



5N65

650V N-Channel Power MOSFET

Features

- $R_{DS(ON)} < 2.4\Omega$ @ $V_{GS} = 10V$, $I_D = 2.5A$
- Fast switching capability
- Lead free in compliance with EU RoHS directive.
- Green molding compound

PRODUCT SUMMARY

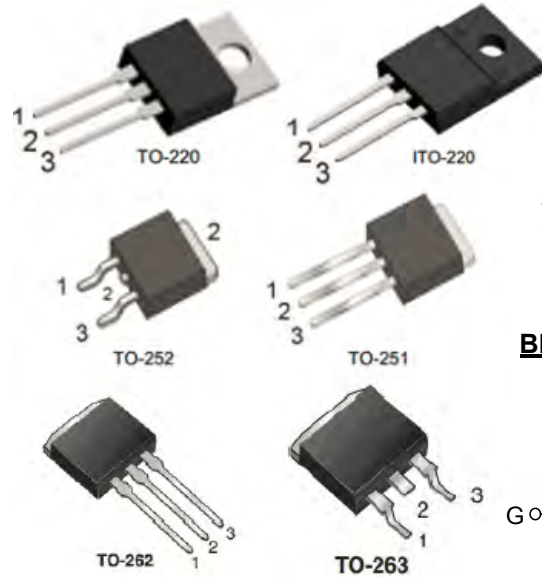
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
650	2.4 @ $V_{GS} = 10V$	5

Mechanical Data

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

Ordering Information

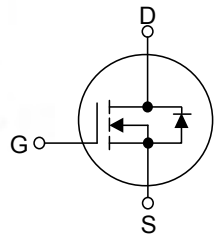
Part No.	Package	Packing
DMP5N65-TU	TO-251	75pcs / Tube
DMD5N65-TR	TO-252	2.5Kpcs / 13" Reel
DMD5N65-TU	TO-252	75pcs / Tube
DMT5N65-TU	TO-220	50pcs / Tube
DMF5N65-TU	ITO-220	50pcs / Tube
DMK5N65-TU	TO-262	50pcs / Tube
DMG5N65-TU	TO-263	50pcs / Tube
DMG5N65-TR	TO-263	800pcs / 13" Reel



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}	± 30	V
Avalanche Current (Note 2)		I_{AR}	5	A
Continuous Drain Current		I_D	5	A
Pulsed Drain Current (Note 2)		I_{DM}	20	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	210	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220, TO-262, TO-263	P_D	100	W
	ITO-220		36	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. $L = 16.8mH$, $I_{AS} = 5A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$

