



5N50

500V N-Channel Power MOSFET

Features

- $R_{DS(ON)} < 1.5\Omega$ @ $V_{GS}=10V, I_D=2.5A$
- Fast switching capability
- Lead free in compliance with EU RoHS directive.
- Green molding compound

Mechanical Data

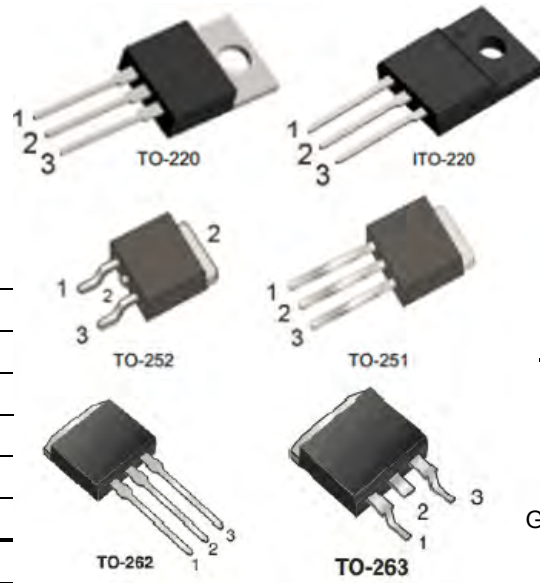
- Case: TO-251, TO-252, TO-220, ITO-220
TO-262, TO-263 Package

Ordering Information

Part No.	Package	Packing
DMP5N50-TU	TO-251	75pcs / Tube
DMD5N50-TR	TO-252	2.5Kpcs / 13" Reel
DMD5N50-TU	TO-252	75pcs / Tube
DMT5N50-TU	TO-220	50pcs / Tube
DMF5N50-TU	ITO-220	50pcs / Tube
DMK5N50-TU	TO-262	50pcs / Tube
DMG5N50-TU	TO-263	50pcs / Tube
DMG5N50-TR	TO-263	800pcs / 13" Reel

PRODUCT SUMMARY

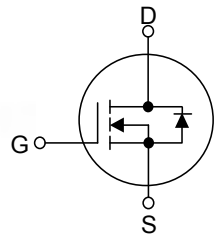
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
500	1.5 @ $V_{GS}=10V$	5



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}	500	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current		I_D	5.0	A
Pulsed Drain Current (Note 2)		I_{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	250	mJ
Power Dissipation	TO-220/TO-262/TO-263	P_D	106	W
	ITO-220		38	W
	TO-251/TO-252		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. $L = 10mH$, $I_{AS} = 7.1A$, $V_{DD} = 50V$, $R_G = 2.4\Omega$, Starting $T_J = 25^\circ C$



