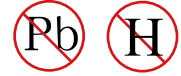


**N-Channel Enhancement MOSFET****V_{DS} = 650V, I_D = 12A****Feature**

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

Mechanical Data

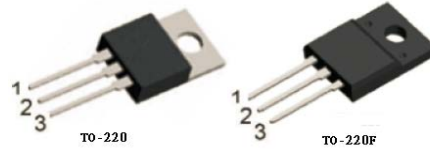
- Case : TO-220, TO-220F, TO-262, TO-263

Ordering Information

Part No.	Package	Packing
YS12N65P-TU	TO-220	50pcs / Tube
YS12N65F-TU	TO-220F	50pcs / Tube
YS12N65J-TU	TO-262	50pcs / Tube
YS12N65H-TU	TO-263	50pcs / Tube
YS12N65H-TR	TO-263	800pcs / 13" Reel

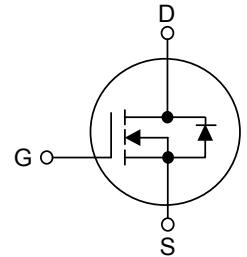
PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
650	0.85 @ V _{GS} = 10V	12



Pin Definition:

1. Gate
2. Drain
3. Source

**Block Diagram****ABSOLUTE MAXIMUM RATINGS** (T_C = 25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	650	V
Gate-Source Voltage		V _{GSS}	±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-220 / TO-262 / TO-263	P _D	225	W
	TO-220F		51	
Junction Temperature		T _J	+150	°C
Operating Temperature		T _{OPR}	-55 ~ +150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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 Ω, Starting T_J = 25°C

DEVICE CHARACTERISTICS

YS12N65

THERMAL DATA

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

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}	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	$V_G=30V, V_{DS}=0V$			100	nA
	Reverse		$V_{GS}=-30V, V_{DS}=0V$			-100	nA
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		$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A$		0.65	0.85	Ω
DYNAMIC CHARACTERISTICS							
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
SWITCHING CHARACTERISTICS							
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
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
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}	$V_{GS}=0V, I_S=12A, di_F/dt=100\text{ A}/\mu\text{s}$ (Note 1)		570		ns
Reverse Recovery Charge		Q_{RR}			5.5		μC

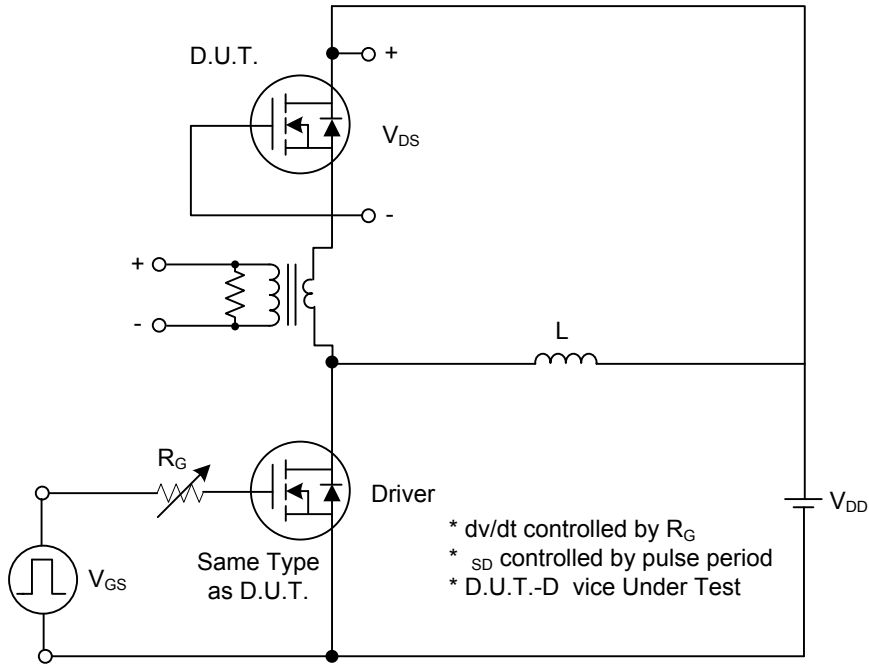
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