4. $I_{SD} \leq 5A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$



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THERMAL DATA

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

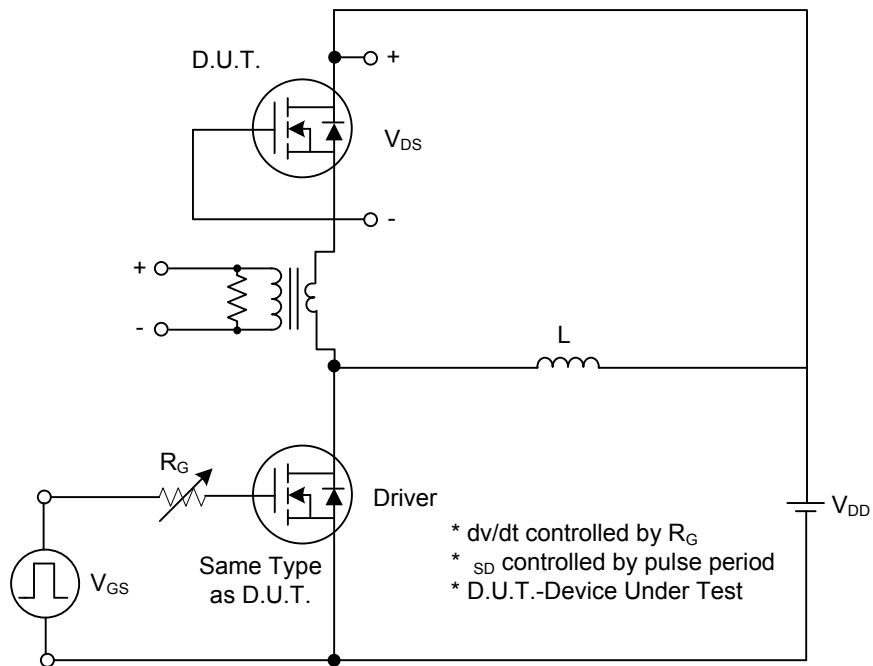
ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 650V, 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
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA,Referenced to 25°C		0.6		V/°C
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		2.0	2.4	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		515	670	pF
Output Capacitance		C _{OSS}			55	72	pF
Reverse Transfer Capacitance		C _{RSS}			6.5	8.5	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{DD} = 325V, I _D =5A, R _G = 25Ω (Note 1, 2)		10	30	ns
Turn-On Rise Time		t _R			42	90	ns
Turn-Off Delay Time		t _{D(OFF)}			38	85	ns
Turn-Off Fall Time		t _F			46	100	ns
Total Gate Charge		Q _G	V _{DS} = 520V,I _D = 5.0A, V _{GS} = 10V (Note 1, 2)		15	19	nC
Gate-Source Charge		Q _{GS}			2.5		nC
Gate-Drain Charge		Q _{GD}			6.6		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0 V, 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
Reverse Recovery Time		t _{rr}	V _{GS} = 0 V, I _S = 5A,		300		ns
Reverse Recovery Charge		Q _{RR}	dl _F /dt = 100 A/ μs (Note 1)		2.2		μC

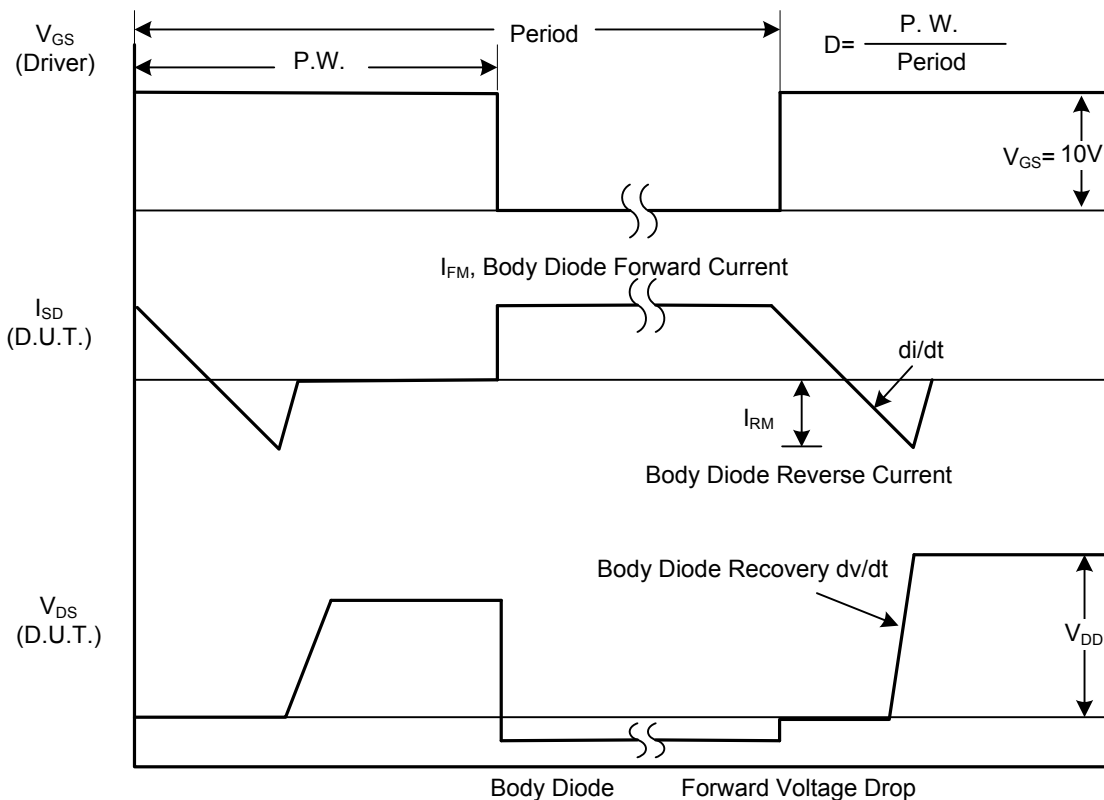
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature