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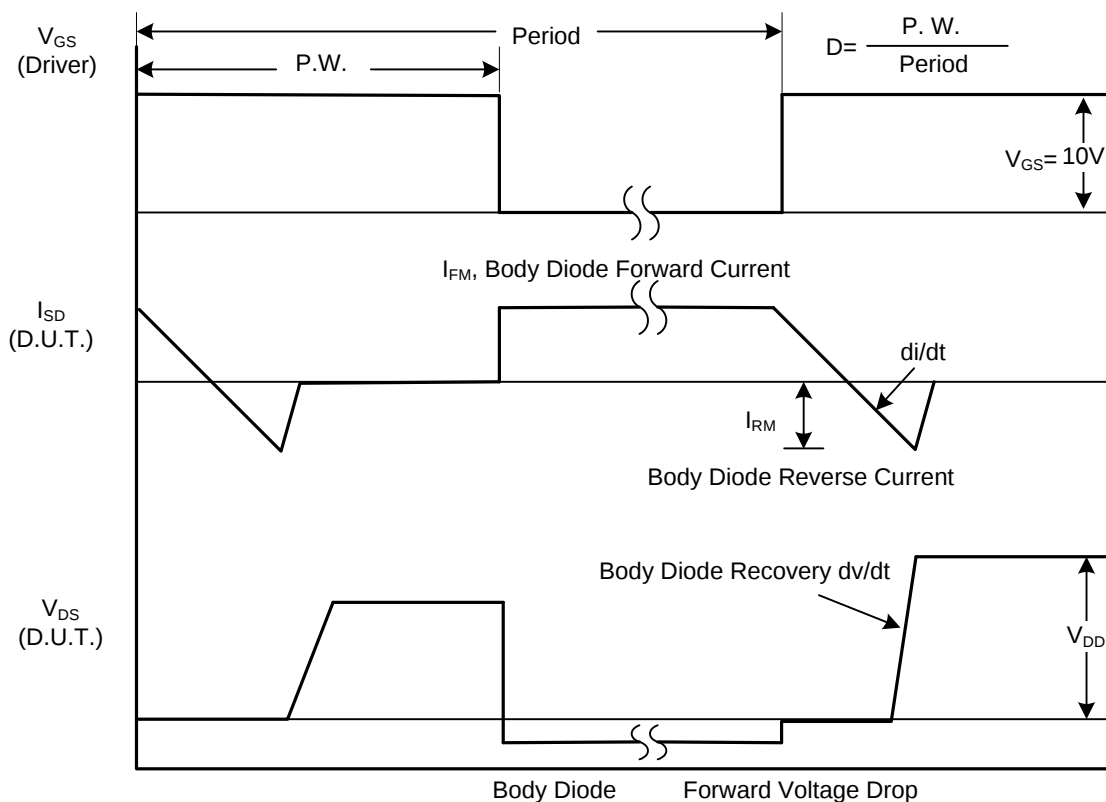
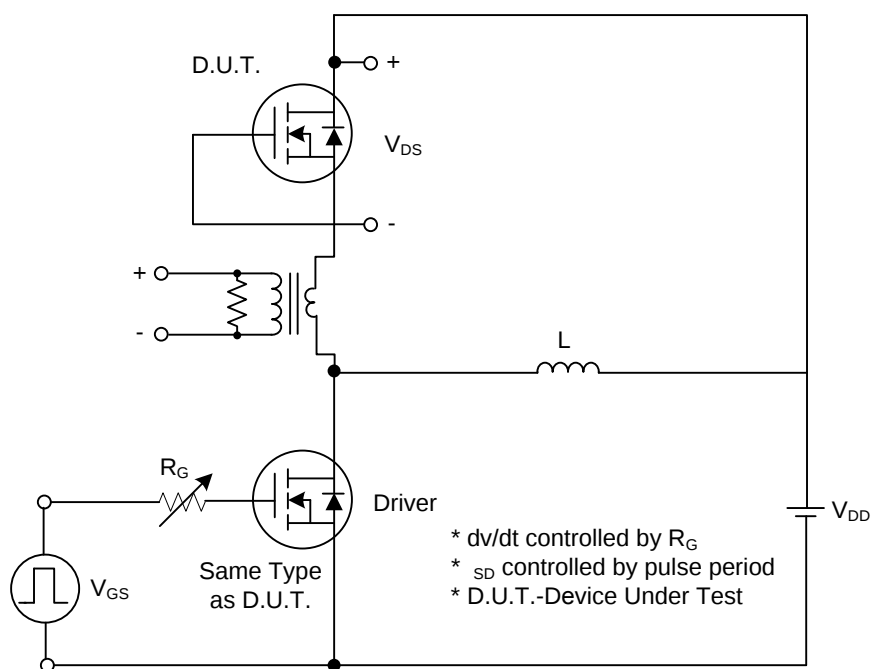
THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/ITO-220	θ_{JA}	62.5	$^{\circ}\text{C/W}$
	TO-262/TO-263			
	TO-251/ TO-252		110	
Junction to Case	TO-220/ITO-220	θ_{JC}	2.35	$^{\circ}\text{C/W}$
	TO-262/TO-263			
	ITO-220		5.5	
	TO-251/ TO-252		2.9	