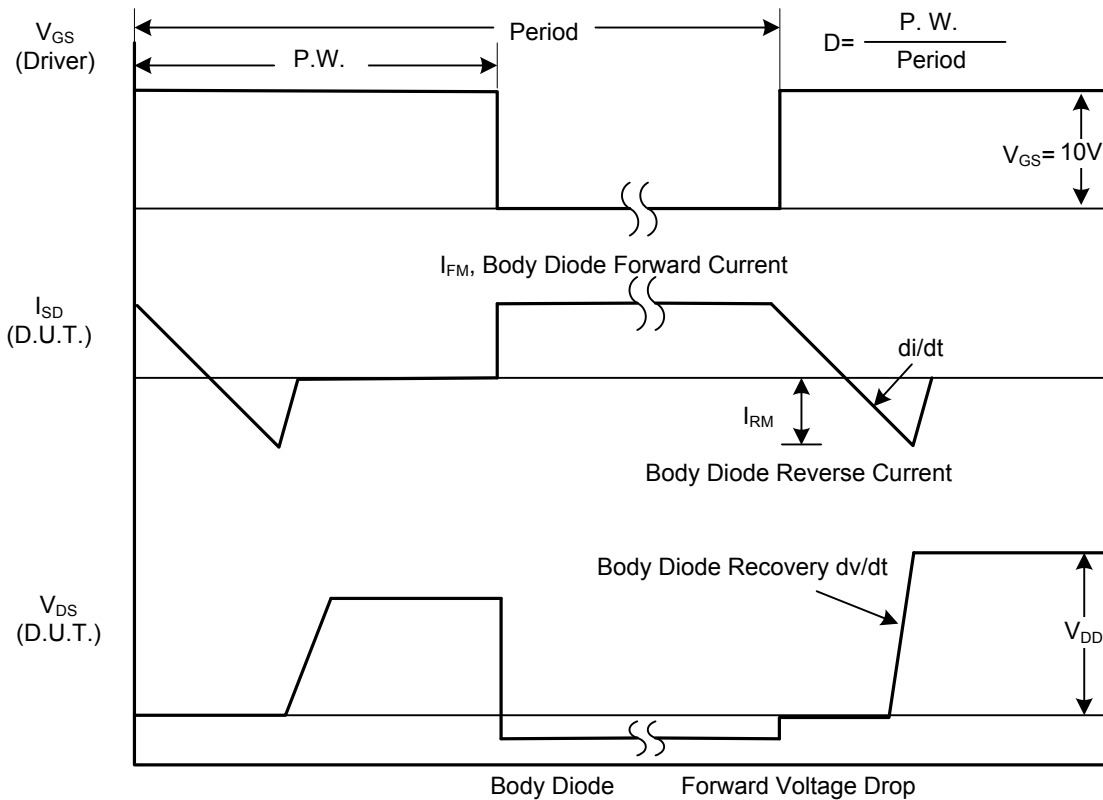
DEVICE CHARACTERISTICS

YS12N65

TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit

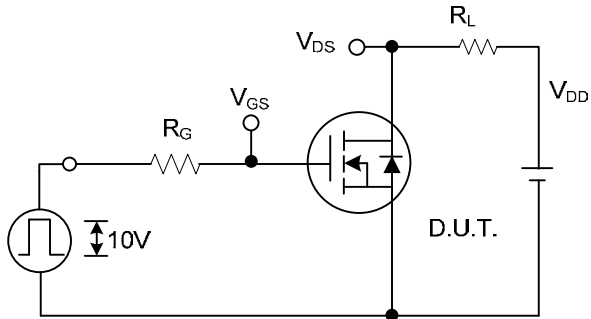


Peak Diode Recovery dv/dt Waveforms

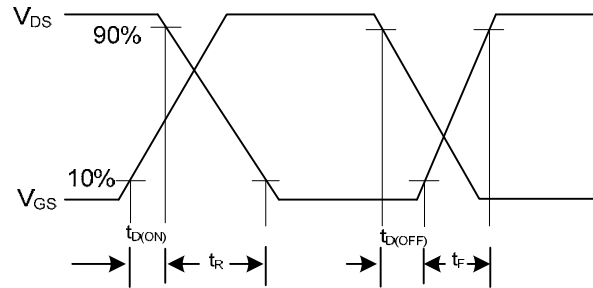
DEVICE CHARACTERISTICS

YS12N65

