

**DESCRIPTION**

The AM04NS08H is available in TO-220, TO-263-2 and TO-263-7 package.

VDSS	RDSON	ID
85V	3mΩ	120A

FEATURE

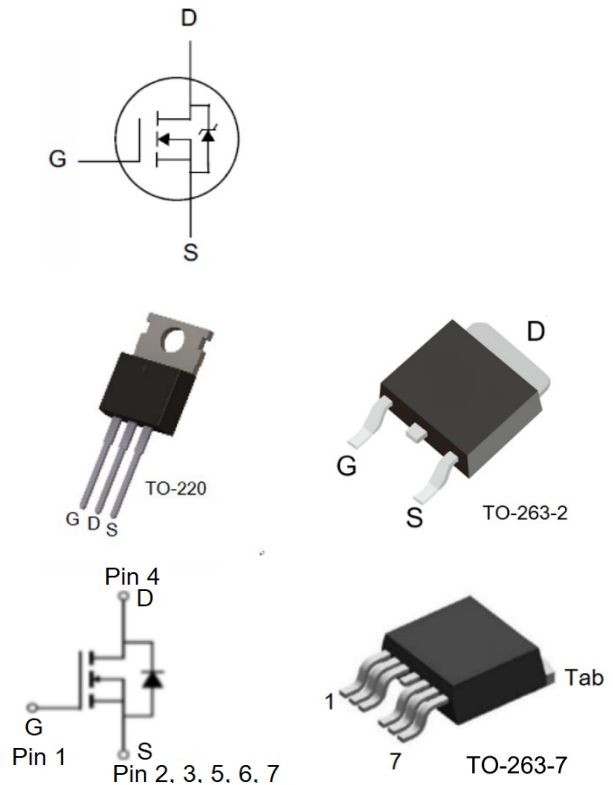
- Fast Switching
- Low On-Resistance ($R_{DS(on)} \leq 4m\Omega$)
- Low Gate Charge
- Low Reverse Transfer Capacitances
- High Avalanche Ruggedness

APPLICATION

- BMS
- Motor Drivers

ORDERING INFORMATION

Package Type	Part Number	
TO-220 SPQ: 800pcs/Reel	T3	AM04NS08HT3U
		AM04NS08HT3VU
TO-263-2 SPQ: 50pcs/Tube	S2	AM04NS08HS2R
		AM04NS08HS2VR
TO-263-7 SPQ: 5,000pcs/Reel	S7	AM04NS08HS7R
		AM04NS08HS7VR
Note	U:Tube	
	R: Tape & Reel	
	V: Halogen free Package	
AiT provides all RoHS products		

PIN DESCRIPTION

Pin#			Symbol	Function
TO-220	TO-263-2	TO-263-7		
1	1	1	G	Gate
2	2,4	4	D	Drain
3	3	2,3,5,6,7	S	Source



ABSOLUTE MAXIMUM RATINGS

$T_C=25^{\circ}\text{C}$, unless otherwise specified

V_{DSS} , Drain-Source Voltage		85V
I_D , Continuous Drain Current	Silicon Limited	185A
	Package Limited	120A
	$T_C=100^{\circ}\text{C}$, Silicon Limited	117.2A
$I_{DM}^{(1)}$, Pulsed Drain Current		480A
V_{GS} , Gate-Source Voltage		$\pm 20\text{V}$
E_{AS} , Avalanche Energy	TO-263-6 ⁽²⁾	240.2mJ
	TO-220, TO-263-2 ⁽³⁾	625mJ
P_D , Power Dissipation		208.3W
P_D , Derating Factor	$T_C=25^{\circ}\text{C}$	1.67W/ $^{\circ}\text{C}$
T_J , Operating Junction Temperature Range		150°C
T_{STG} , Storage Temperature Range		$-55^{\circ}\text{C}\sim +150^{\circ}\text{C}$
T_L , Maximum Temperature for Soldering		260°C

Stresses above 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 Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

(1) Repetitive Rating : Pulse width limited by maximum junction temperature

(2) $L=0.5\text{mH}$, $I_{AS}=31\text{A}$, Start $T_J=25^{\circ}\text{C}$

(3) $L=0.5\text{mH}$, $I_{AS}=50\text{A}$, Start $T_J=25^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Units
Thermal Resistance, Junction-Case	$R_{\theta JC}$	0.6	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-Ambient	$R_{\theta JA}$	62.5	



