



DESCRIPTION

The AM045NS10H is available in TO-220 and TO-263-2 packages.

BVDSS	RDSON	ID
100V	3.6mΩ	120A

APPLICATION

- Switching applications
- Motor drivers

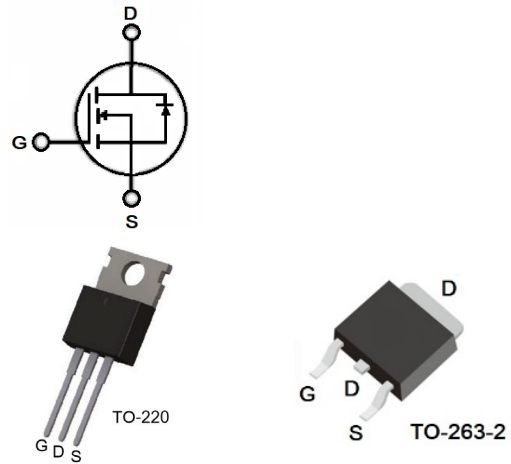
ORDERING INFORMATION

Package Type	Part Number	
TO-220 SPQ: 50pcs/Tube	T3	AM045NS10HT3U
		AM045NS10HT3VU
TO-263-2 SPQ: 800pcs/Reel	S2	AM045NS10HS2R
		AM045NS10HS2VR
Note	V: Halogen free Package R: Tape & Reel U: Tube	
AiT provides all RoHS products		

FEATURE

- Fast Switching
- Low On-Resistance ($R_{DS(on)} \leq 4.5m\Omega$)
- Low Gate Charge
- Low Reverse transfer capacitances
- High avalanche ruggedness

PIN DESCRIPTION



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

**ABSOLUTE MAXIMUM RATINGS** $T_C = 25^\circ\text{C}$, unless otherwise noted

V_{DS} , Drain-Source Voltage	100V
I_D , Continuous Drain Current, Silicon Limited	170A
I_D , Continuous Drain Current, Package Limited	120A
I_D , Continuous Drain Current @ $T_C=100^\circ\text{C}$, Silicon Limited	109A
I_{DM} , Pulsed Drain Current ⁽¹⁾	480A
V_{GS} , Gate-Source Voltage	$\pm 20\text{V}$
E_{AS} , Avalanche Energy ⁽²⁾	625mJ
P_D , Power Dissipation	227.2W
P_D , Derating Factor above 25°C	1.82W/ $^\circ\text{C}$
T_J , Operation Junction Temperature Range	+150 $^\circ\text{C}$
T_{STG} , Storage Temperature Range	-55 $^\circ\text{C}$ ~+150 $^\circ\text{C}$
T_L , Maximum Temperature for Soldering	260 $^\circ\text{C}$
$R_{\theta JC}$, Thermal Resistance, Junction-Case	0.55 $^\circ\text{C}/\text{W}$
$R_{\theta JA}$, Thermal Resistance, Junction-Ambient	62.5 $^\circ\text{C}/\text{W}$

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



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	100	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
		V _{DS} =80V, V _{GS} =0V @T _C =125°C	-	-	100	μA
Gate-Source Forward Leakage	I _{GSS(F)}	V _{GS} =+20V	-	-	100	nA
Gate-Source Reverse Leakage	I _{GSS(R)}	V _{GS} =-20V	-	-	-100	nA
On Characteristics						
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =50A	-	3.6	4.5	mΩ
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0	3.0	4.0	V
Pulse width tp≤300μs, δ≤2%						
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0, f=1MHz	-	6975	-	pF
Output Capacitance	C _{oss}		-	965	-	
Reverse Transfer Capacitance	C _{rss}		-	115	-	
Total Gate Charge	Q _g	V _{DD} =50V, I _D =50A, V _{GS} =10V	-	102	-	nC
Gate-Source charge	Q _{gs}		-	30	-	
Gate-Drain charge	Q _{gd}		-	19.6	-	
Switching Characteristics						
Turn-on Delay Time	t _{d(ON)}	V _{DD} =50V, I _D =50A, V _{GS} =10V, R _G =3Ω, Resistive Load	-	29	-	ns
Rise Time	t _r		-	33	-	
Turn-Off Delay Time	t _{d(OFF)}		-	48	-	
Fall Time	t _f		-	26	-	
Source-Drain Diode Characteristics						
Continuous Source Current	I _S		-	-	120	A
Maximum Pulsed Current	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 =50A, di/dt=100A/us	-	80	-	ns
Reverse Recovery Charge	Q _{rr}		-	189	-	nC



TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Safe Operating Area

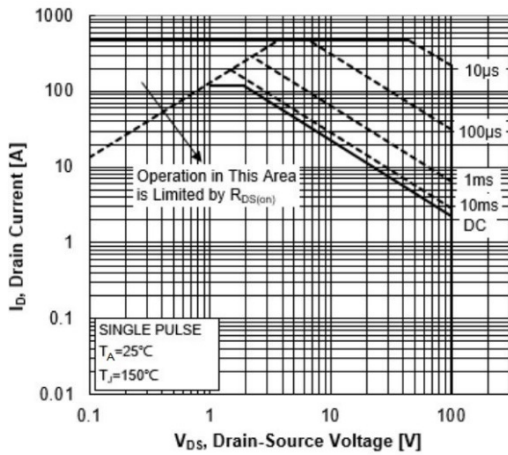


Fig 2. Maximum Power Dissipation vs. Case Temperature

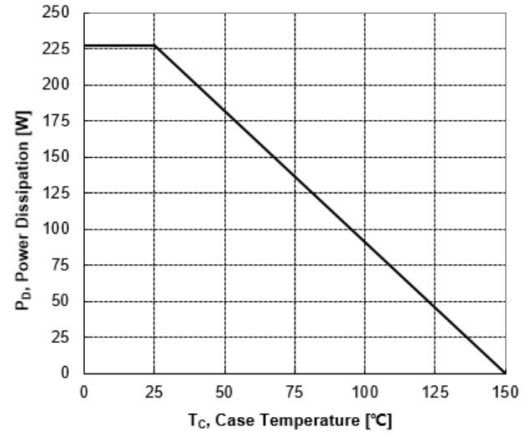


Fig 3. Maximum Continuous Drain Current vs. Case Temperature

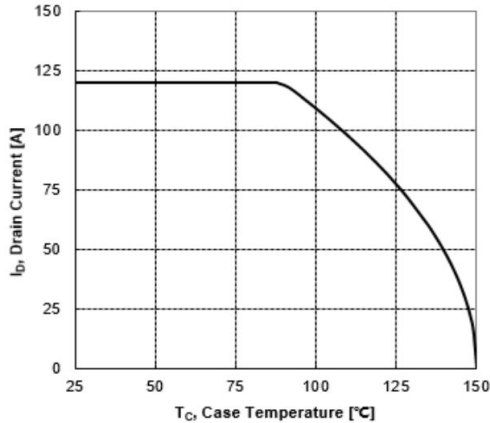


Fig 4. Typical Output Characteristics

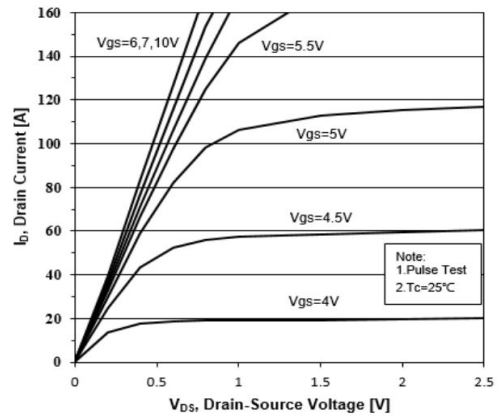


Fig 5. Transient Thermal Impedance

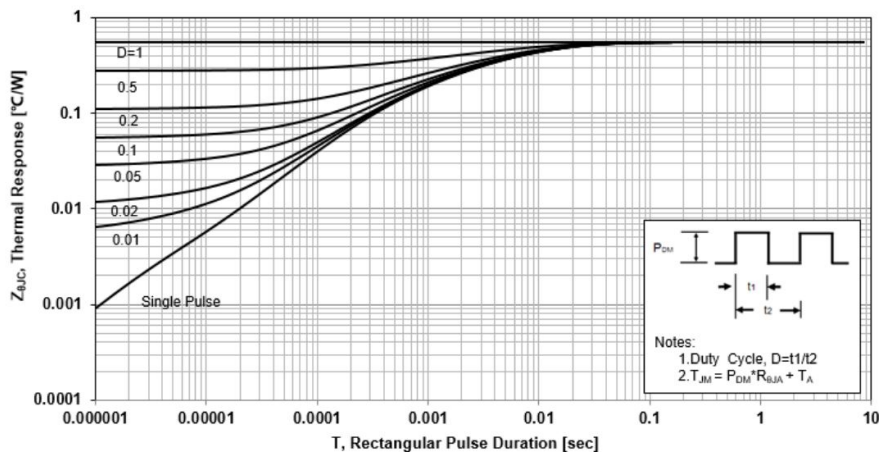




