

### Features

- $R_{DS(ON)} < 0.85\Omega @ V_{GS}=10V$
- Fast switching capability
- Low gate charge
- Lead free in compliance with EU RoHS directive.
- Green molding compound

### PRODUCT SUMMARY

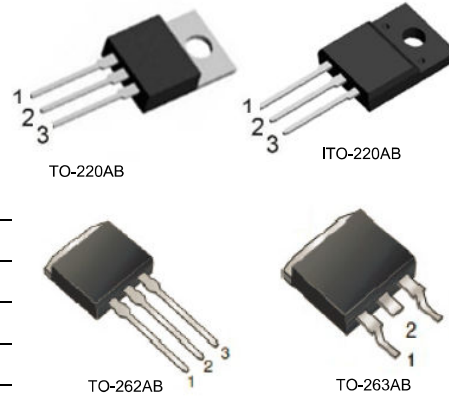
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
650	0.85@ $V_{GS}=10V$	12

### Mechanical Data

- Case: TO-220AB, ITO-220AB Package  
TO-262AB, TO-263AB Package

### Ordering Information

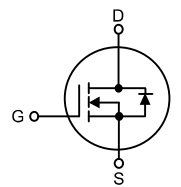
Part No.	Package	Packing
AT12N65S	TO-220AB	50pcs / Tube
AF12N65S	ITO-220AB	50pcs / Tube
AK12N65S	TO-262AB	50pcs / Tube
AG12N65S	TO-263AB	800pcs / 13" Reel



Pin Definition:

1. Gate
2. Drain
3. Source

### Block Diagram



### ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	650	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	12	A
Pulsed Drain Current (Note 2)	$I_{DM}$	48	A
Avalanche Energy	Single Pulsed (Note 3) $E_{AS}$	790	mJ
Power Dissipation	TO-220AB/TO-262AB TO-263AB	$P_D$ 225	W
	ITO-220AB	51	W
Junction Temperature	$T_J$	+150	$^\circ C$
Operating Temperature	$T_{OPR}$	-55 ~ +150	$^\circ C$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ C$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by  $T_J$

3.  $L = 30mH$ ,  $I_{AS} = 7.1A$ ,  $V_{DD} = 50V$ ,  $R_G = 25 \Omega$ , Starting  $T_J = 25^\circ C$

### THERMAL DATA

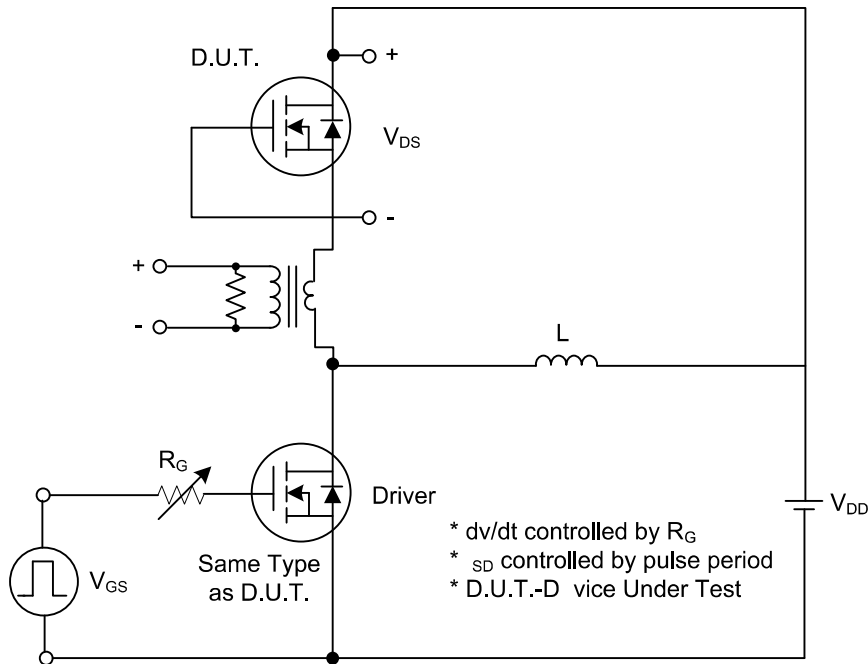
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220AB/ITO-220AB TO-262AB/TO-263AB	$\theta_{JA}$	62.5	$^{\circ}\text{C/W}$
Junction to Case	TO-220AB	$\theta_{JC}$	0.56	$^{\circ}\text{C/W}$
	ITO-220AB		2.6	