ELECTRICAL CHARACTERISTICS

T_C = 25°C, unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit	
OFF Characteristics							
Drain-Source Breakdown Voltage	V _{DSS}	V _{GS} =0V, I _D =250μA	85	95	-	V	
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 85V, V _{GS} =0V,	-	-	1	μA	
		V _{DS} = 68V, V _{GS} =0V, T _C =125°C	-	-	100		
Gate-Source Forward Current	I _{GSS(F)}	V _{GS} =+20V	-	-	100	nA	
Gate-Source Reverse Current	I _{GSS(R)}	V _{GS} =-20V	-	-	-100		
ON Characteristics							
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =50A	TO-236-6	-	3	4	mΩ
			TO-220, TO-236-2	-	3	3.6	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2	3	4	V	
Pulse width tp≤300μs, δ≤2%							
Dynamic Characteristics							
Input Capacitance	C _{iSS}	V _{DS} =42.5V, V _{GS} =0 f=1MHz	-	6234	-	pF	
Output Capacitance	C _{oSS}		-	1181	-		
Reverse Transfer Capacitance	C _{rSS}		-	97	-		
Total Gate Charge	Q _g	V _{DD} =42.5V, I _D =50A, V _{GS} =10V	-	124	-	nC	
Gate-Source Charge	Q _{gs}		-	31.2	-		
Gate-Drain Charge	Q _{gd}		-	39.2	-		
Gate Resistance	R _G	V _{GS} =0, V _{DS} =0	-	1.75	-	Ω	
Switching Characteristics							
Turn-on Delay Time	t _{d(on)}	V _{DD} =42.5V, I _D =10A, V _{GS} =10V, R _G =3 Ω, Resistive Load	-	41	-	ns	
Rise Time	t _r		-	68	-		
Turn-Off Delay Time	t _{d(off)}		-	76	-		
Fall Time	t _f		-	44	-		
Source-Drain Diode Characteristics							
Continuous Source Current	I _S	-	-	-	120	A	
Pulsed Source Current ⁽¹⁾⁽³⁾	I _{SM}		-	-	480	A	
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =50A	-	-	1.2	V	
Reverse Recovery Time	T _{rr}	I _S =30A, V _{GS} =0, di/dt=100A/us	-	80	-	ns	
Reverse Recovery Charge	Q _{rr}		-	112	-	nC	



TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Safe Operating Area

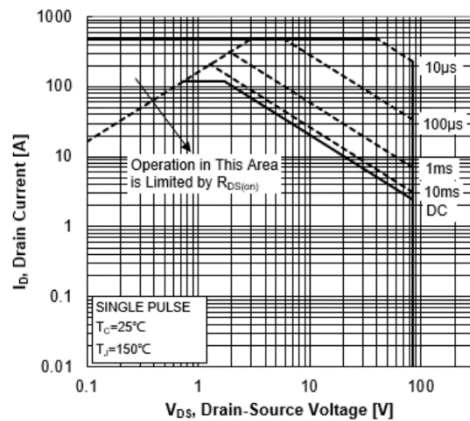


Fig 2. Maximum Power Dissipation
vs. Case Temperature

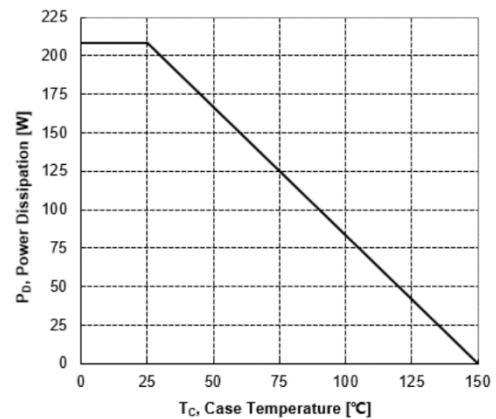


Fig 3. Maximum Continuous Drain Current
vs. Case Temperature

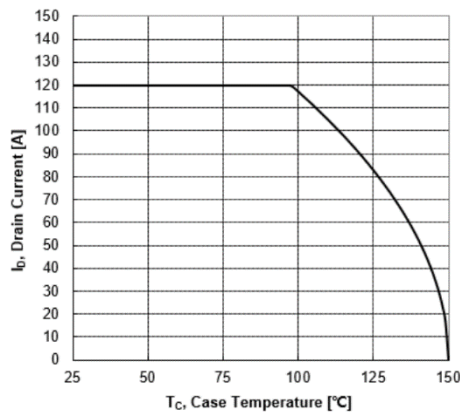


Fig 4. Typical Output Characteristics

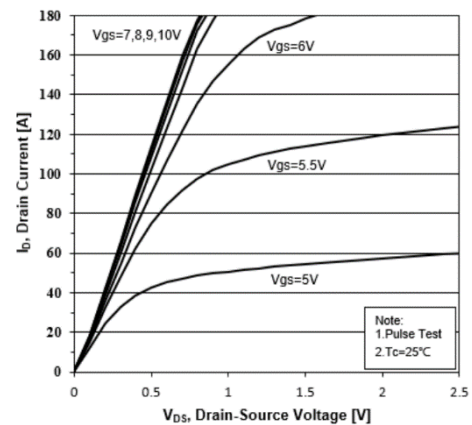


Fig 5. Transient Thermal Impedance

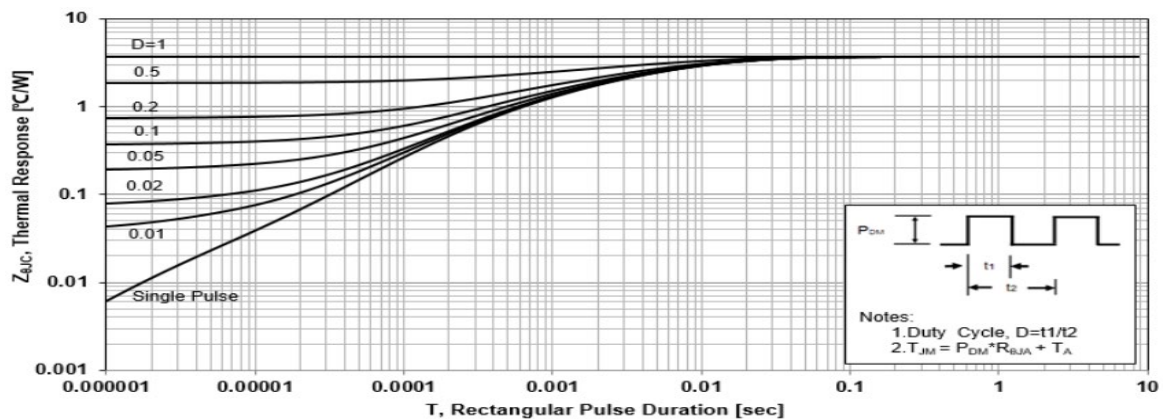




Fig 6. Typical Transfer Characteristics