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

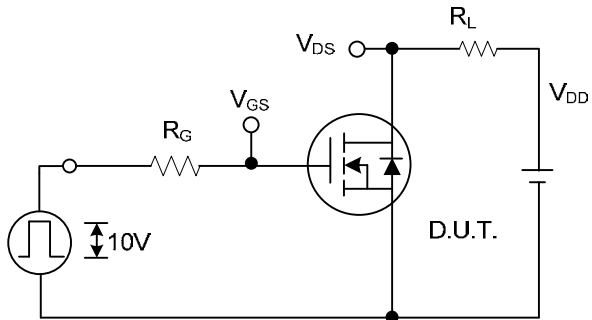
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	600			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 500V, V _{GS} = 0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} = 30V, V _{DS} = 0V			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 = 250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V,I _D = 2.5A			1.5	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		584		pF
Output Capacitance		C _{OSS}			80		pF
Reverse Transfer Capacitance		C _{RSS}			30		pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _G =25Ω (Note 1, 2)		30		ns
Turn-On Rise Time		t _R			50		ns
Turn-Off Delay Time		t _{D(OFF)}			145		ns
Turn-Off Fall Time		t _F			70		ns
Total Gate Charge		Q _G	V _{GS} = 10V,I _D = 1.3A, V _{GS} = 50V (Note 1, 2)		20		nC
Gate-Source Charge		Q _{GS}			4		nC
Gate-Drain Charge		Q _{GD}			5		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V,I _S =5A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I _S				5	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				20	A

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

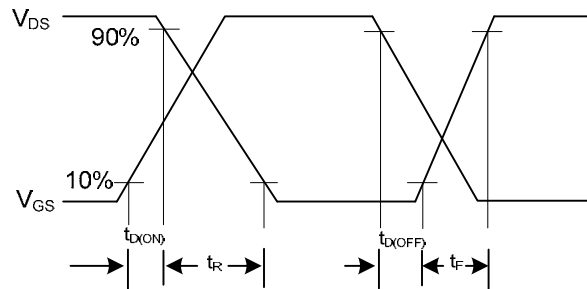




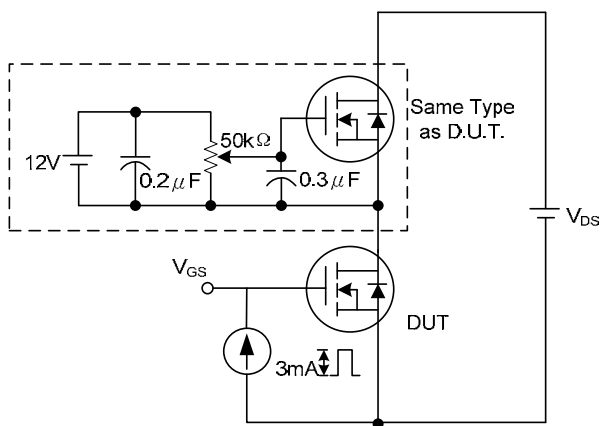
TEST CIRCUITS AND WAVEFORMS(Cont.)