### ELECTRICAL CHARACTERISTICS ( $T_C=25^{\circ}\text{C}$ , unless otherwise specified)

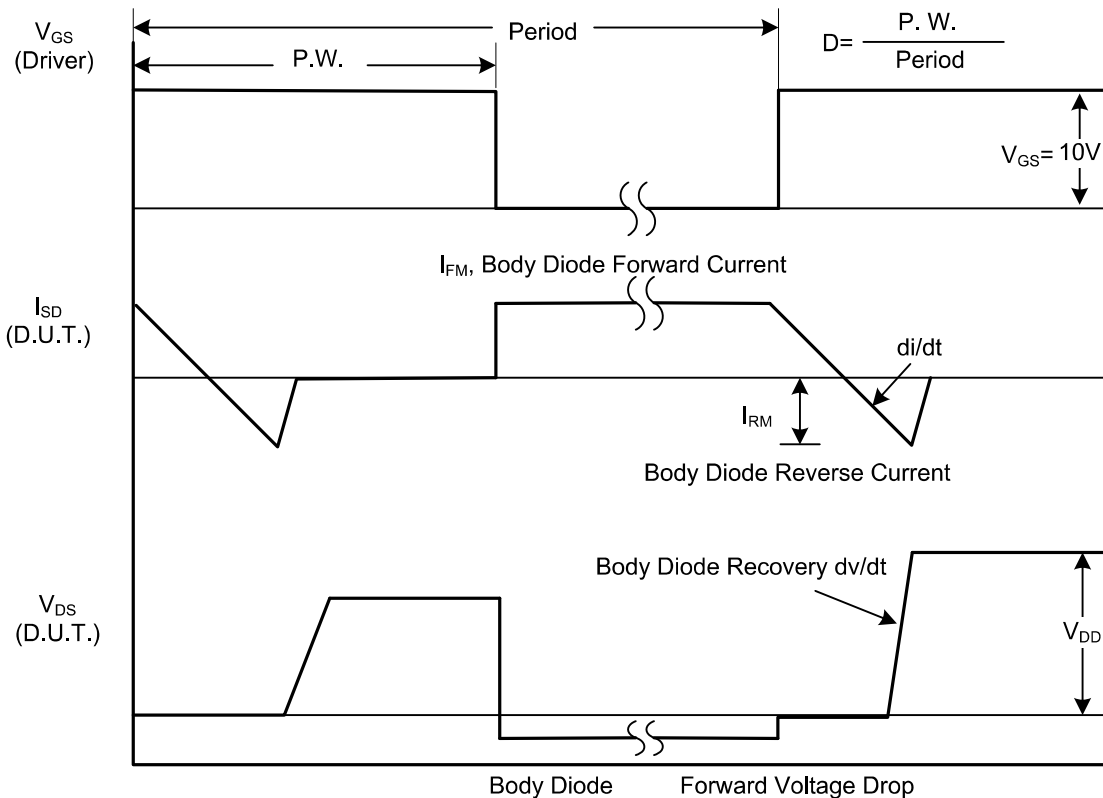
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>							
Drain-Source Breakdown Voltage		$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Leakage Current		$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$			1	$\mu A$
Gate- Source Leakage Current	Forward	$I_{GSS}$	$V_{GS}=30V, V_{DS}=0V$			100	nA
	Reverse		$V_{GS}=-30V, V_{DS}=0V$			-100	nA
<b>ON CHARACTERISTICS</b>							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A$		0.65	0.85	$\Omega$
<b>DYNAMIC CHARACTERISTICS</b>							
Input Capacitance		$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{ MHz}$		1480		pF
Output Capacitance		$C_{OSS}$			200		pF
Reverse Transfer Capacitance		$C_{RSS}$			25		pF
<b>SWITCHING CHARACTERISTICS</b>							
Turn-On Delay Time		$t_{D(ON)}$	$V_{DD}=300V, I_D=12A, R_G=25\Omega$ (Note 1, 2)		30		ns
Turn-On Rise Time		$t_R$			115		ns
Turn-Off Delay Time		$t_{D(OFF)}$			95		ns
Turn-Off Fall Time		$t_F$			85		ns
Total Gate Charge		$Q_G$	$V_{DS}=480V, I_D=12A, V_{GS}=10V$ (Note 1, 2)		42		nC
Gate-Source Charge		$Q_{GS}$			8.6		nC
Gate-Drain Charge		$Q_{GD}$			21		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>							
Drain-Source Diode Forward Voltage		$V_{SD}$	$V_{GS}=0V, I_S=12A$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		$I_S$				12	A
Maximum Pulsed Drain-Source Diode Forward Current		$I_{SM}$				48	A
Reverse Recovery Time		$t_{rr}$	$V_{GS}=0V, I_S=12A, dI/dt=100\text{ A}/\mu\text{s}$ (Note 1)		570		ns
Reverse Recovery Charge		$Q_{RR}$			5.5		$\mu\text{C}$

Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .  
2. Essentially independent of operating temperature.

## TEST CIRCUITS AND WAVEFORMS

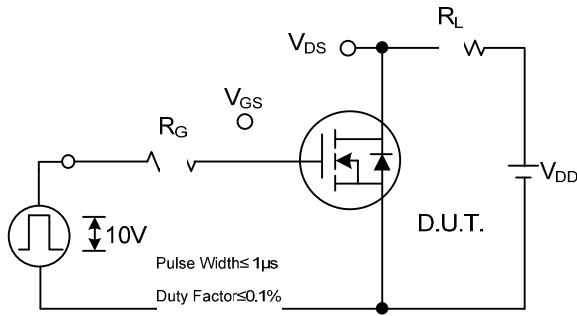


**Peak Diode Recovery  $dv/dt$  Test Circuit**

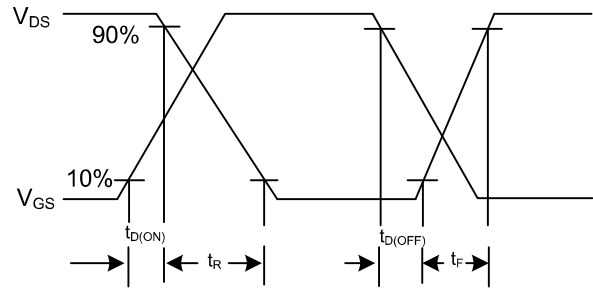


**Peak Diode Recovery  $dv/dt$  Waveforms**

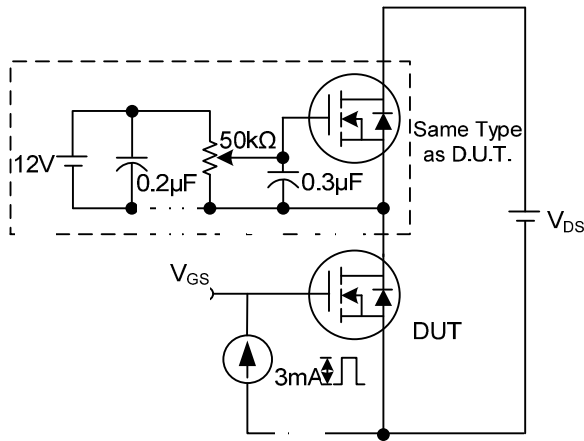
### TEST CIRCUITS AND WAVEFORMS(Cont.)