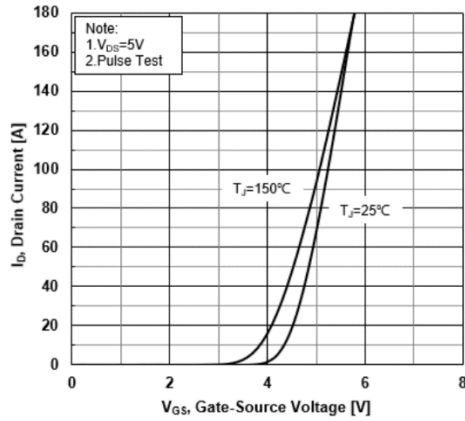


Fig 7. Source-Drain Diode Forward Characteristics

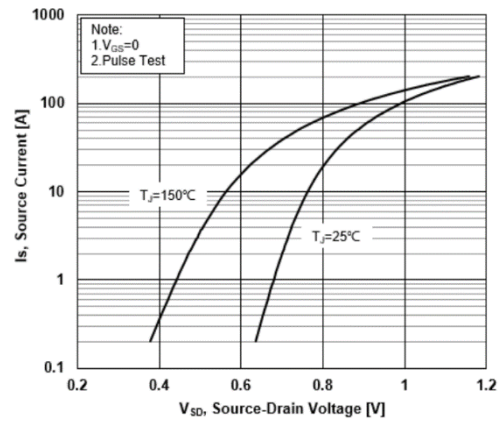


Fig 8. Drain-Source On-Resistance vs. Drain Current

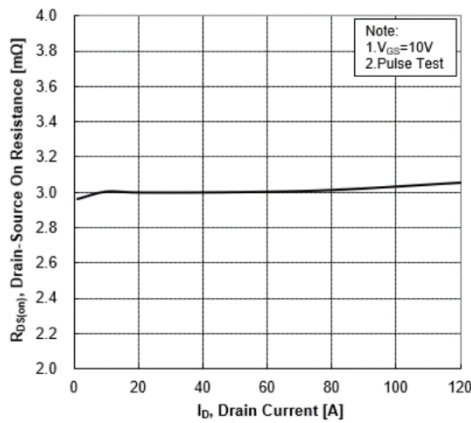


Fig 9. Normalized On-Resistance vs. Junction Temperature

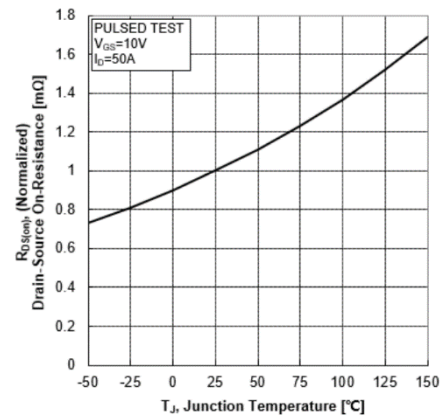


Fig 10. Normalized Threshold Voltage vs. Junction Temperature

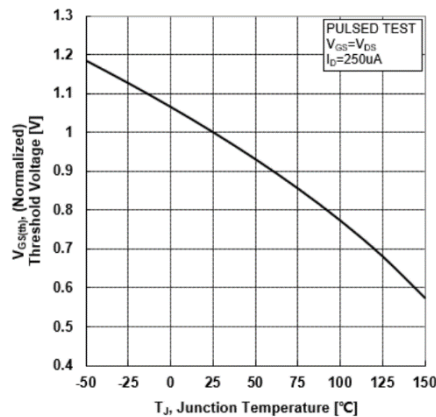


Fig 11. Normalized Breakdown Voltage vs. Junction Temperature

