

Features

- $R_{DS(ON)} < 1.3\Omega$ @ $V_{GS} = 10V$, $I_D = 3.5A$
- Fast switching capability
- Lead free in compliance with EU RoHS directive.
- Green molding compound

PRODUCT SUMMARY

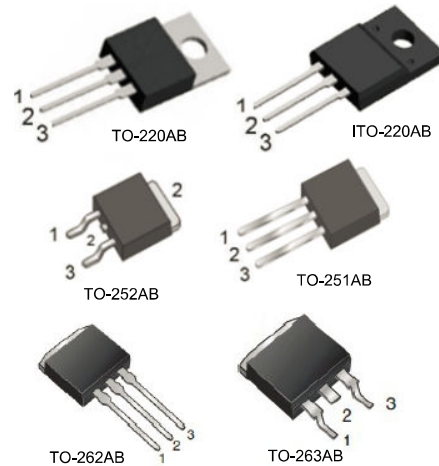
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
600	1.3 @ $V_{GS} = 10V$	7

Mechanical Data

- Case: TO-251AB, TO-252AB, TO-220, ITO-220AB, TO-262AB, TO-263AB Package

Ordering Information

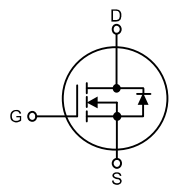
Part No.	Package	Packing
AU7N60S	TO-251AB	75pcs / Tube
AD7N60S	TO-252AB	2.5Kpcs / 13" Reel
AT7N60S	TO-220AB	50pcs / Tube
AF7N60S	ITO-220AB	50pcs / Tube
AK7N60S	TO-262AB	50pcs / Tube
AG7N60S	TO-263AB	800pcs / 13" Reel



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}	600	V
Gate-Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 2)		I_{AR}	7	A
Continuous Drain Current		I_D	7	A
Pulsed Drain Current (Note 2)		I_{DM}	30.8	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	500	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220AB/TO-262AB/TO-263AB	P_D	140	W
	ITO-220AB		36	W
	TO-251AB/TO-252AB		54	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 maximum junction temperature

3. $L = 19.5mH$, $I_{AS} = 7A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

4. $I_{SD} \leq 7A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$

THERMAL DATA

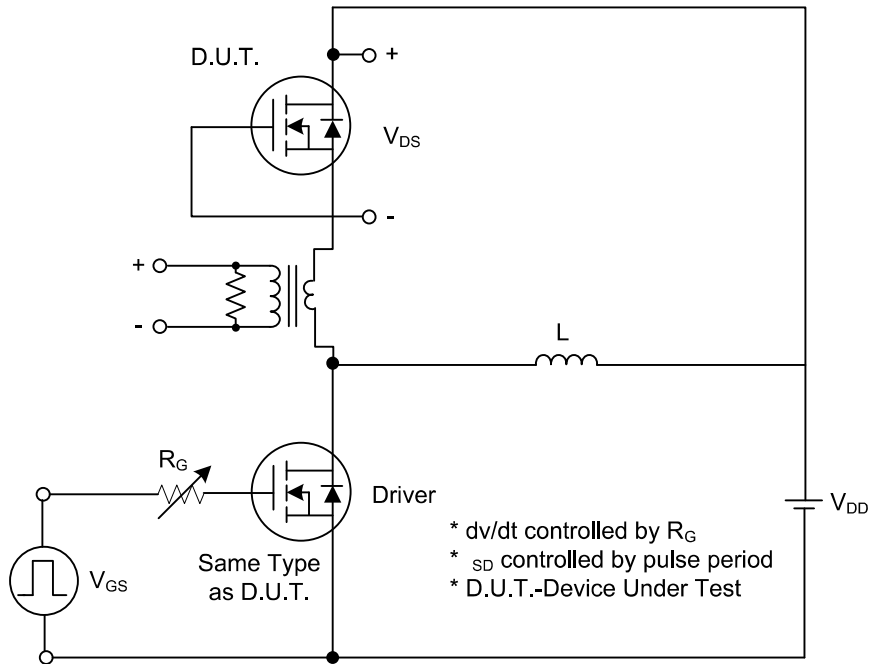
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220AB/ITO-220AB TO-262AB/TO-263AB	θ_{JA}	62.5	°C/W
	TO-251AB/TO-252AB		160	
	TO-220AB TO-262AB/TO-263AB		1.25	
Junction to Case	ITO-220AB	θ_{JC}	3.5	°C/W
	TO-251AB/TO-252AB		2.5	