TEST CIRCUITS AND WAVEFORMS



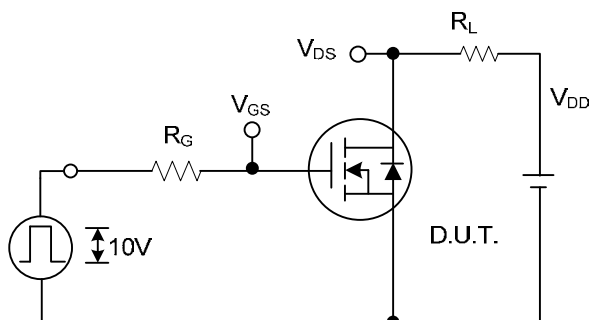
Peak Diode Recovery dv/dt Test Circuit



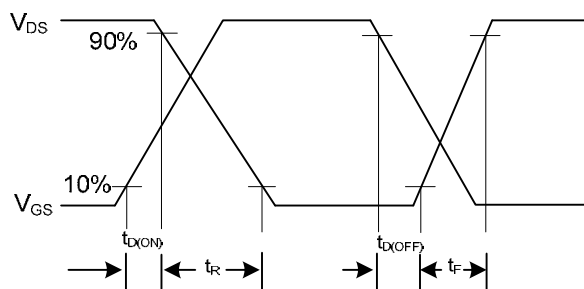
Peak Diode Recovery dv/dt Waveforms



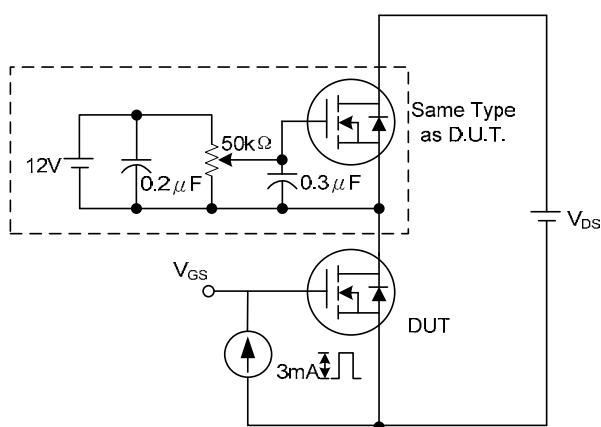
TEST CIRCUITS AND WAVEFORMS(Cont.)



