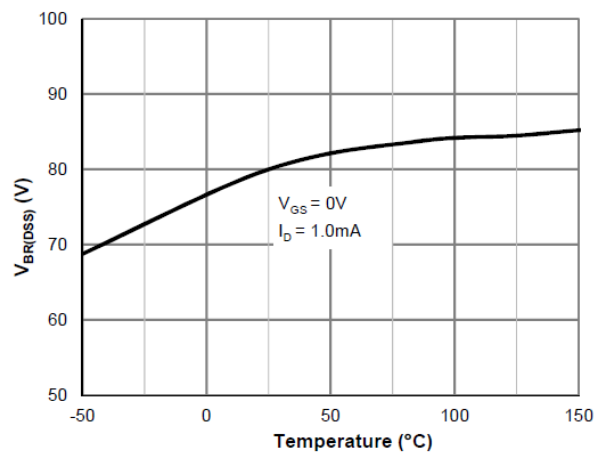


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Electrical Characteristic

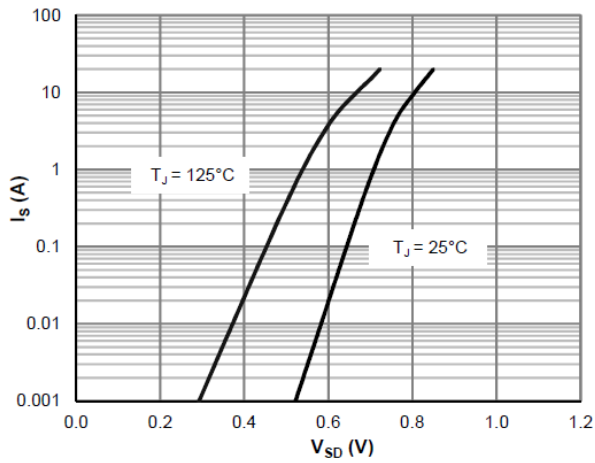


Figure 7: Body-Diode Characteristics

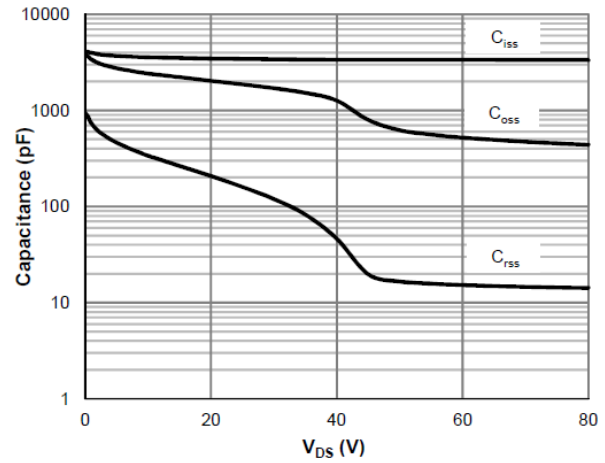