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

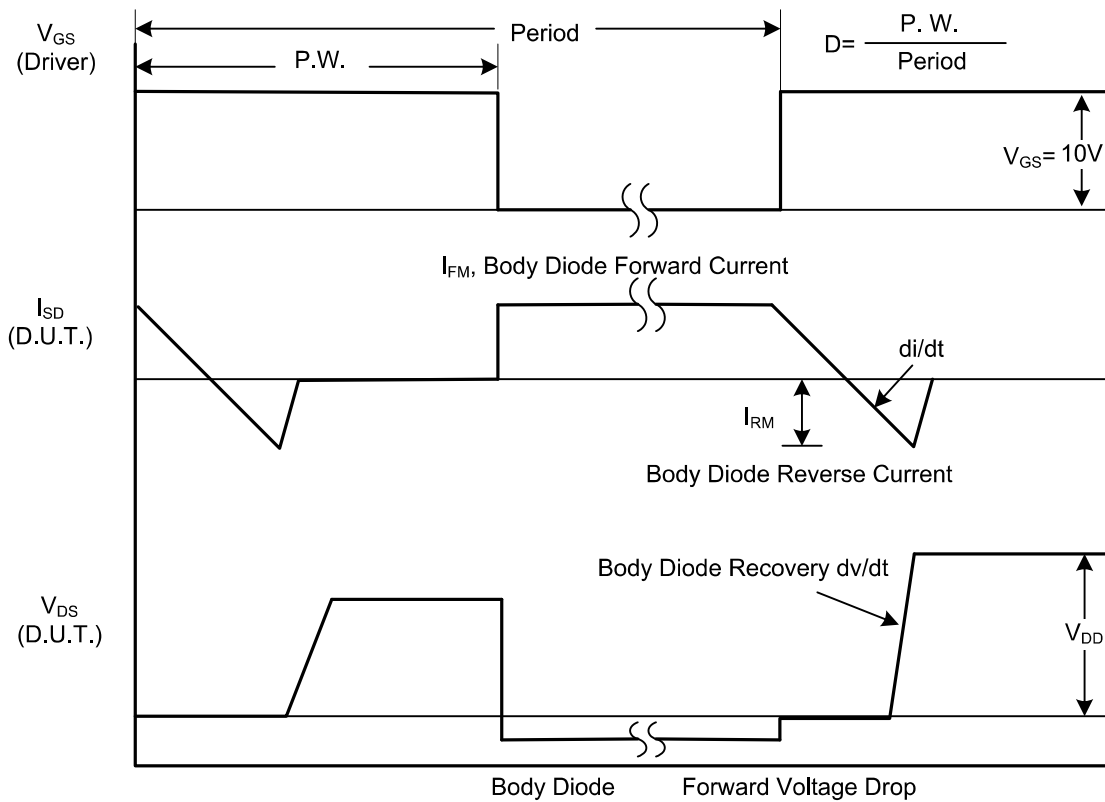
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	600			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V$			1	μA
Gate-Source Leakage Current	Forward	$V_{GS} = 30V, V_{DS} = 0V$ $V_{GS} = -30V, V_{DS} = 0V$			100	nA
	Reverse				-100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, Referenced to 25°C		0.67		V/°C
ON CHARACTERISTICS						
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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$			1.3	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1\text{MHz}$		1200	1400	pF
Output Capacitance	C_{OSS}			125	155	pF
Reverse Transfer Capacitance	C_{RSS}			40	50	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD} = 300V, I_D = 7A,$ $R_G = 25\Omega$ (Note 1, 2)		65	95	ns
Turn-On Rise Time	t_R			180	210	ns
Turn-Off Delay Time	$t_{D(OFF)}$			320	360	ns
Turn-Off Fall Time	t_F			220	260	ns
Total Gate Charge	Q_G			210	230	nC
Gate-Source Charge	Q_{GS}	$V_{DS} = 480V, I_D = 7A,$ $V_{GS} = 10V$ (Note 1, 2)		11		nC
Gate-Drain Charge	Q_{GD}			38		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=7A$			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				7	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				25	A
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_S = 7A,$ $dI_F/dt = 100 A/\mu s$ (Note 1)		320		ns
Reverse Recovery Charge	Q_{RR}			2.4		μC