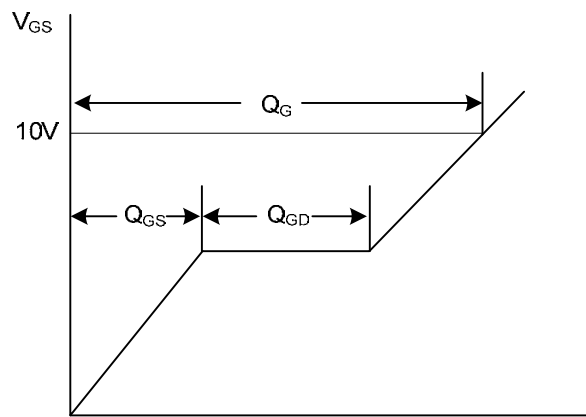
Switching Test Circuit



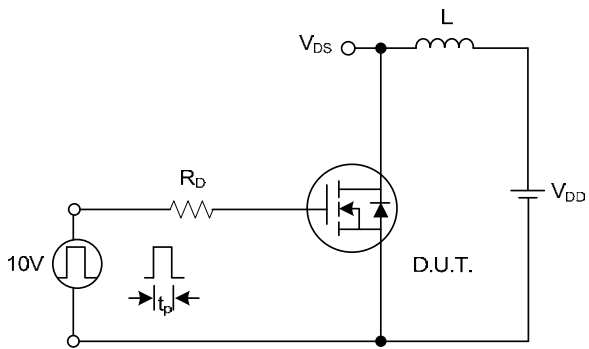
Switching Waveforms



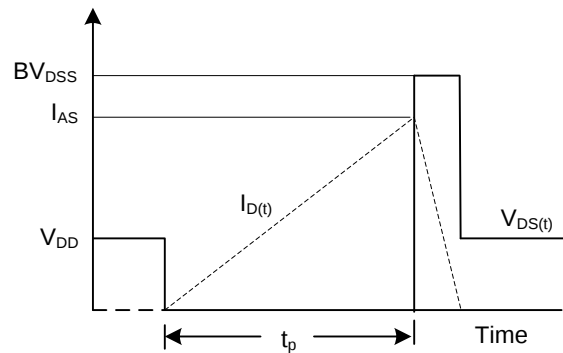
Gate Charge Test Circuit



Gate Charge Waveform