Figure 8: Capacitance Characteristics

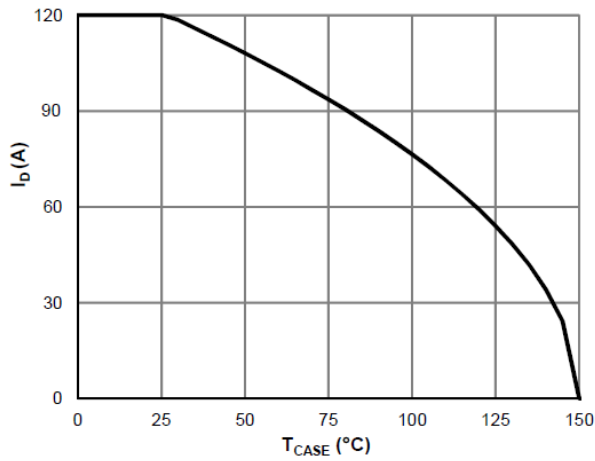


Figure 9: Current De-rating

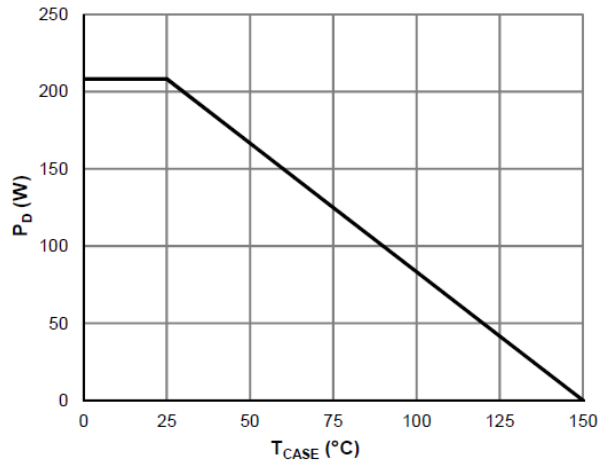


Figure 10: Power De-rating

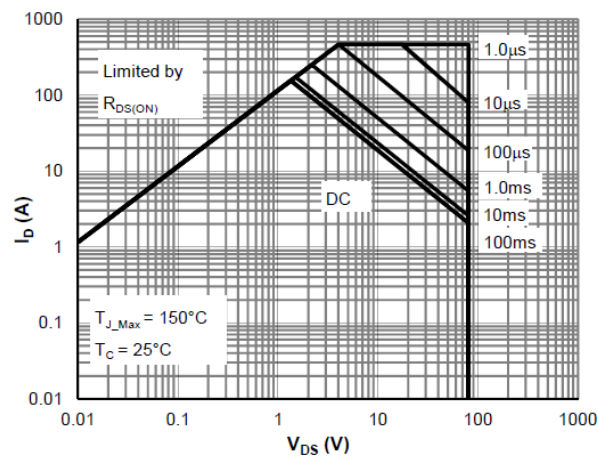