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

TEST CIRCUITS AND WAVEFORMS

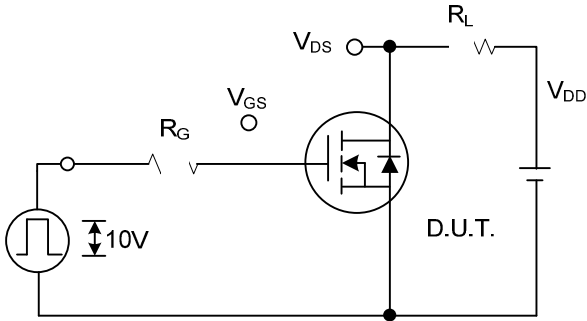


Peak Diode Recovery dv/dt Test Circuit

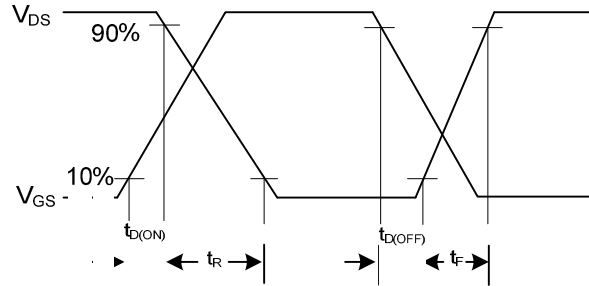


Peak Diode Recovery dv/dt Waveforms

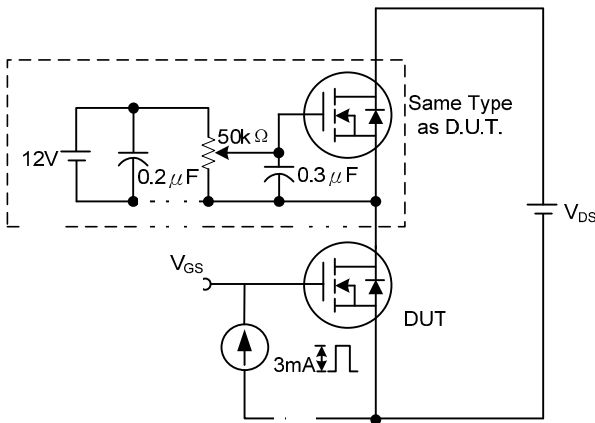
TEST CIRCUITS AND WAVEFORMS(Cont.)