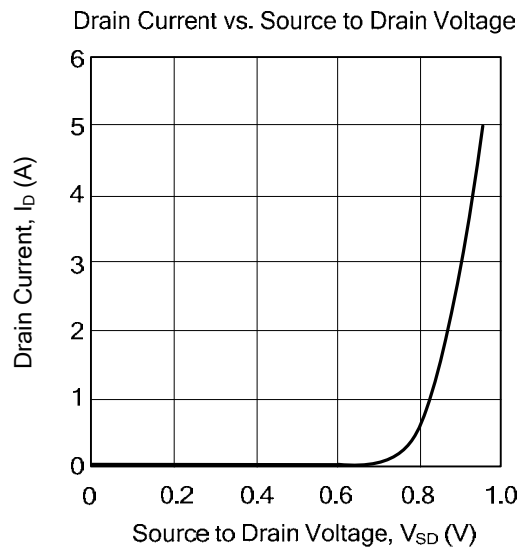
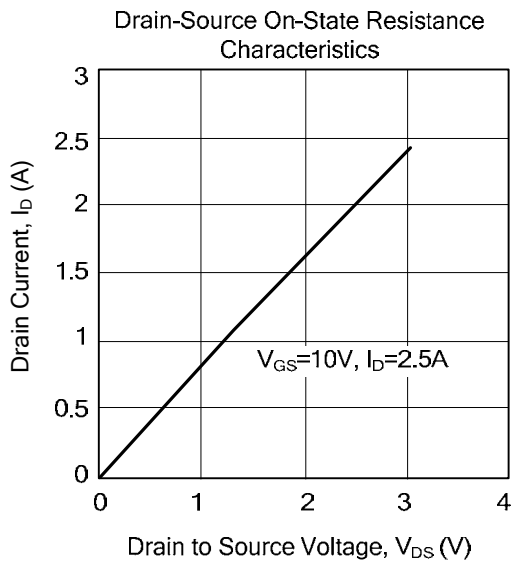
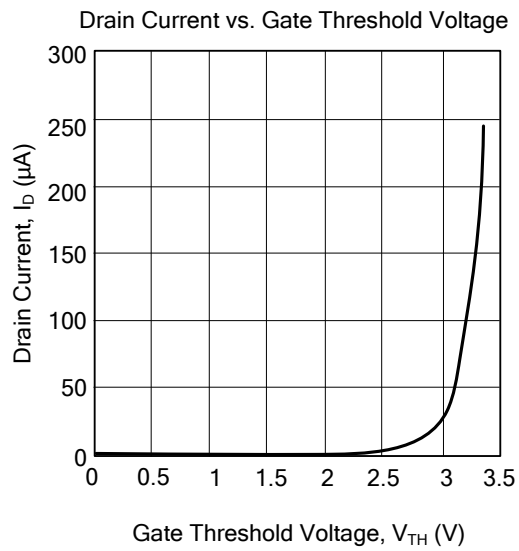
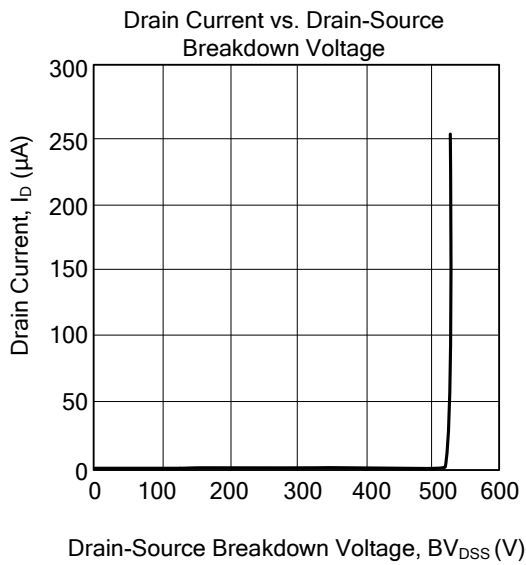
Unclamped Inductive Switching Test Circuit