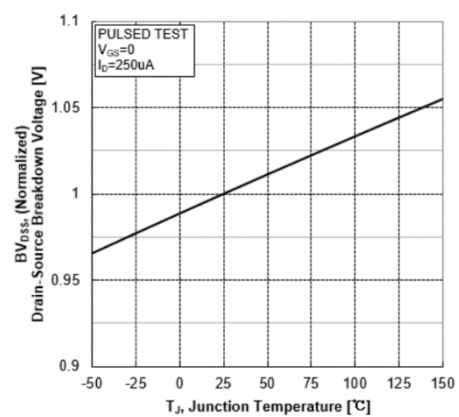




Fig 12. Capacitance Characteristics

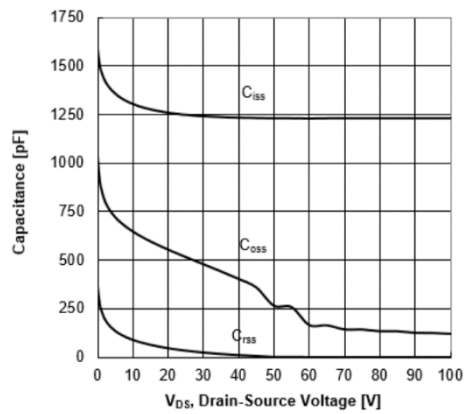


Fig 13. Typical Gate Charge
vs. Gate-Source Voltage

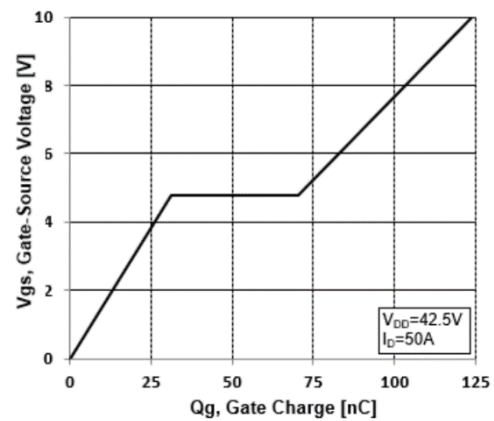


Fig 14. Resistive Switching Test Circuit

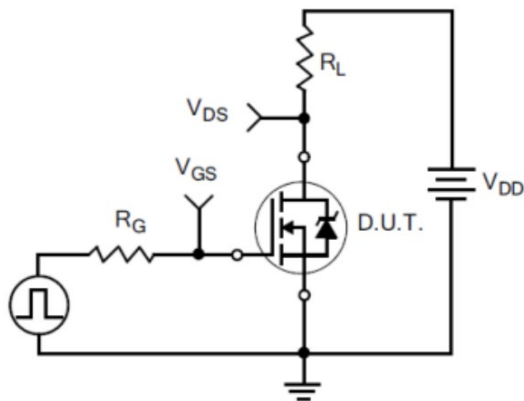


Fig 15. Resistive Switching Waveforms

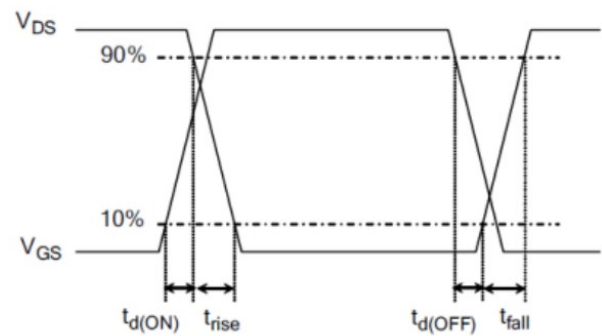


Fig 16. Gate Charge Test Circuit

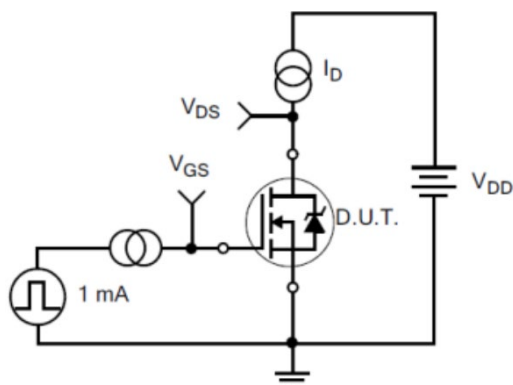


Fig 17. Gate Charge Waveforms

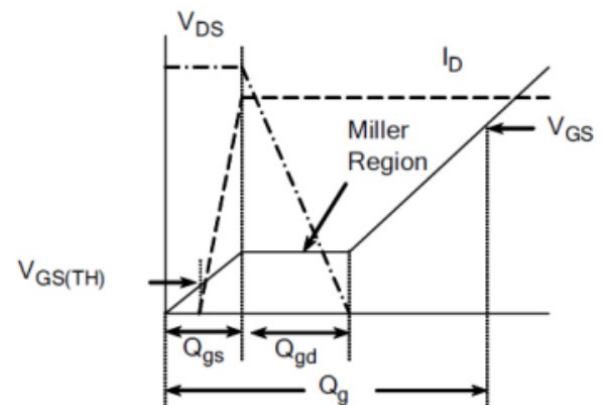