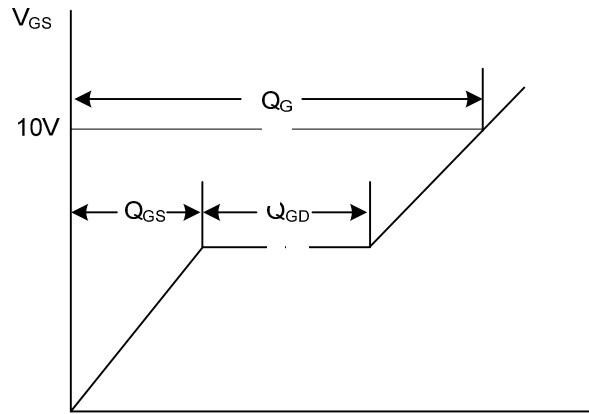
Switching Test Circuit



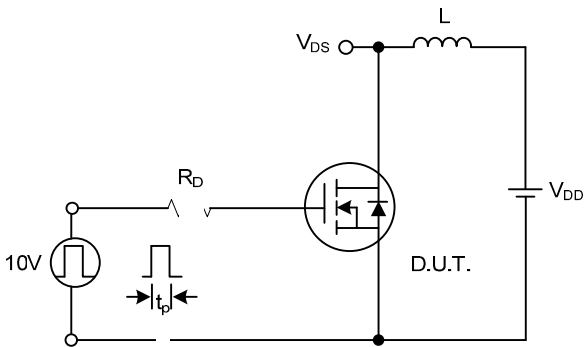
Switching Waveforms



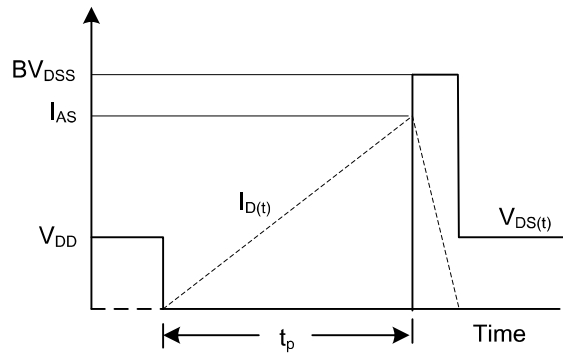
Gate Charge Test Circuit



Gate Charge Waveform



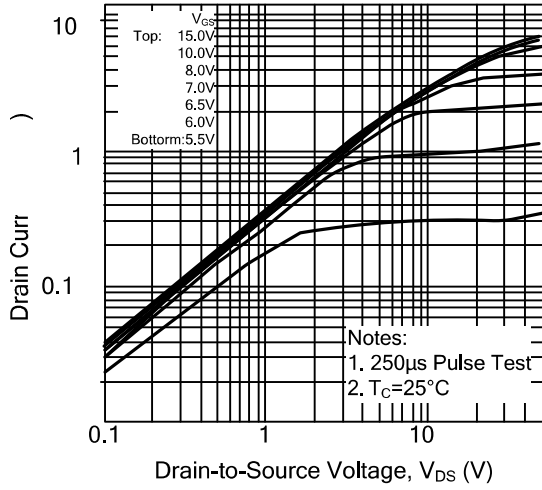
Unclamped Inductive Switching Test Circuit



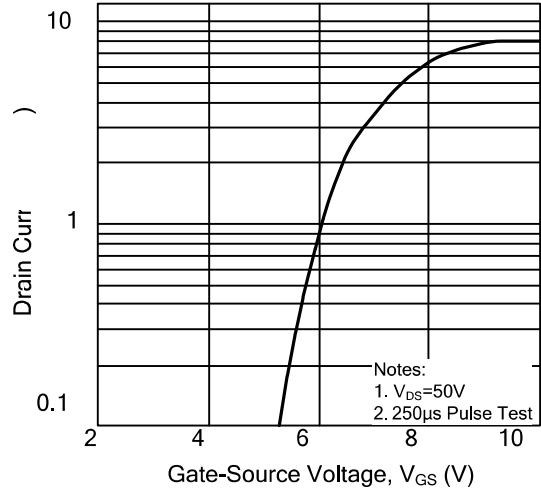
Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS