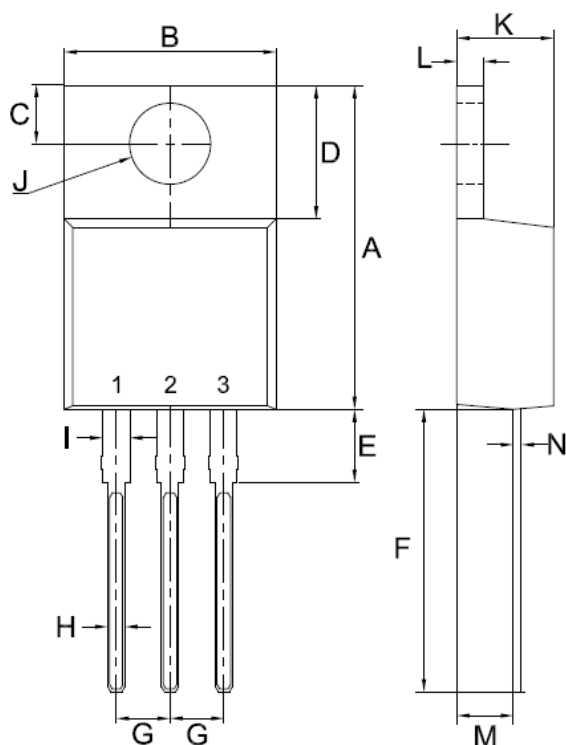


Unclamped Inductive Switching Waveforms

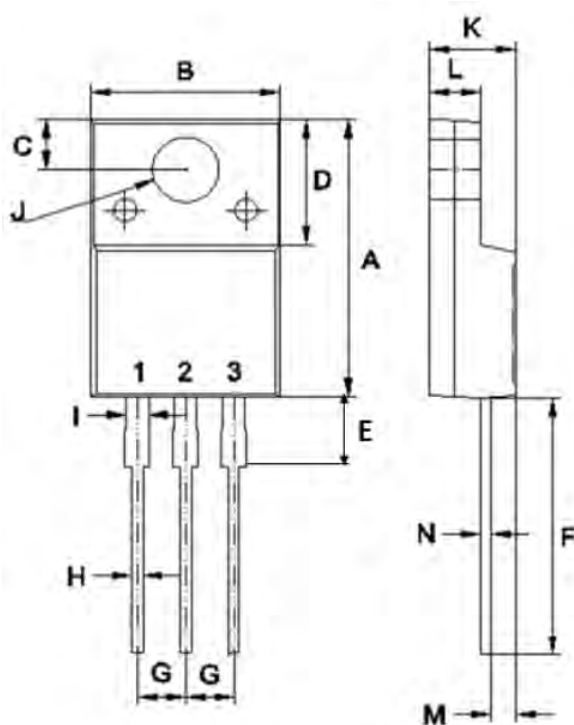


TYPICAL CHARACTERISTICS



**TO-220 Mechanical Drawing**

TO-220AB		
Unit:mm		
DIM	MIN	MAX
A	14.80	15.80
B	9.57	10.57
C	2.54	2.94
D	5.80	6.80
E	2.95	3.95
F	12.70	13.40
G	2.34	2.74
H	0.51	1.11
I	0.97	1.57
J	3.54 ϕ	4.14 ϕ
K	4.27	4.87
L	1.07	1.47
M	2.03	2.92
N	0.30	0.64

ITO-220 Mechanical Drawing

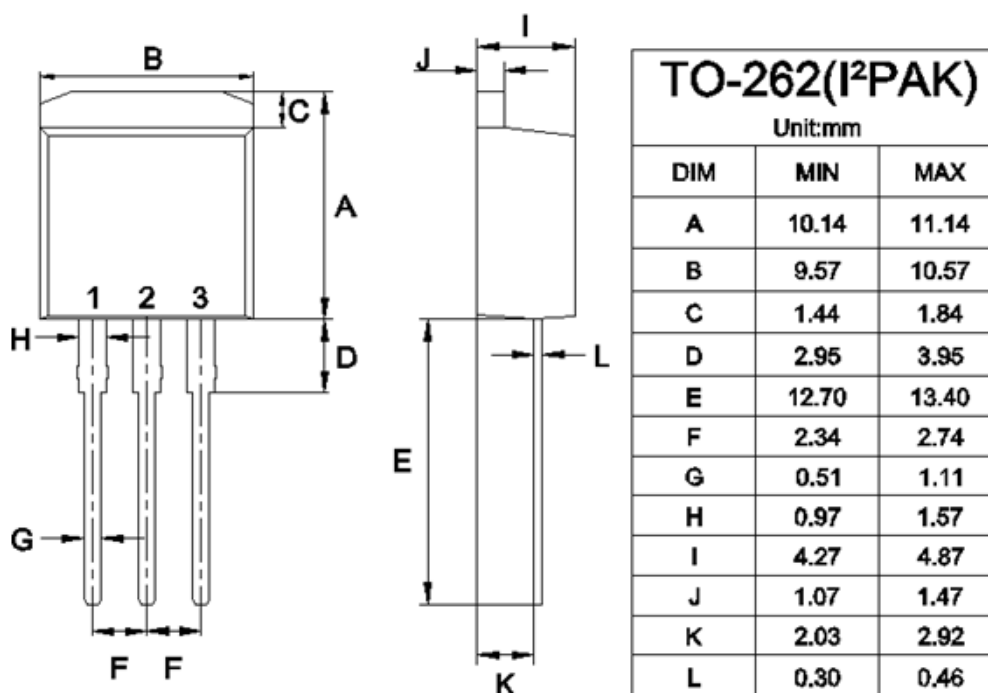
ITO-220AB Unit:mm		
DIM	MIN	MAX
A	14.50	15.50
B	9.50	10.50
C	2.50	2.90
D	6.30	7.30
E	3.30	4.30
F	13.00	14.00
G	2.35	2.75
H	0.30	0.90
I	0.90	1.50
J	3.20	3.80
K	4.24	4.84
L	2.52	2.92
M	1.09	1.49
N	0.47	0.64