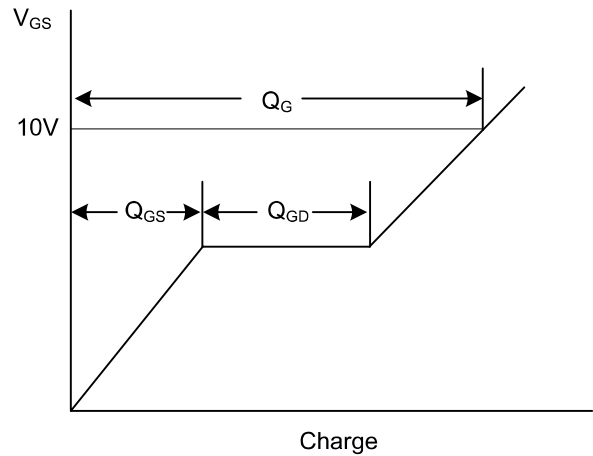
**Switching Test Circuit**



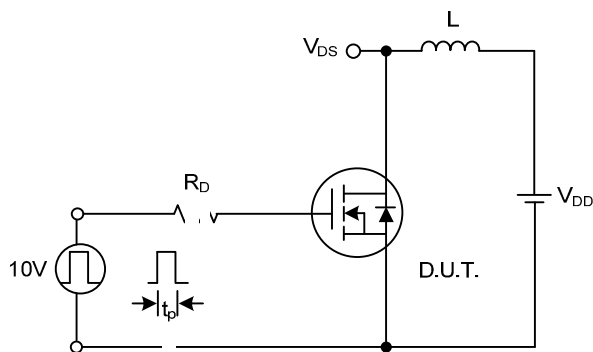
**Switching Waveforms**



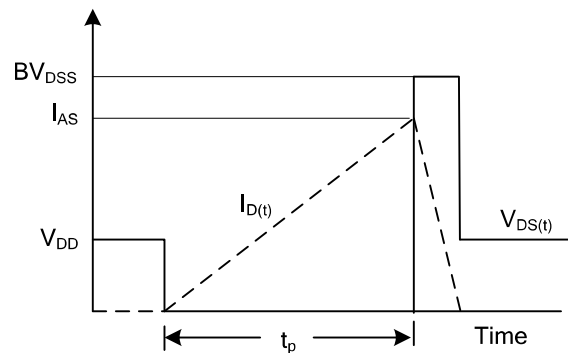
**Gate Charge Test Circuit**



**Gate Charge Waveform**

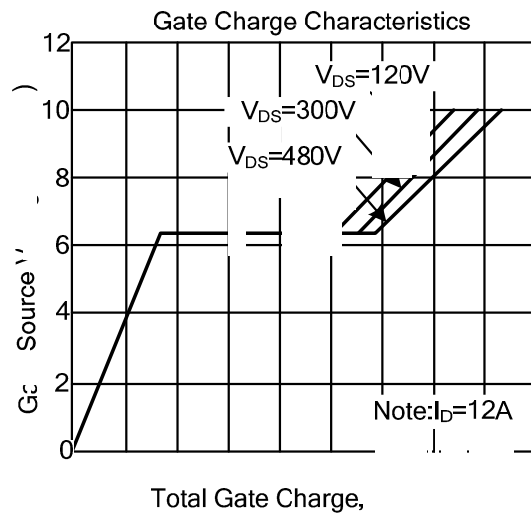