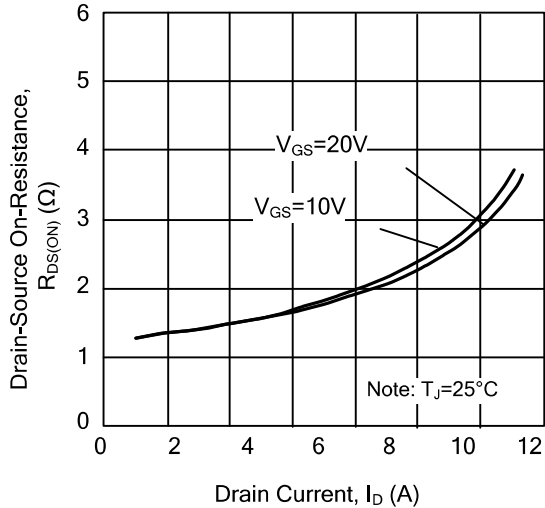
On-State Characteristics



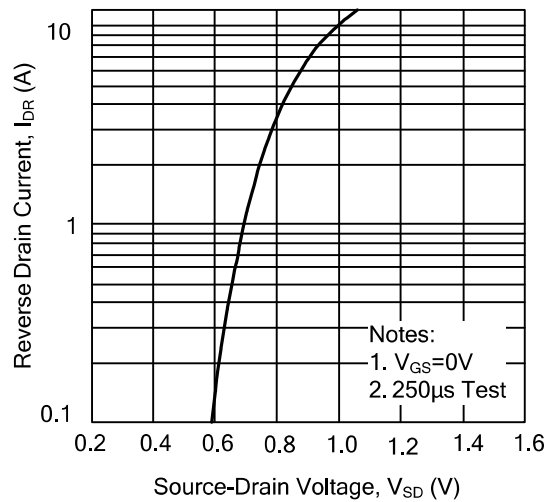
Transfer Characteristics



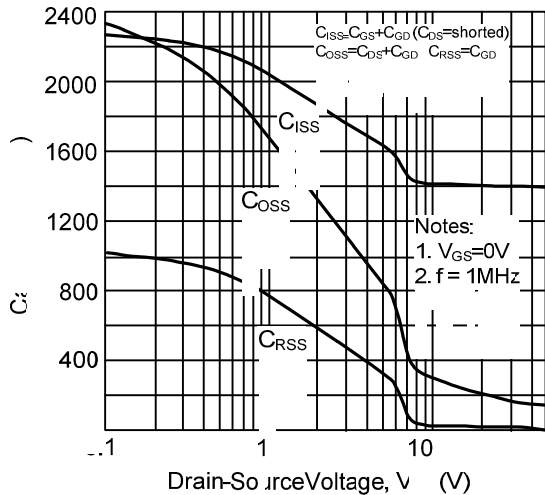
On-Resistance Variation vs. Drain Current and Gate Voltage



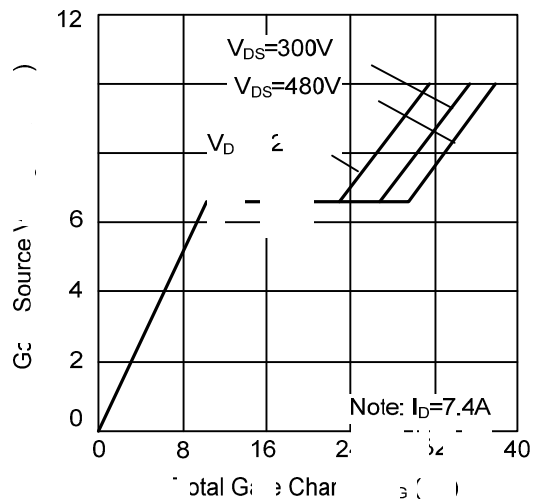
On State Current vs. Allowable Case Temperature



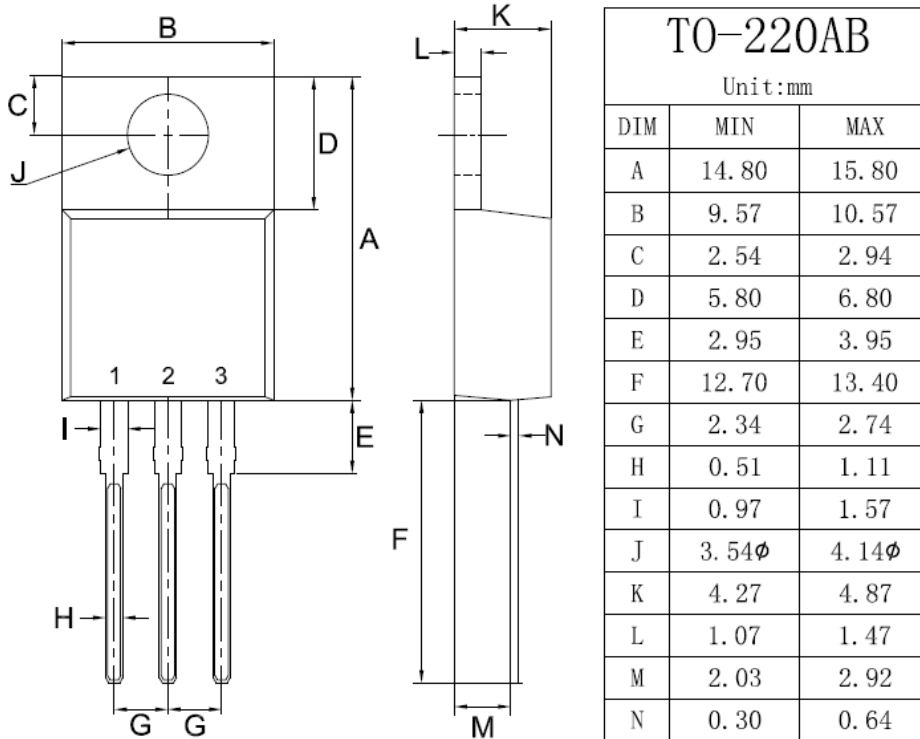
Capacitance Characteristics (Non-Repetitive)