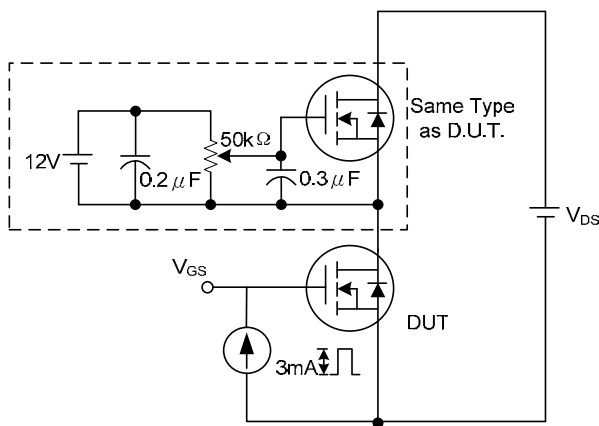
TEST CIRCUITS AND WAVEFORMS(Cont.)



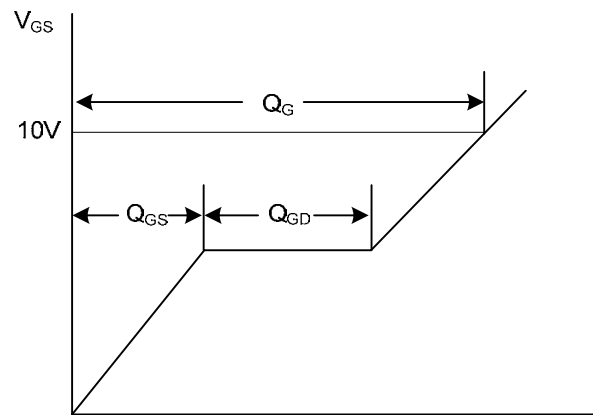
Switching Test Circuit



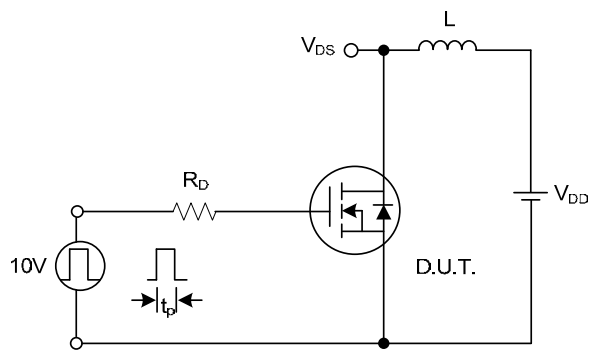
Switching Waveforms



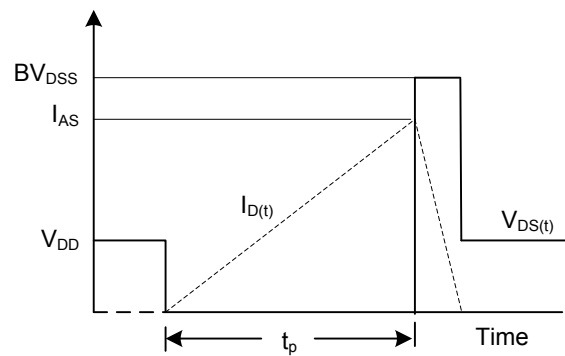
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