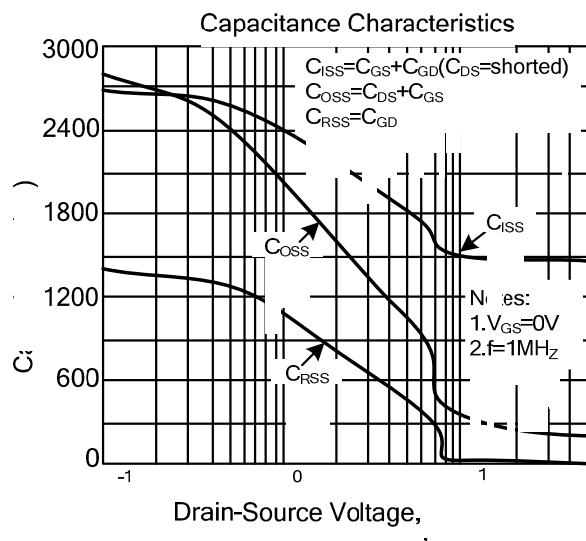
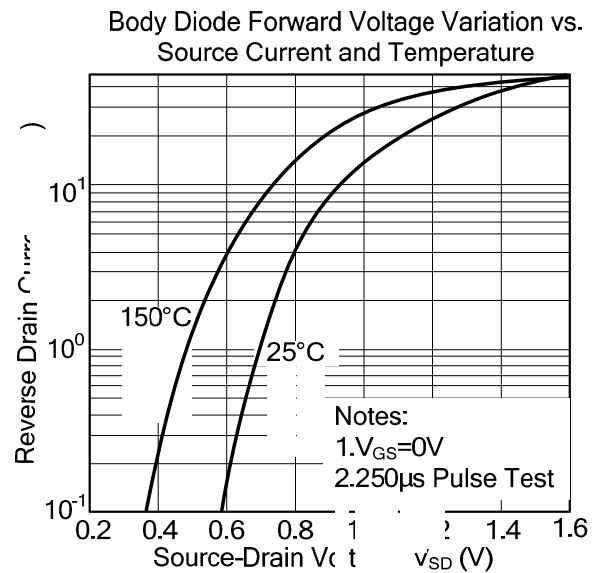
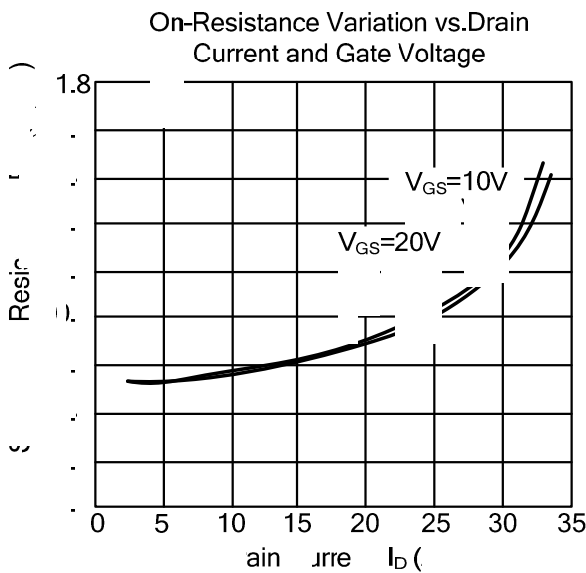
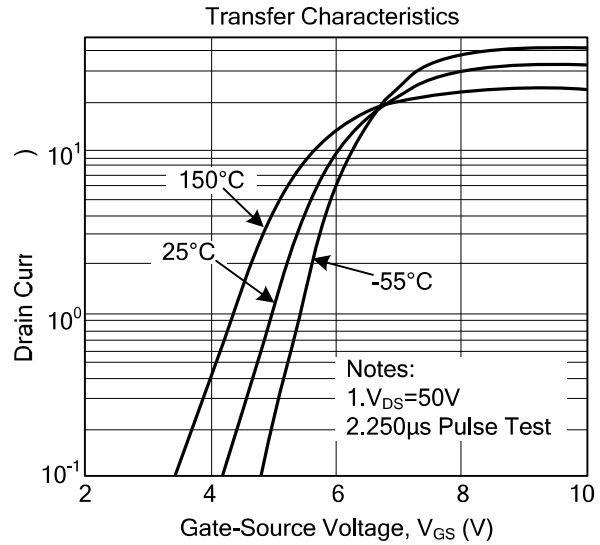
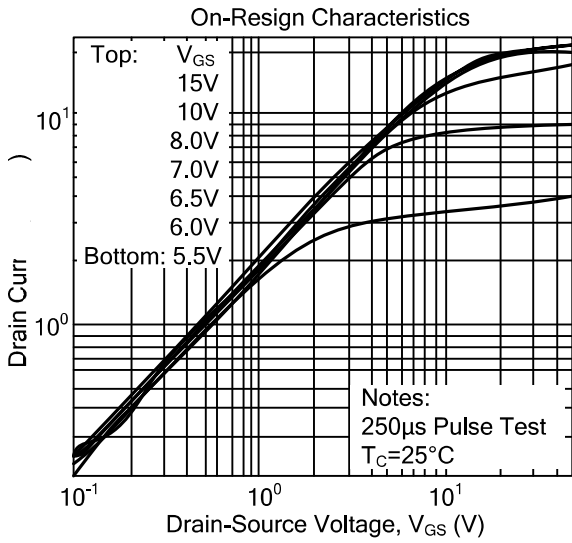