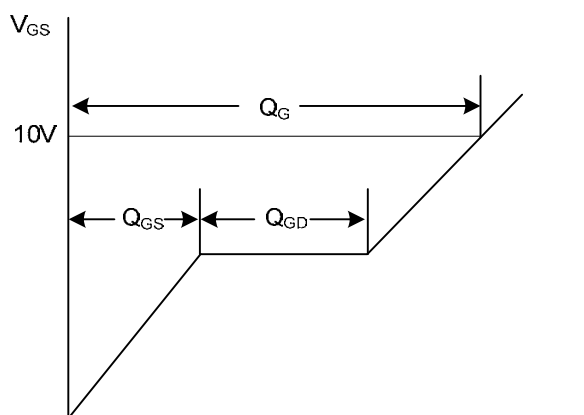
Switching Test Circuit



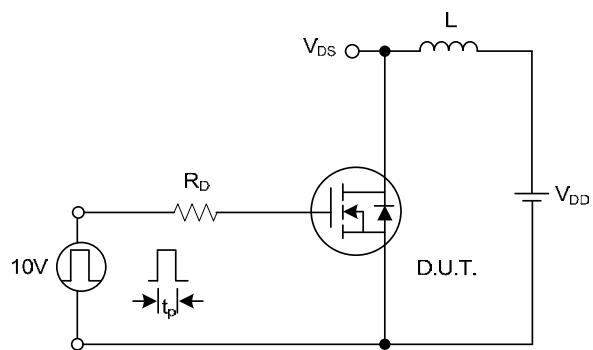
Switching Waveforms



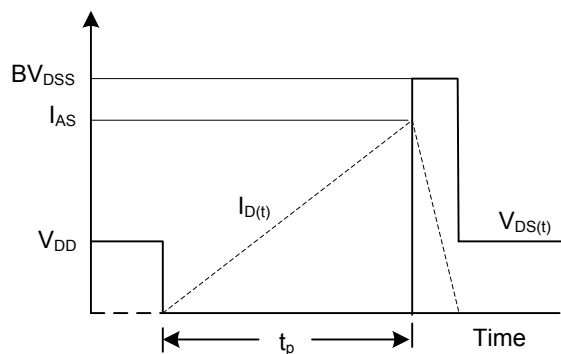
Gate Charge Test Circuit



Gate Charge Waveform



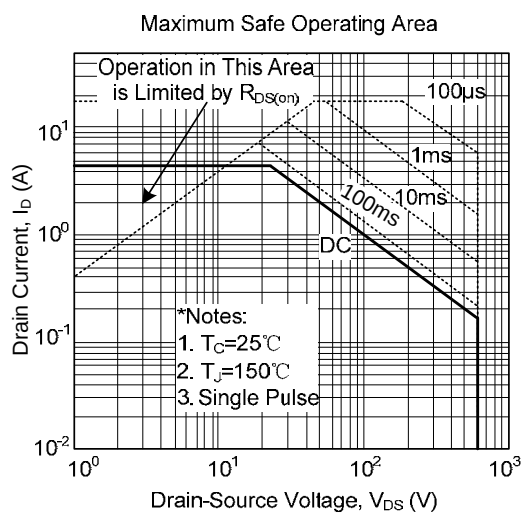
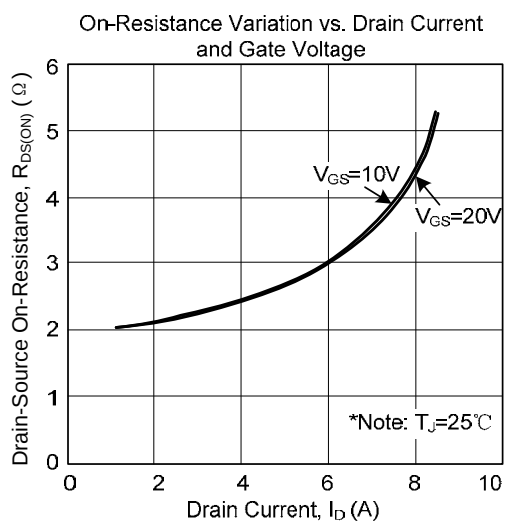
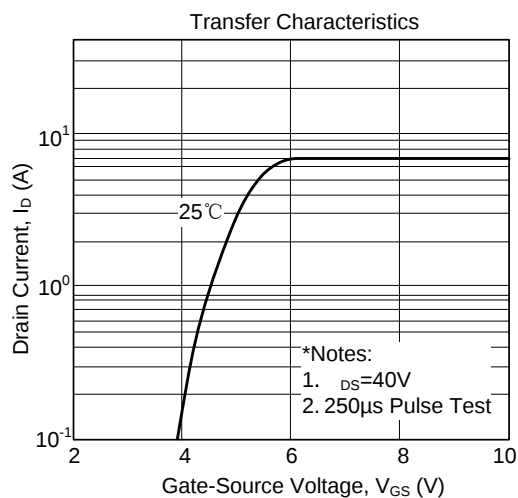
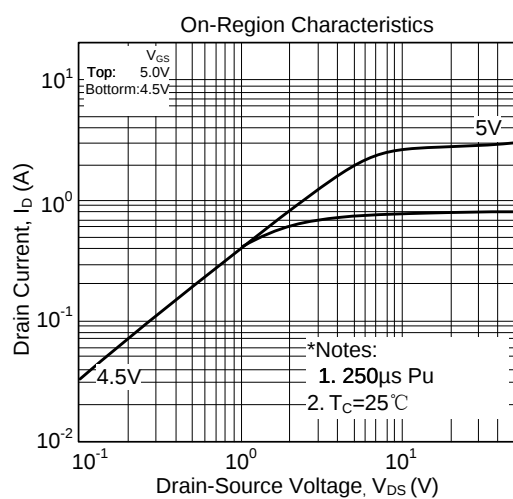
Unclamped Inductive Switching Test Circuit