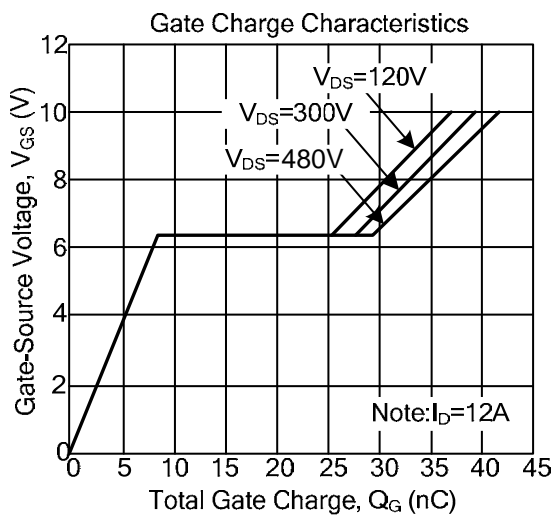
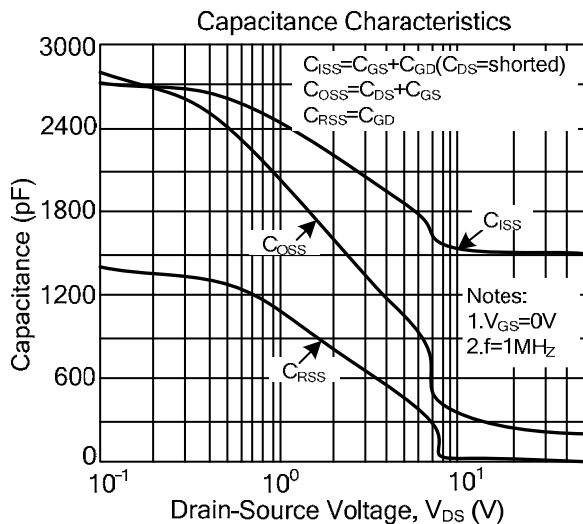
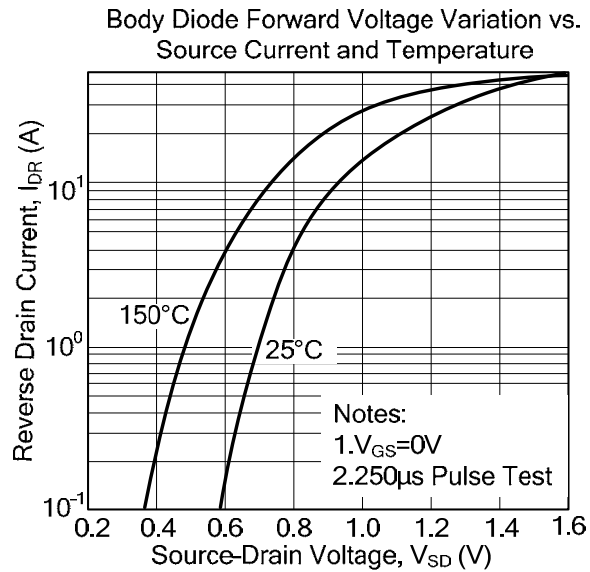
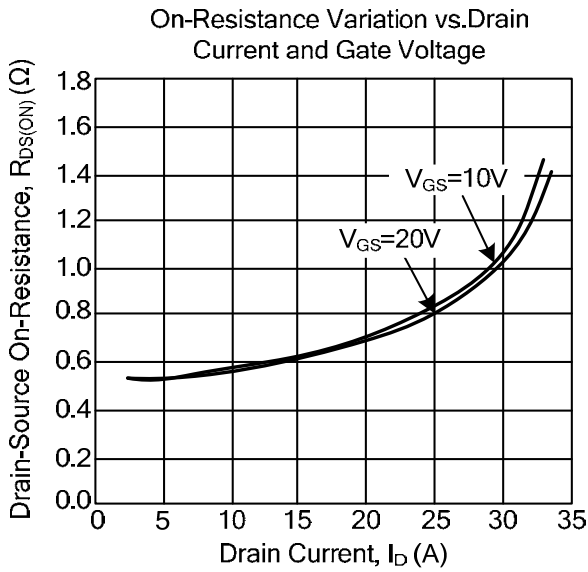
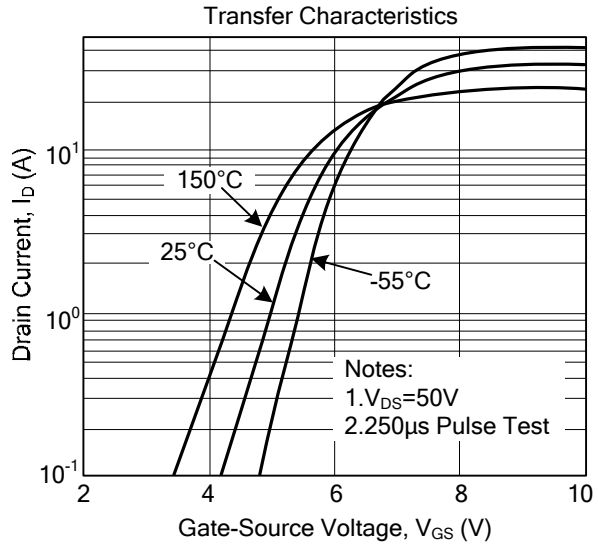
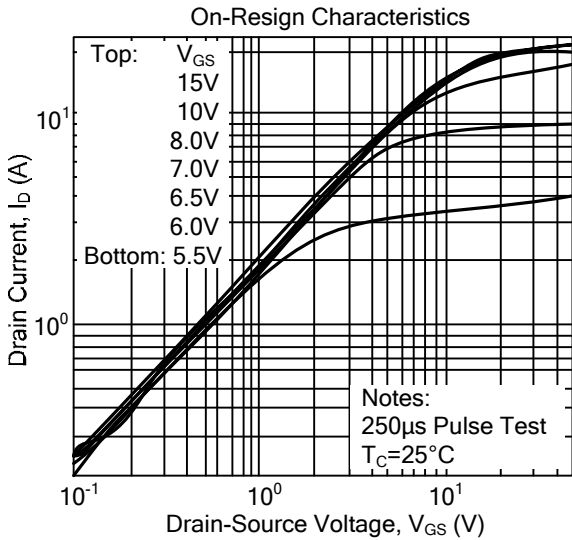