**Unclamped Inductive Switching Test Circuit**

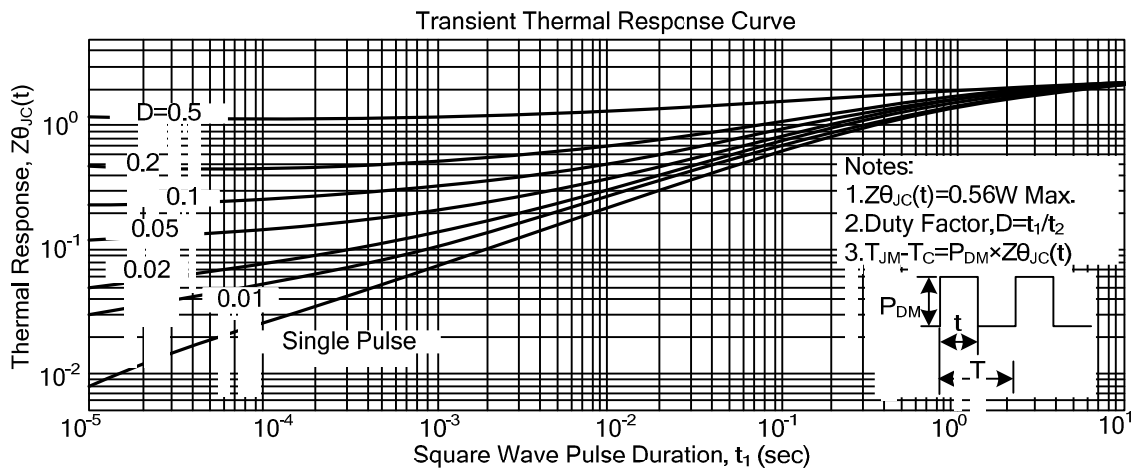
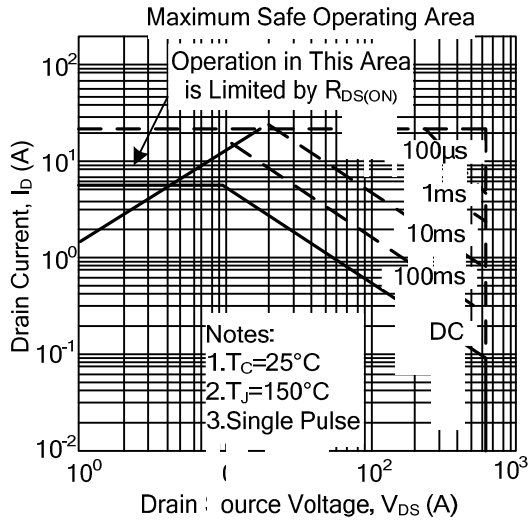