Figure 11: Maximum Safe Operating Area

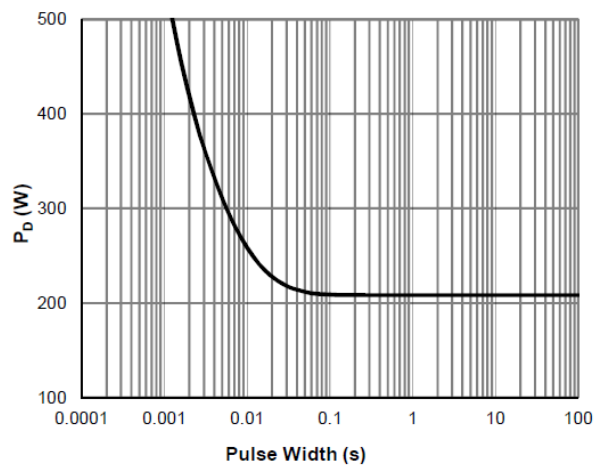


Figure 12: Single Pulse Power Rating, Junction-to-Case

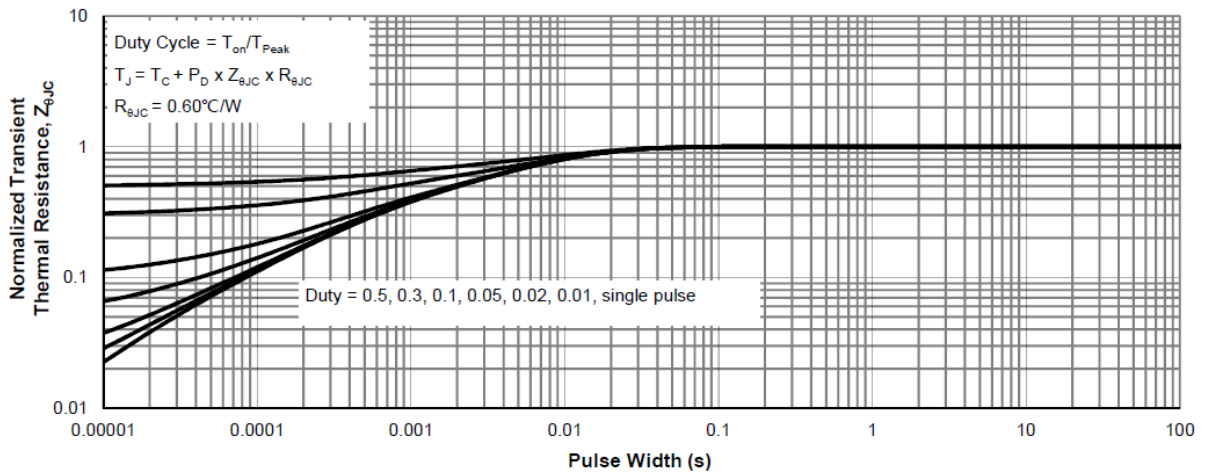
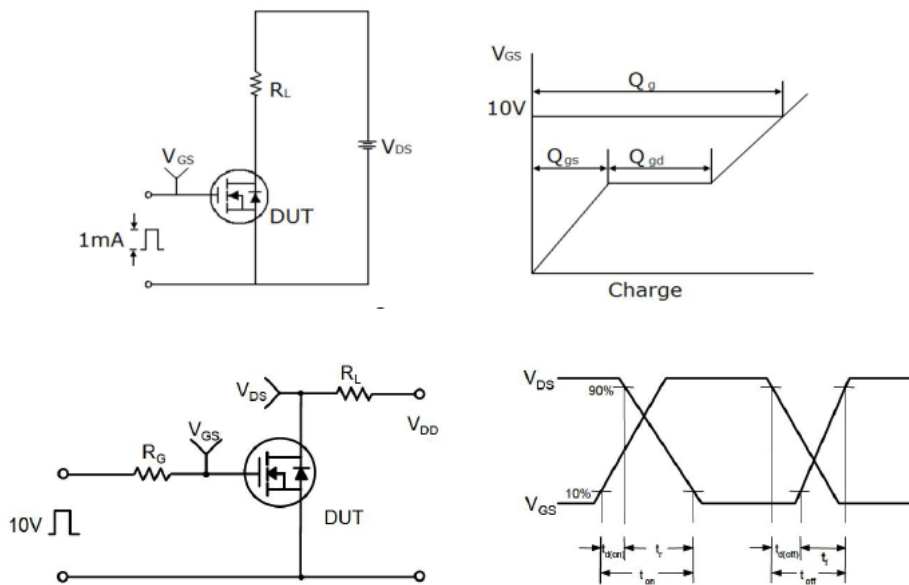
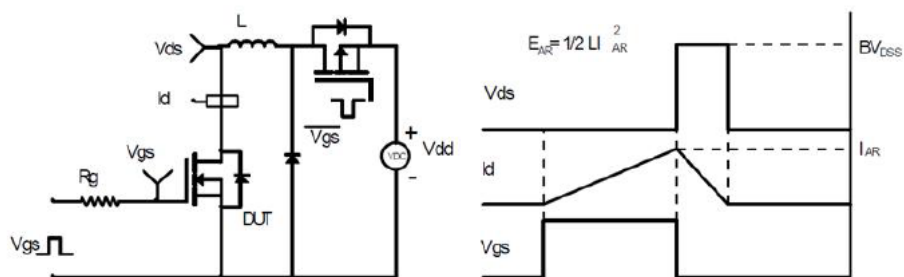