Fig 18. Diode Reverse Recovery Test Circuit

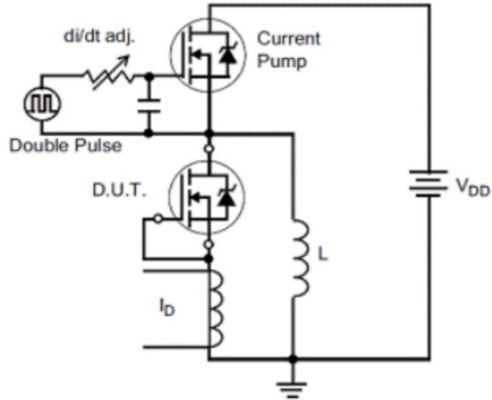


Fig 19. Diode Reverse Recovery Waveform

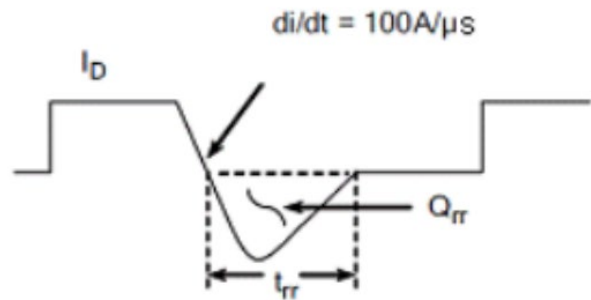


Fig 20. Unclamped Inductive Switching Test Circuit

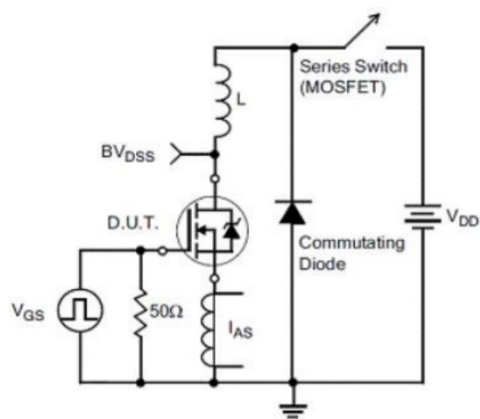
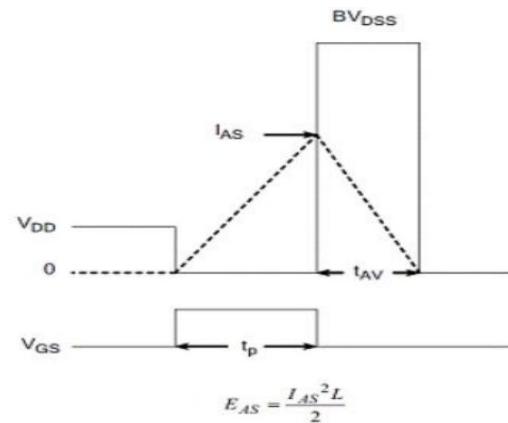
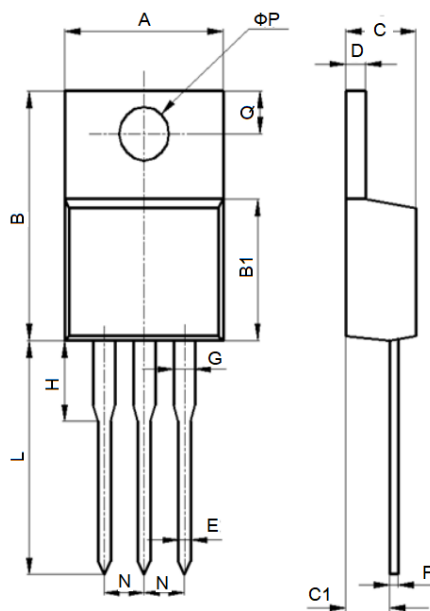


Fig 21. Unclamped Inductive Switching Waveform



**PACKAGE INFORMATION**

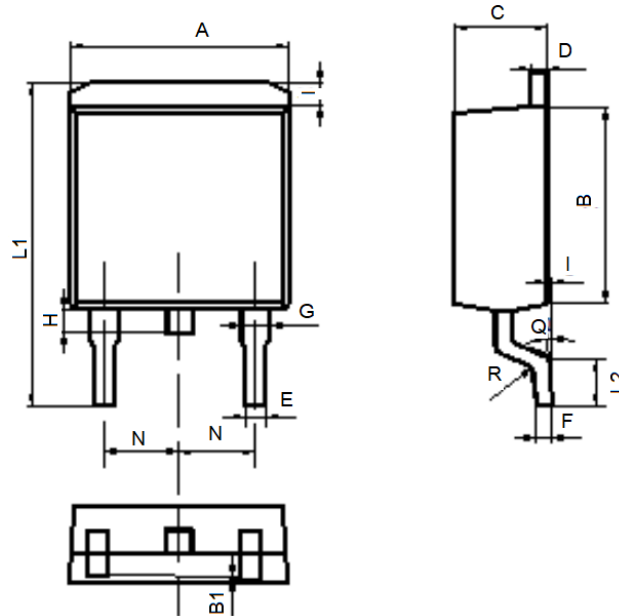
Dimension in TO-220 (Unit: mm)