**Unclamped Inductive Switching Waveforms**

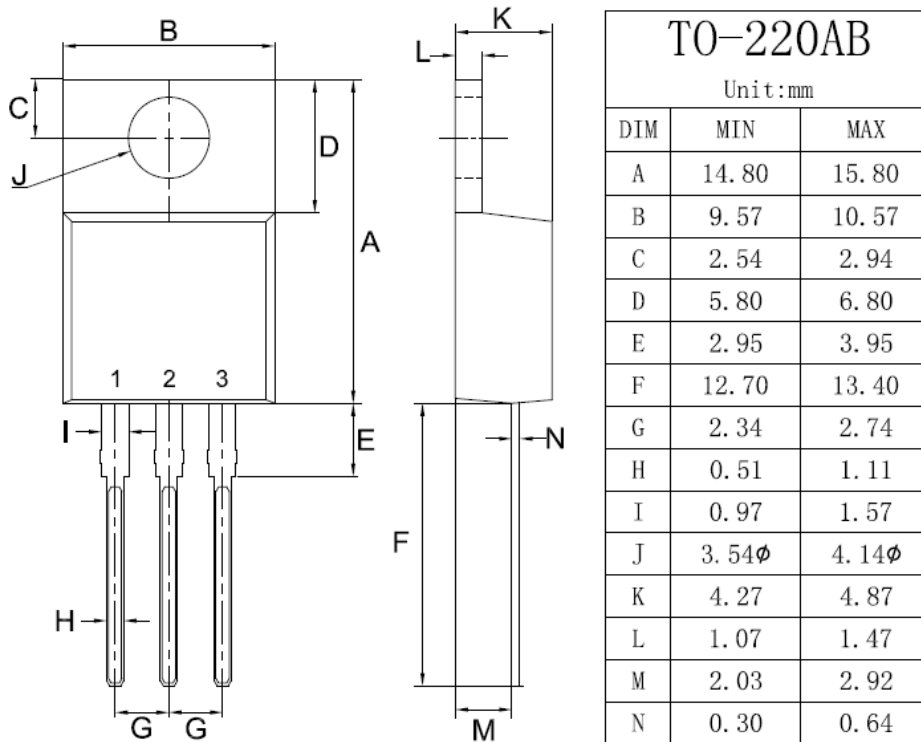
### TYPICAL CHARACTERISTICS



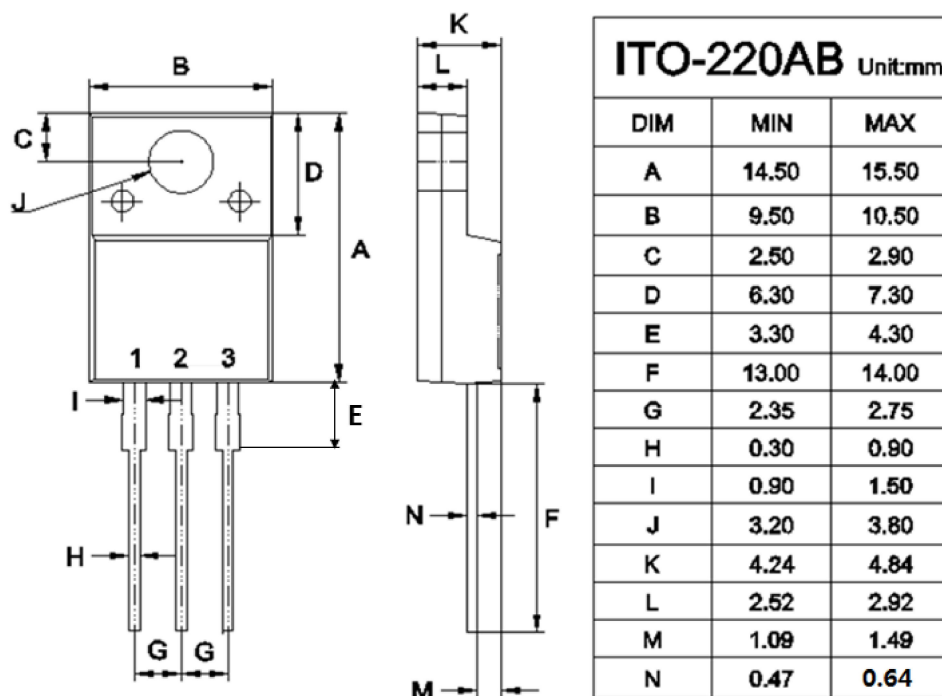
## TYPICAL CHARACTERISTICS



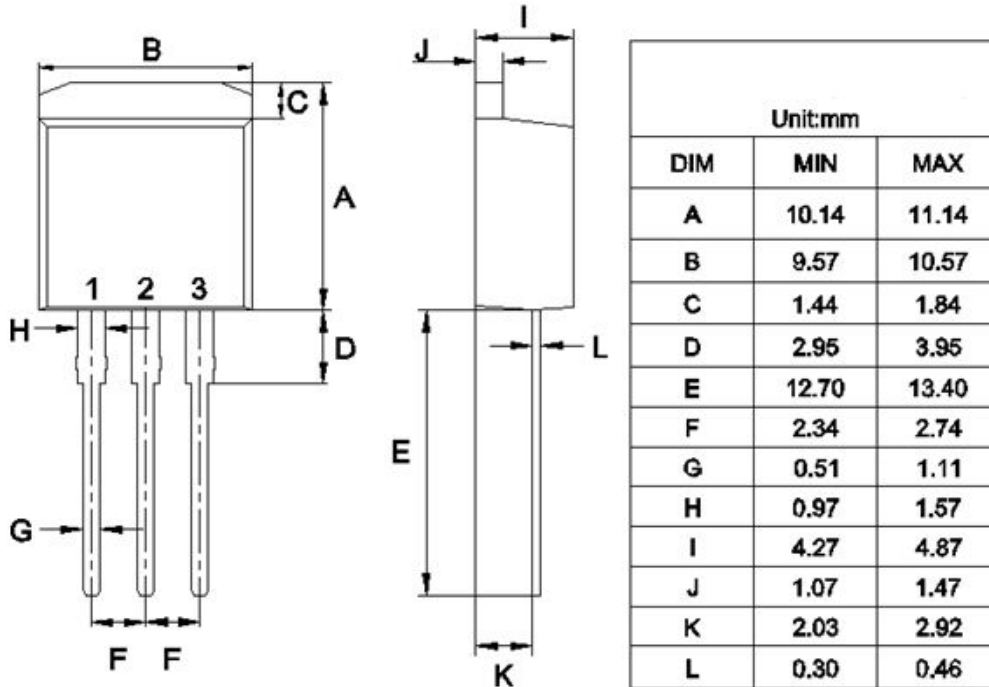
### TO-220AB Mechanical Drawing



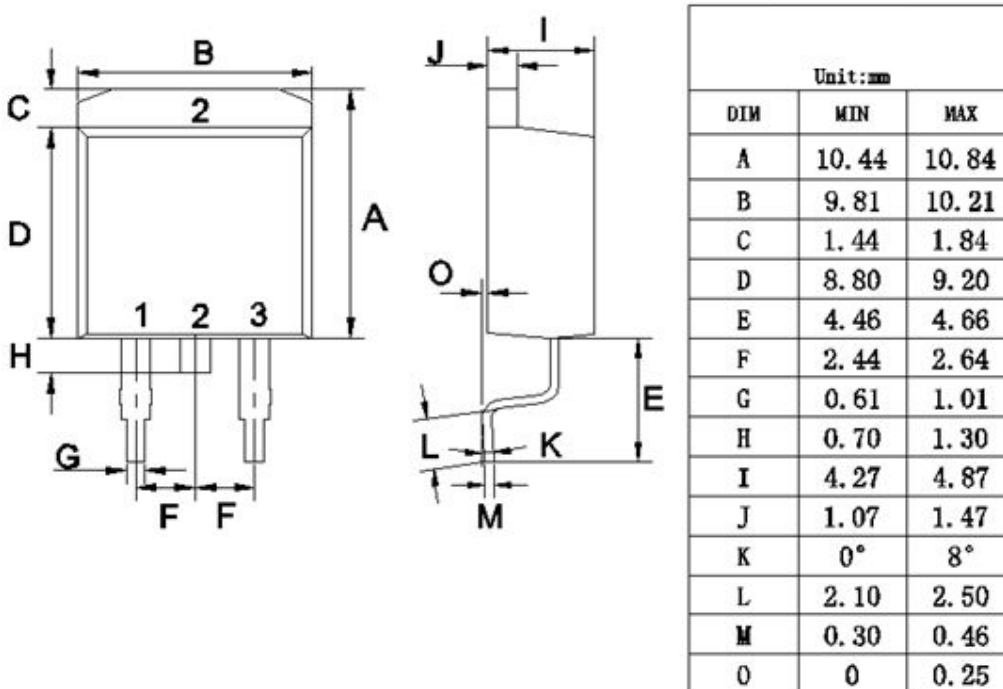
### ITO-220AB Mechanical Drawing



### TO-262AB Mechanical Drawing



### TO-263AB Mechanical Drawing





## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [MOSFET](#) category:*

*Click to view products by [AnBon](#) manufacturer:*

Other Similar products are found below :

[MCH3443-TL-E](#) [MCH6422-TL-E](#) [FDPF9N50NZ](#) [NTNS3A92PZT5G](#) [IRFD120](#) [JANTX2N5237](#) [2N7000](#) [2SK2464-TL-E](#) [AOD464](#) [2SJ277-DL-E](#) [2SK2267\(Q\)](#) [2SK2545\(Q,T\)](#) [405094E](#) [423220D](#) [MIC4420CM-TR](#) [VN1206L](#) [614234A](#) [715780A](#) [SSM6J414TU,LF\(T](#) [751625C](#)  
[IRS2092STRPBF-EL](#) [IPS70R2K0CEAKMA1](#) [BSF024N03LT3 G](#) [PSMN4R2-30MLD](#) [TK31J60W5,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#)  
[DMN1017UCP3-7](#) [EFC2J004NUZTDG](#) [P85W28HP2F-7071](#) [DMN1053UCP4-7](#) [SQJ469EP-T1-GE3](#) [NTE2384](#) [NTE6400A](#)  
[DMC2700UDMQ-7](#) [DMN2080UCB4-7](#) [DMN61D9UWQ-13](#) [US6M2GTR](#) [DMN31D5UDJ-7](#) [SSM6P54TU,LF](#) [DMP22D4UFO-7B](#)  
[IPS60R3K4CEAKMA1](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#) [STF5N65M6](#) [IRF40H233XTMA1](#) [IPSA70R950CEAKMA1](#)  
[IPSA70R2K0CEAKMA1](#) [STU5N65M6](#) [C3M0021120D](#) [DMN6022SSD-13](#)