Unclamped Inductive Switching Waveforms

DEVICE CHARACTERISTICS

YS12N65

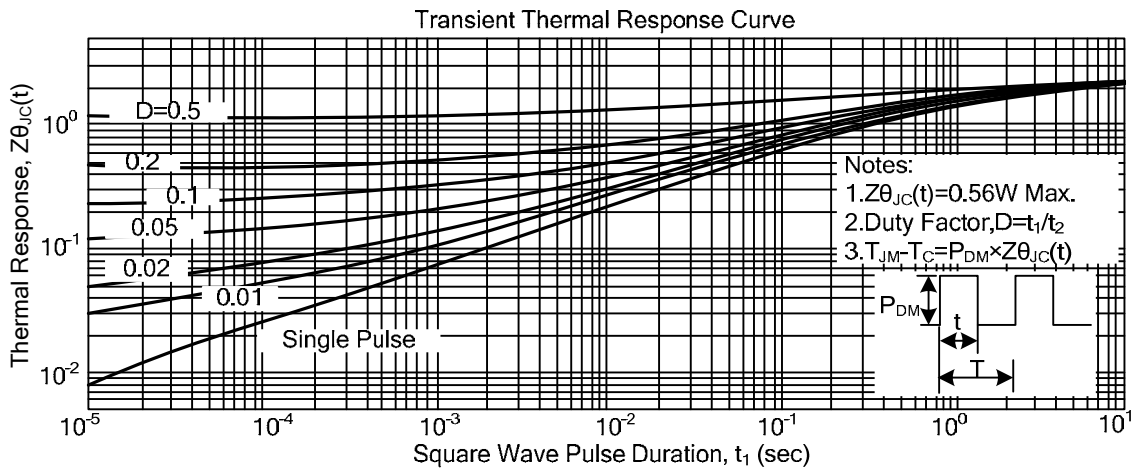
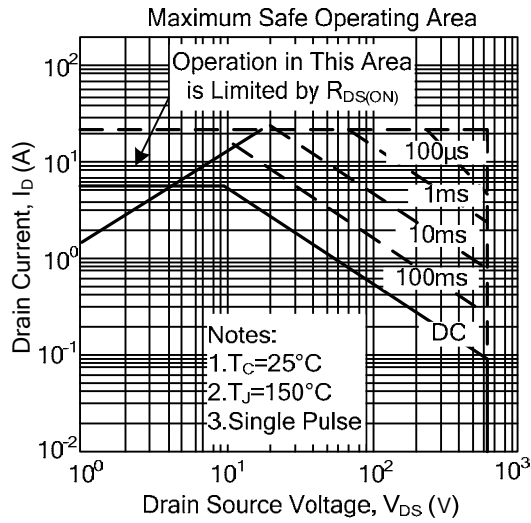
TYPICAL CHARACTERISTICS