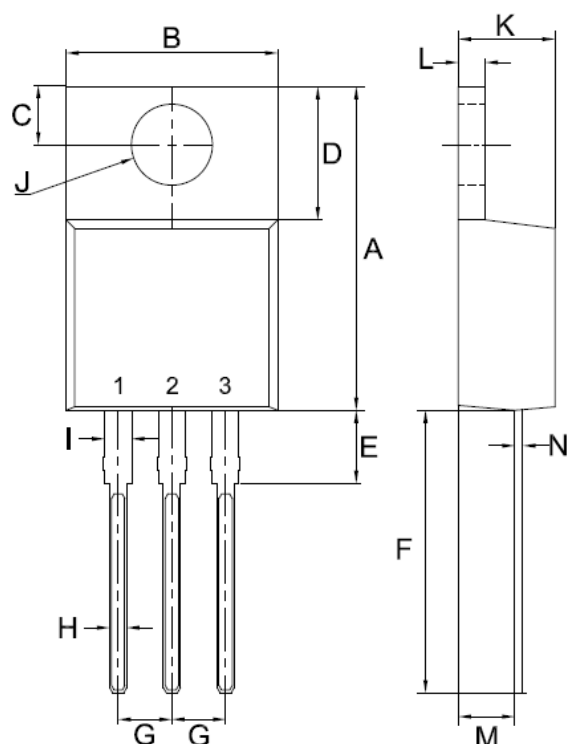


Unclamped Inductive Switching Waveforms

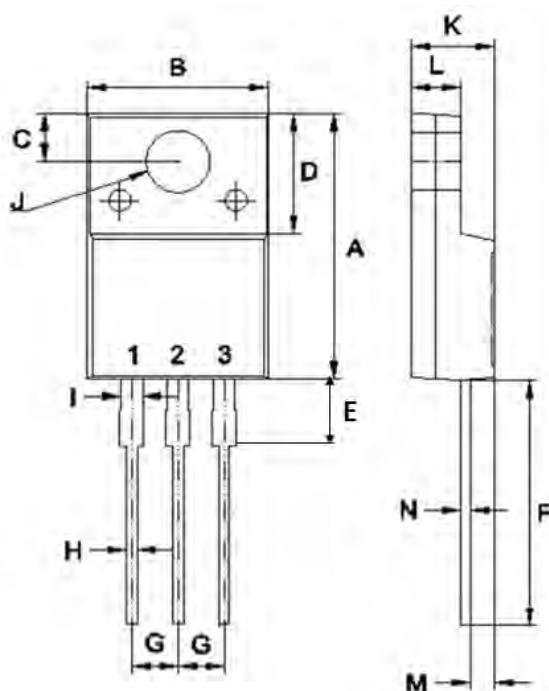


TYPICAL CHARACTERISTICS



**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

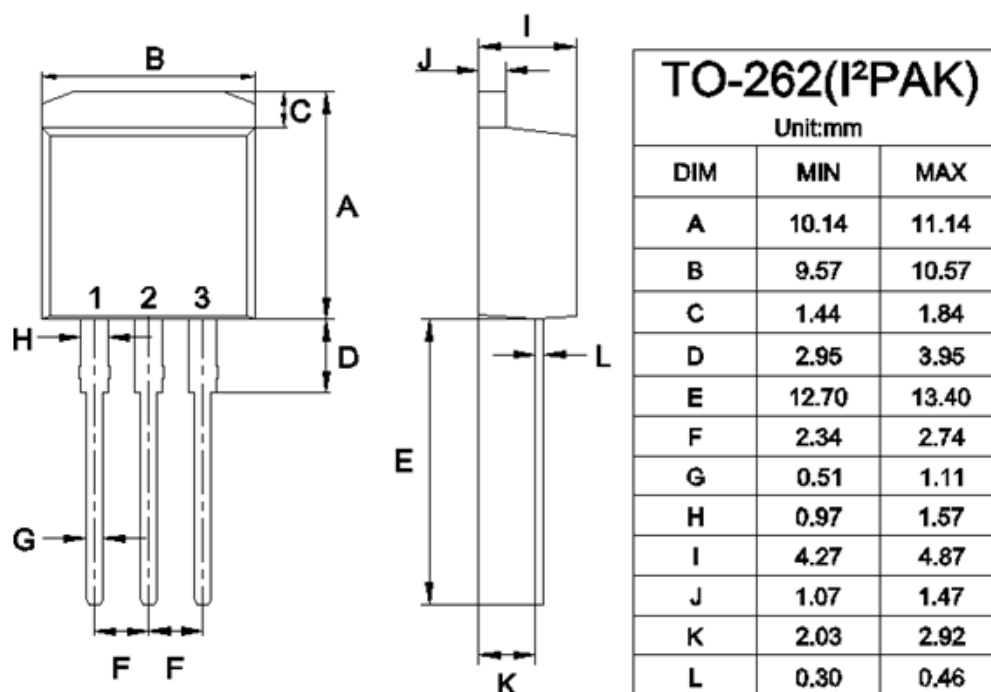
ITO-220AB		
Unit:mm		
DIM	MIN	MAX