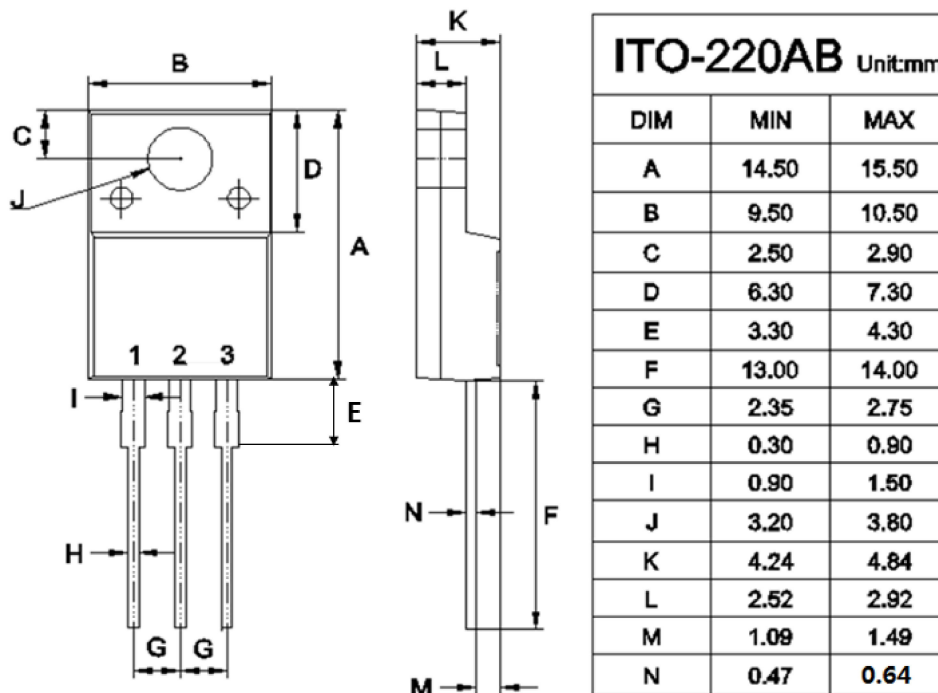
Gate Charge Characteristics



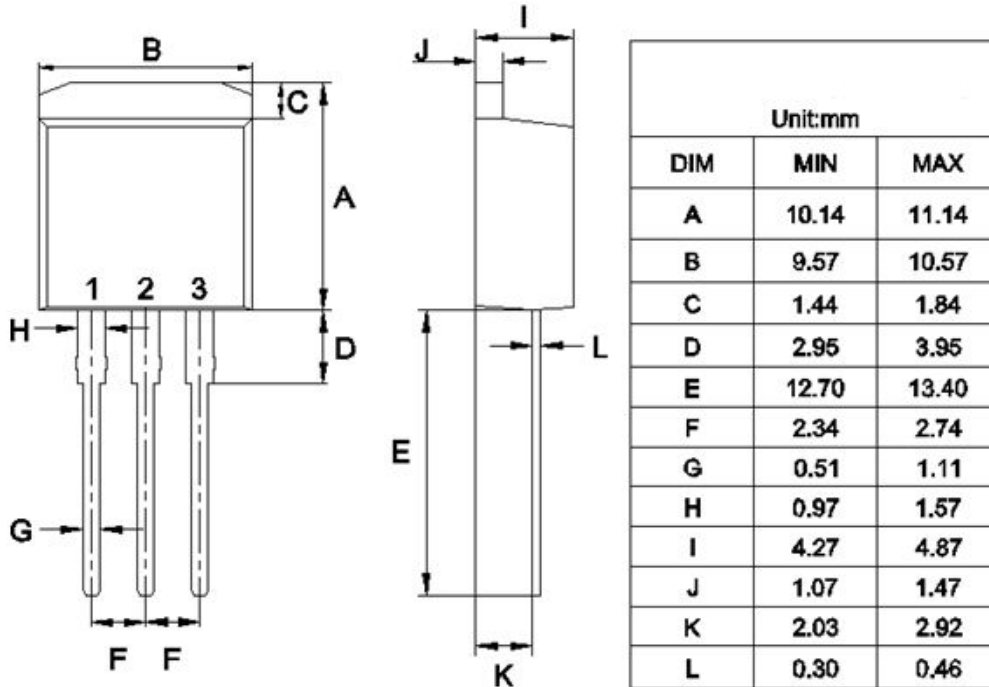
TO-220AB Mechanical Drawing



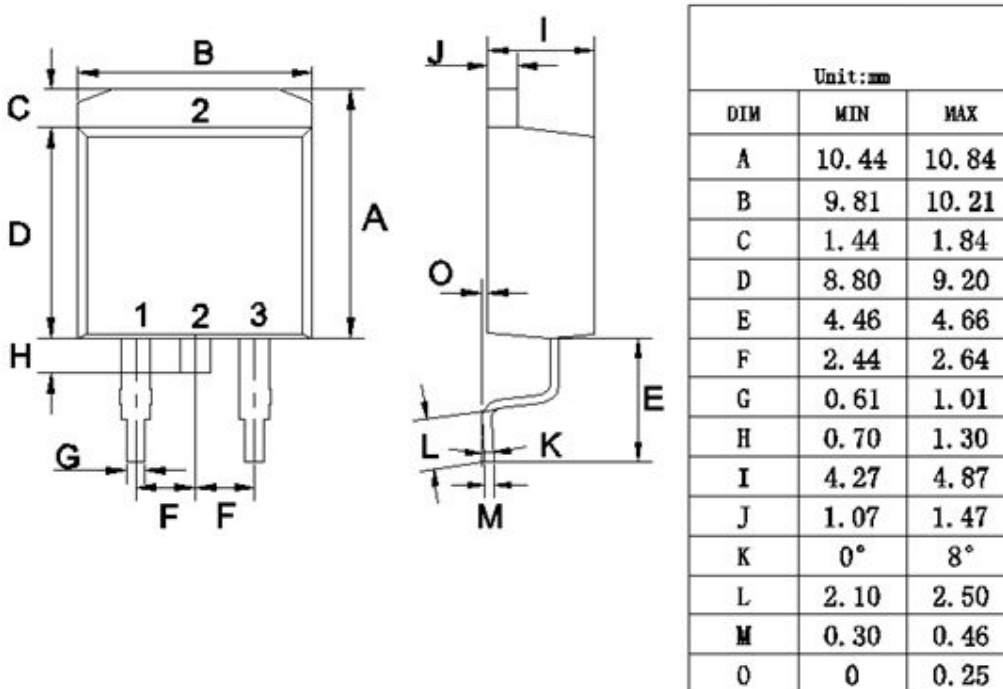