DEVICE CHARACTERISTICS

YS12N65

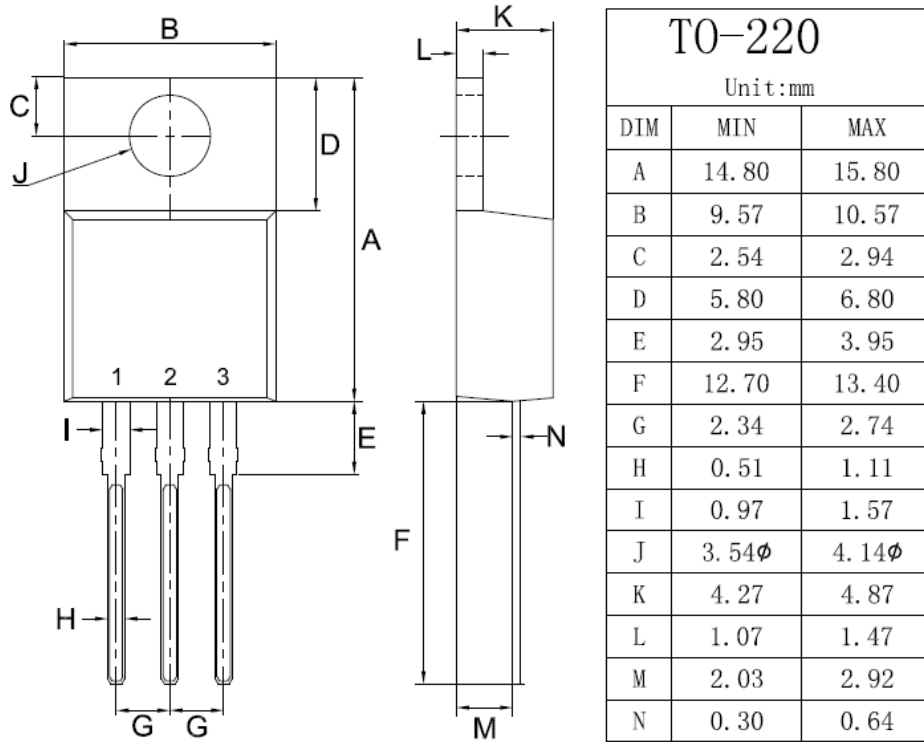
TYPICAL CHARACTERISTICS



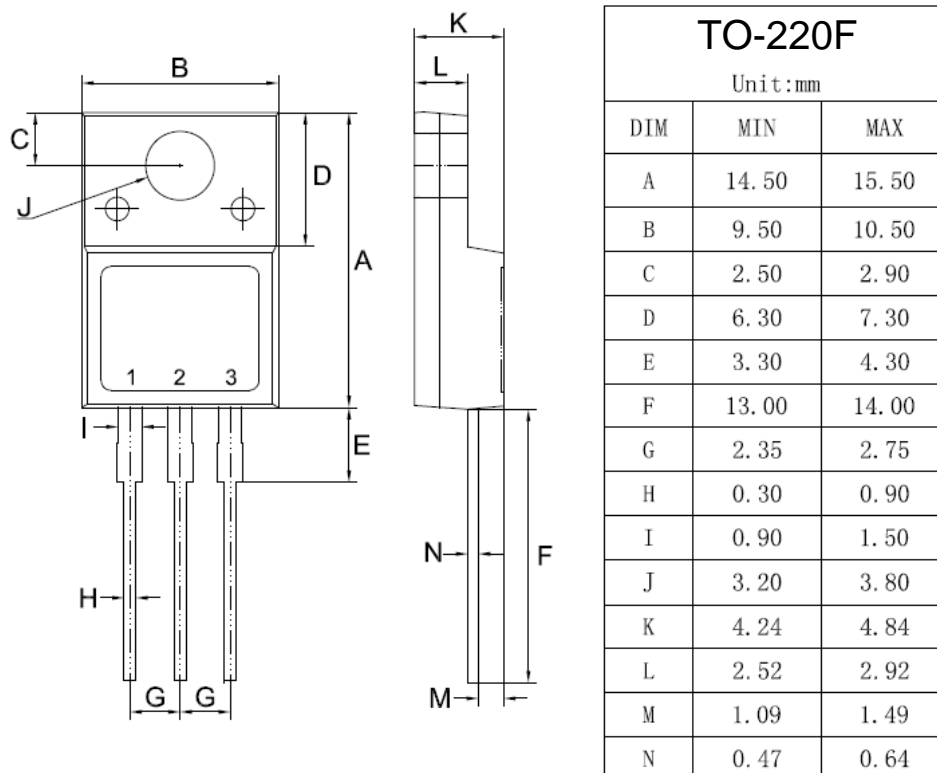
PACKAGE OUTLINE & DIMENSIONS

YS12N65