Fig 6. Typical Transfer Characteristics

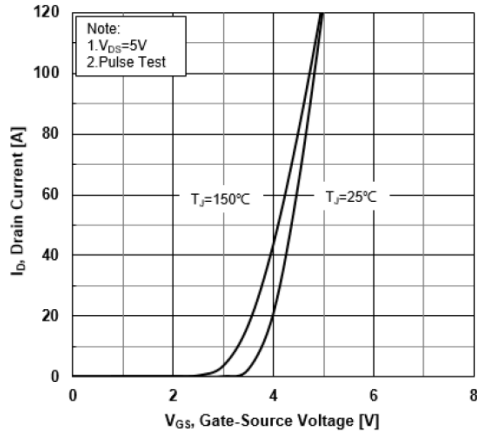


Fig 7. Source-Drain Diode Forward Characteristics

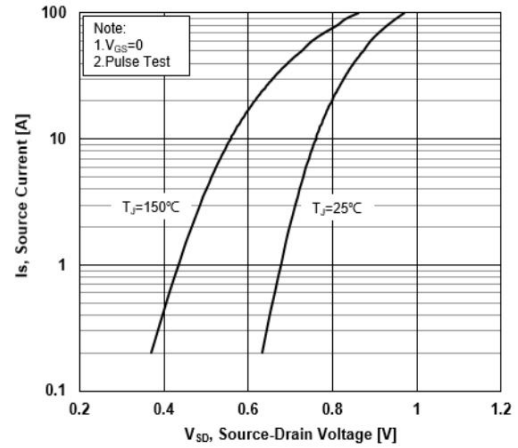


Fig 8. Drain-Source On-Resistance vs. Drain Current

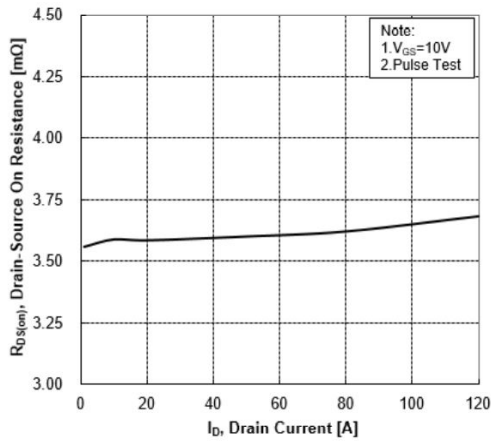


Fig 9. Normalized On-Resistance vs. Junction Temperature

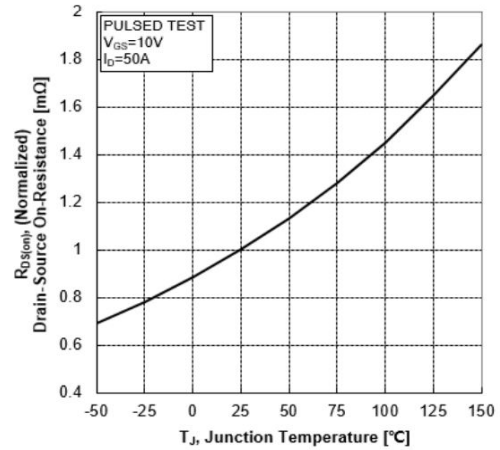


Fig 10. Normalized Threshold Voltage vs. Junction Temperature