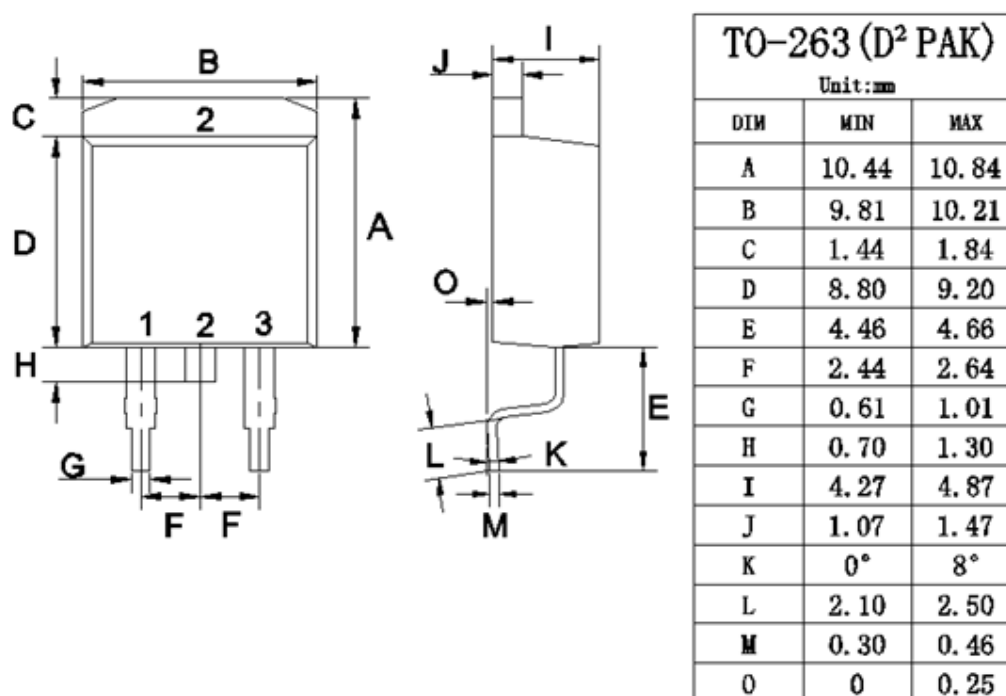
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TO-262 Mechanical Drawing



TO-263 Mechanical Drawing

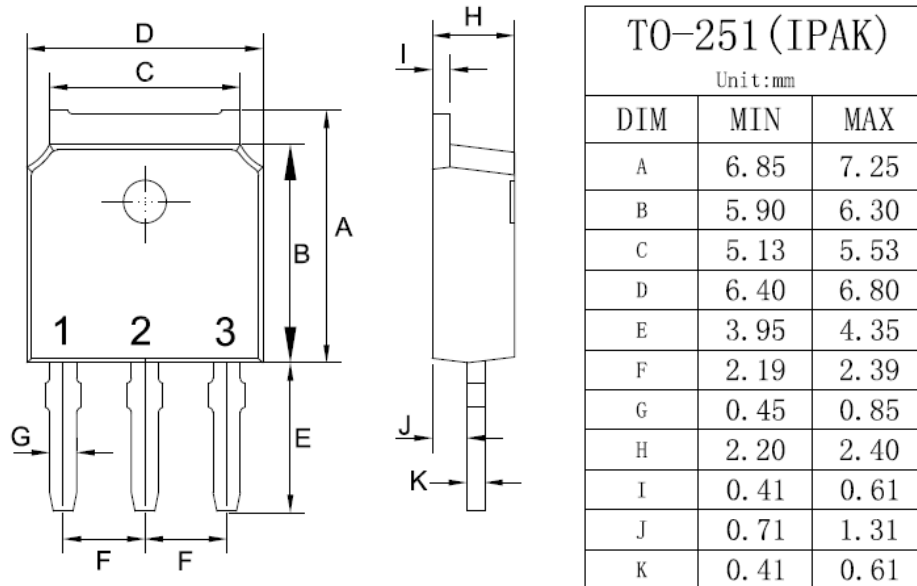




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TO-251 Mechanical Drawing



TO-252 Mechanical Drawing