TO-220 Mechanical Drawing



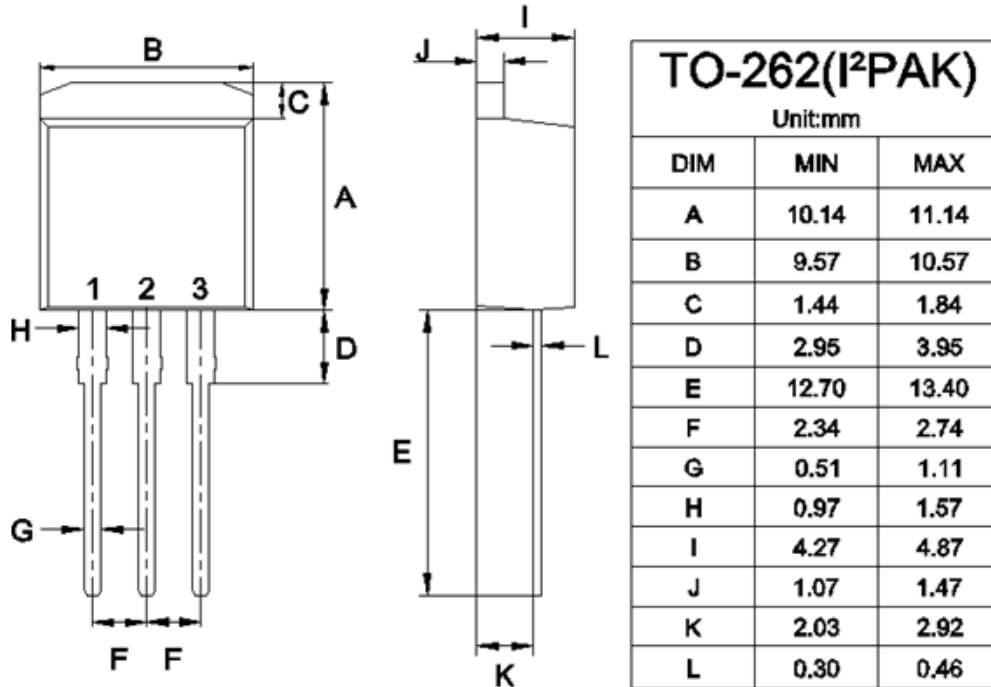
TO-220F Mechanical Drawing



PACKAGE OUTLINE & DIMENSIONS

YS12N65

TO-262 Mechanical Drawing



TO-263 Mechanical Drawing