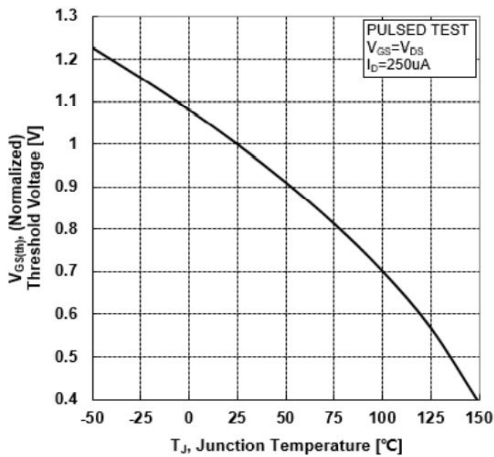


Fig 11. Normalized Breakdown Voltage vs. Junction Temperature

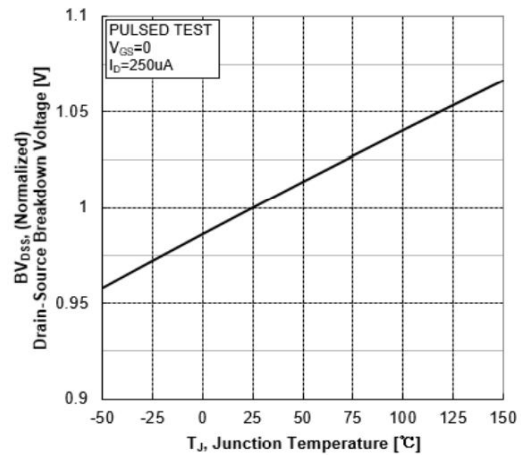




Fig12. Capacitance Characteristics

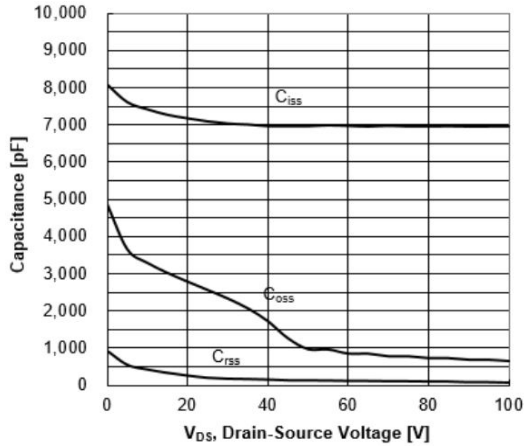


Fig 13. Typical Gate Charge vs. Gate-Source Voltage

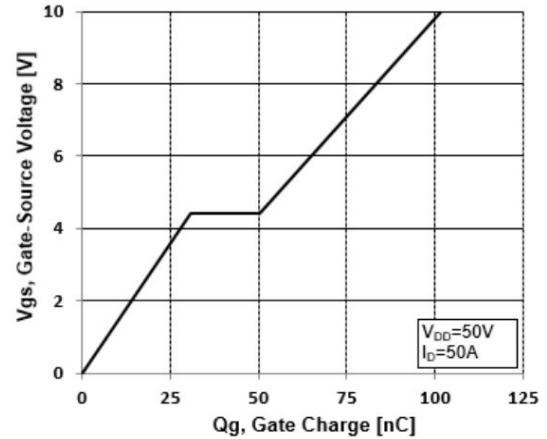


Fig 14. Resistive Switching Test Circuit

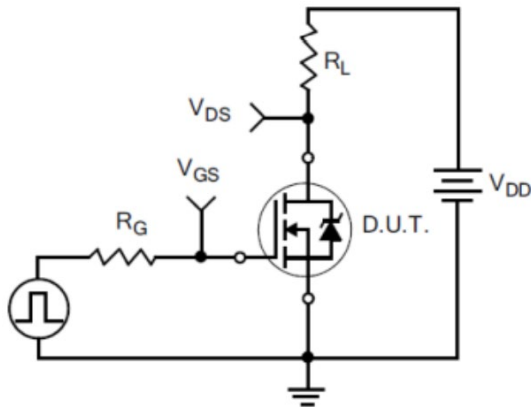


Fig 15. Resistive Switching Waveforms

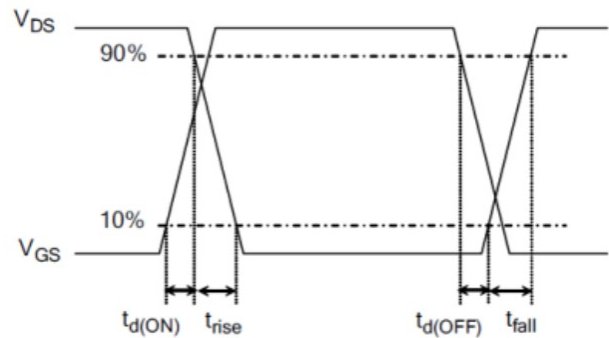