Figure 13: Normalized Maximum Transient Thermal Impedance

Gate Charge Test Circuit & Waveform

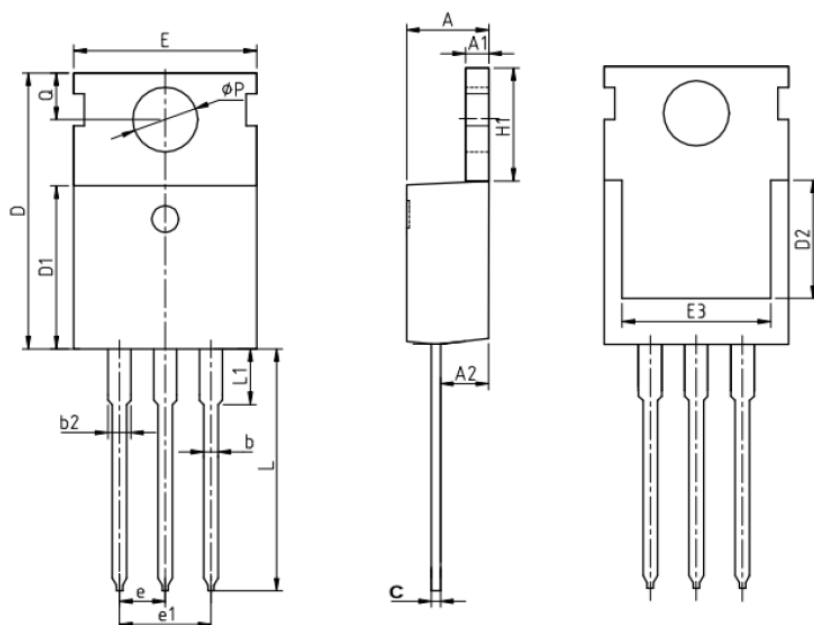


Unclamped Inductive Switching Test Circuit & Waveforms



Package Dimensions

TO-220-3L



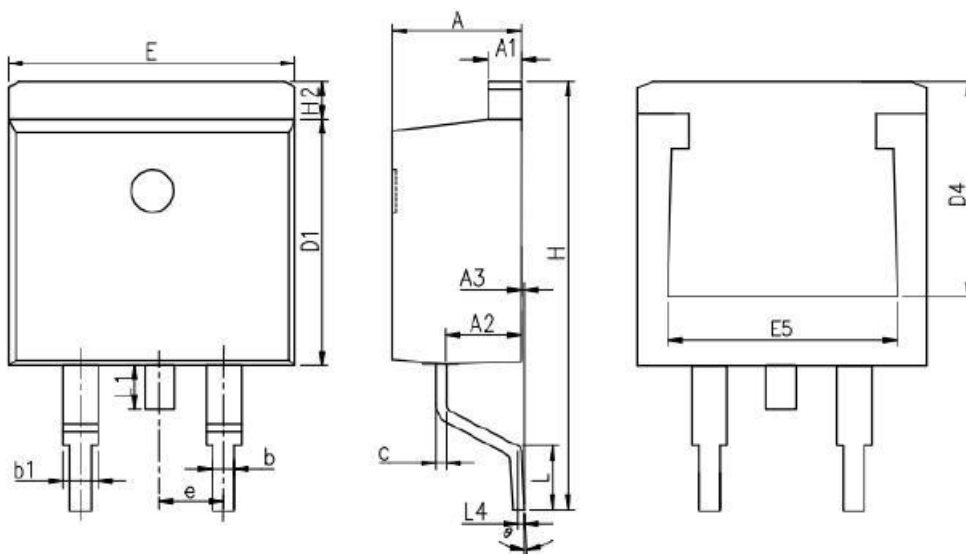
COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50		
E	9.70	10.00	10.30
E3	7.00		
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1		3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00

REV. 02



TO-263-2L



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0	0.13	0.25
b	0.7	0.81	0.96
b1	1.17	1.27	1.47
c	0.3	0.38	0.53
D1	8.5	8.7	8.9
D4	6.6		
E	9.86	10.16	10.36
E5	7.06		
e	2.54 BSC		
H	14.7	15.1	15.5
H2	1.07	1.27	1.47
L	2	2.3	2.6
L1	1.4	1.55	1.7
L4	0.25 BSC		
θ	0°	5°	9°

REV. 02

Revision History

No	Date	Contents
0	2018-10-10	Initial Brief Datasheet Release
1	2019-01-11	Capacitance Update
2	2019-03-22	R _{θJC} , P _D Update

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