Symbol	Values	
	Min.	Max.
A	9.600	10.600
B	15.000	16.000
B1	8.900	9.500
C	4.300	4.800
C1	2.300	3.100
D	1.200	1.400
E	0.700	0.900
F	0.300	0.600
G	1.170	1.370
H	2.700	3.800
L	12.600	14.800
N	2.340	2.740
Q	2.400	3.000
ΦP	3.500	3.900



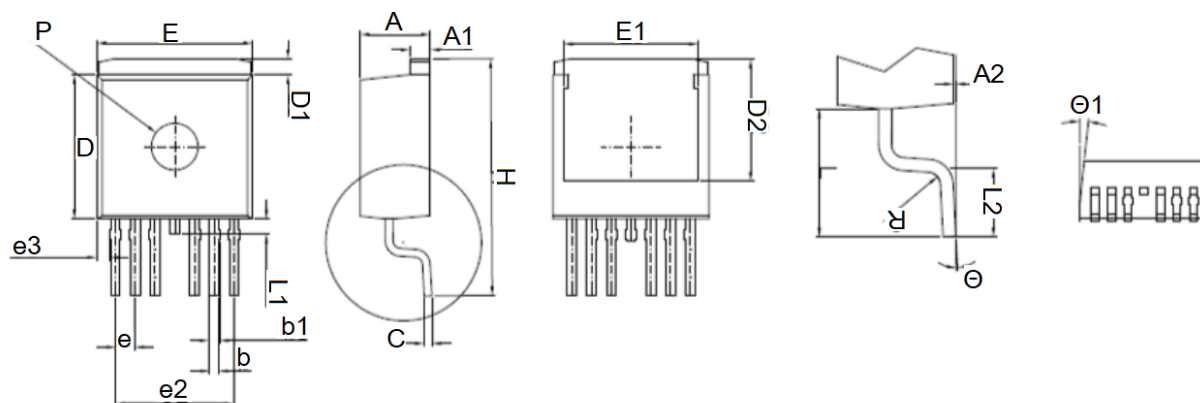
Dimension in TO-263-2 (Unit: mm)



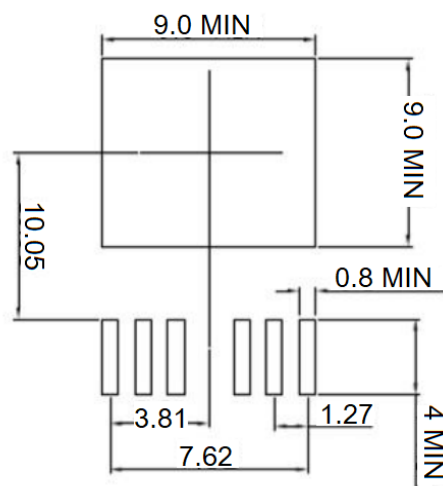
Symbol	Values	
	Min.	Max.
A	9.80	10.400
B	8.900	9.500
B1	0.000	0.100
C	4.400	4.800
D	1.160	1.370
E	0.700	0.950
F	0.300	0.600
G	1.070	1.470
H	1.300	1.800
I	0.000	0.200
K	0.950	1.370
L1	14.500	16.500
L2	1.600	2.300
Q	0°	8°
R	0.400	0.400
N	2.390	2.690



Dimension in TO-263-6 (Unit: mm)



RECOMMENDED LAND PATTERN



UNIT:mm

Symbol	Values	
	Min.	Max.
A	4.300	4.700
A1	1.200	1.400
A2	0.050	0.300
b	0.500	0.700
b1	0.500	0.600
c	0.400	0.900
D	9.050	9.450
D1	0.700	1.300
D2	7.350	8.350
E	9.800	10.200
E1	8.100	9.100
e	1.070	1.470
e2	7.320	7.920
e3	0.640	1.040
H	14.650	15.650
L	4.470	5.470
L1	0.900	1.500
L2	2.200	2.800
Θ	0°	8°
Θ1	0°	10°
ΦP	2.700	3.300



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