Fig 16. Gate Charge Test Circuit

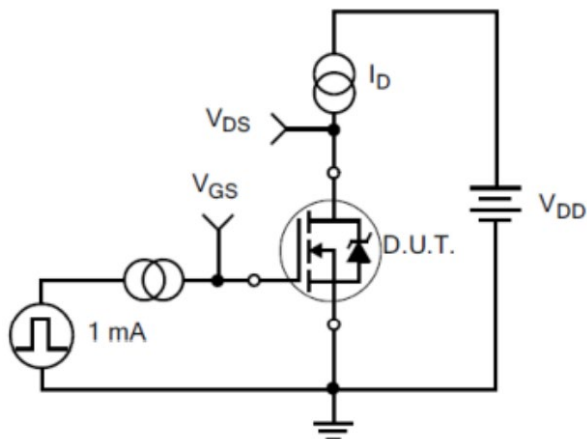


Fig 17. Gate Charge Waveforms

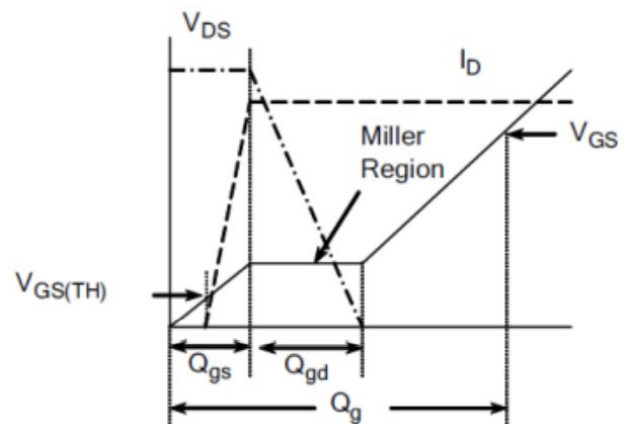




Fig 18. Diode Reverse Recovery Test Circuit

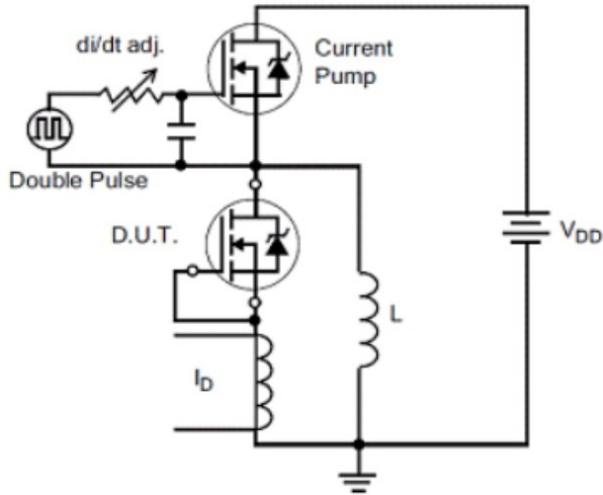


Fig 19. Diode Reverse Recovery Waveform

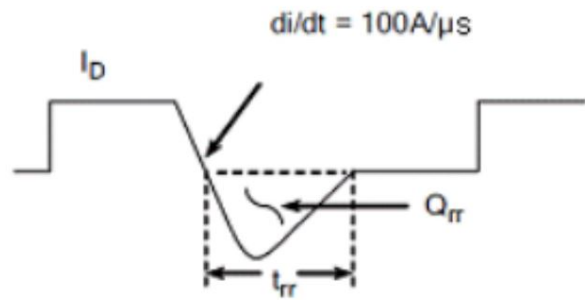


Fig 20. Unclamped Inductive Switching Test Circuit

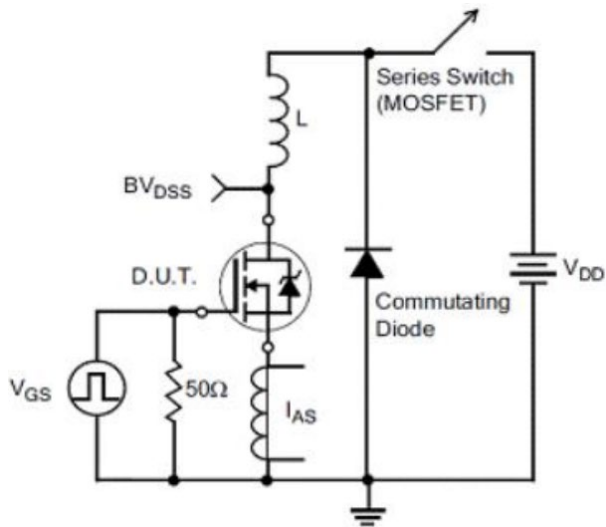
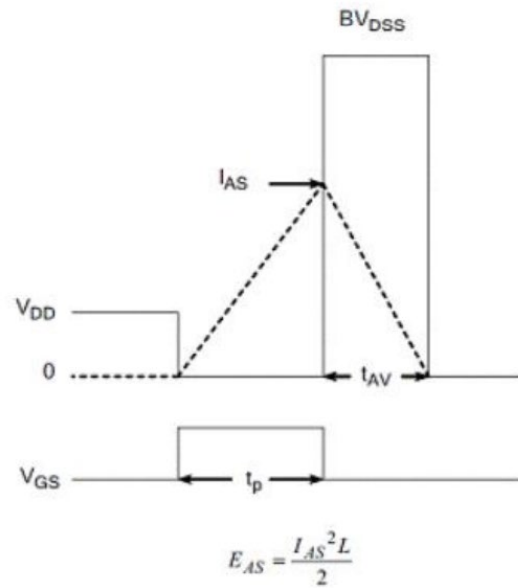