ITO-220AB Mechanical Drawing



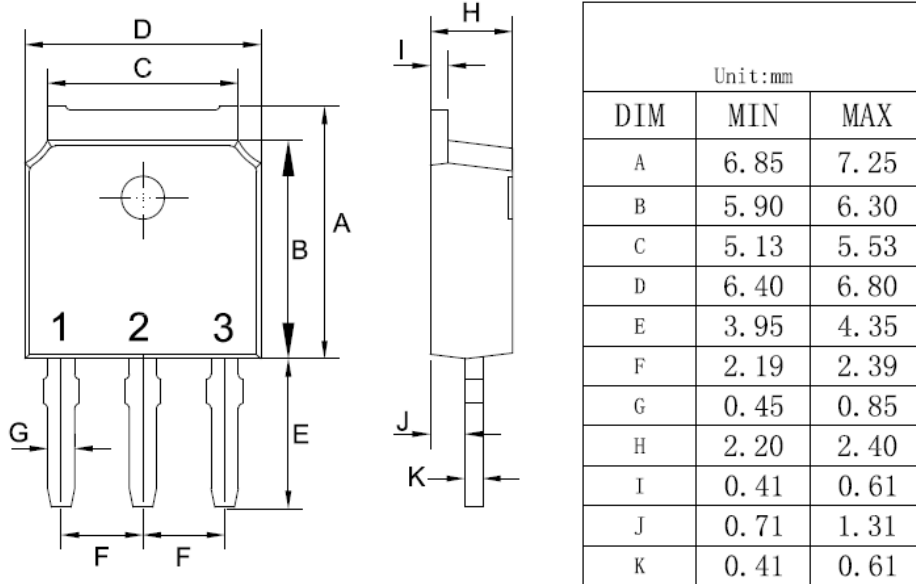
TO-262AB Mechanical Drawing



TO-263AB Mechanical Drawing



TO-251AB Mechanical Drawing



TO-252AB Mechanical Drawing