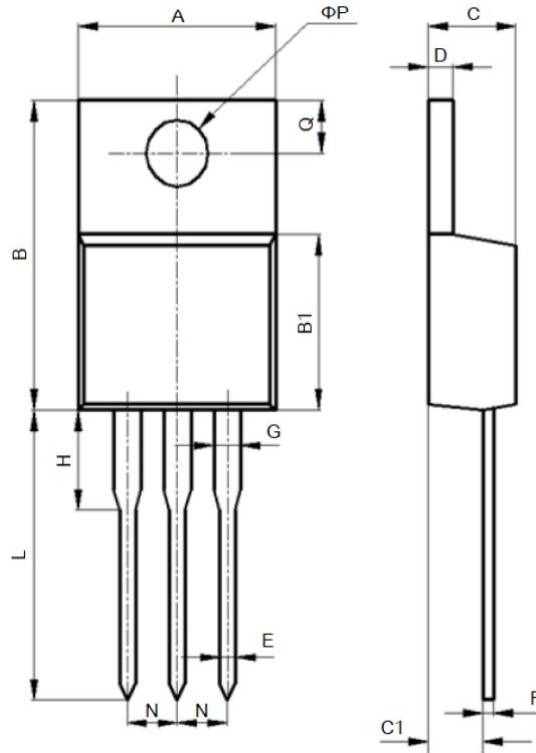
Fig 21. Unclamped Inductive Switching Waveform





PACKAGE INFORMATION

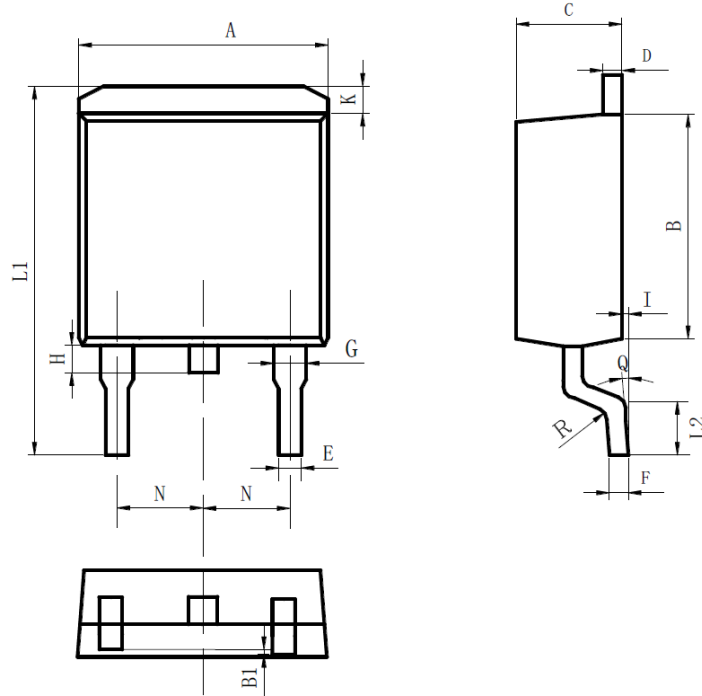
Dimension in TO-220 (Unit: mm)



Symbol	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	MILLIMETERS	
	Min.	Max.
A	9.800	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
K	0.950	1.370
L1	14.500	16.500
L2	1.600	2.300
I	0.000	0.200
Q	0°	8°
R	0.4°	
N	2.390	2.690



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