A	14.50	15.50
B	9.50	10.50
C	2.50	2.90
D	6.30	7.30
E	3.30	4.30
F	13.00	14.00
G	2.35	2.75
H	0.30	0.90
I	0.90	1.50
J	3.20	3.80
K	4.24	4.84
L	2.52	2.92
M	1.09	1.49
N	0.47	0.64



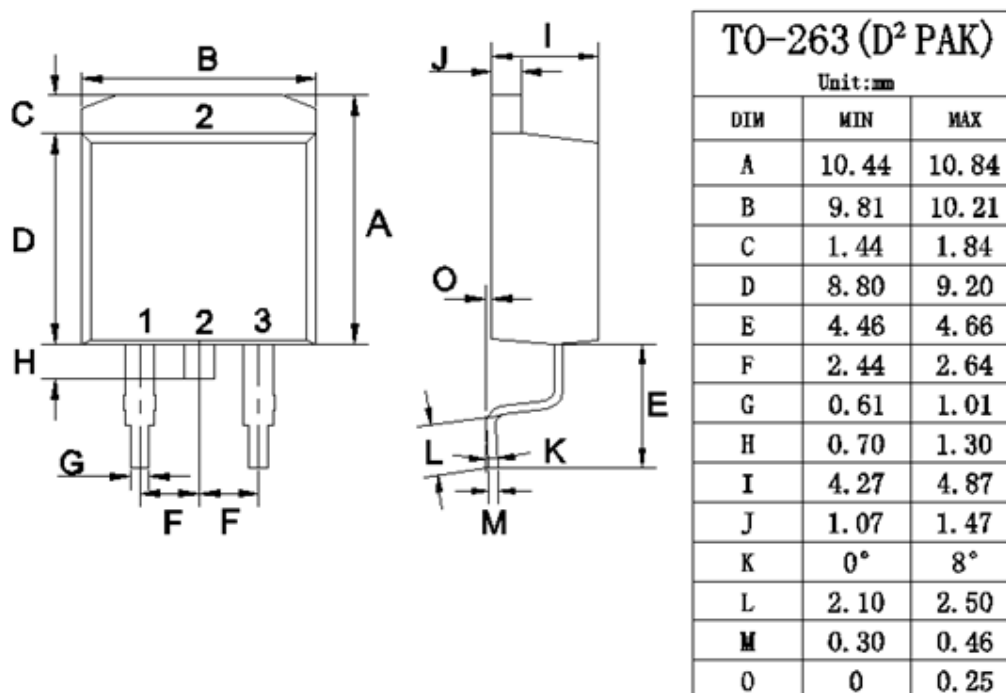
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TO-262 Mechanical Drawing

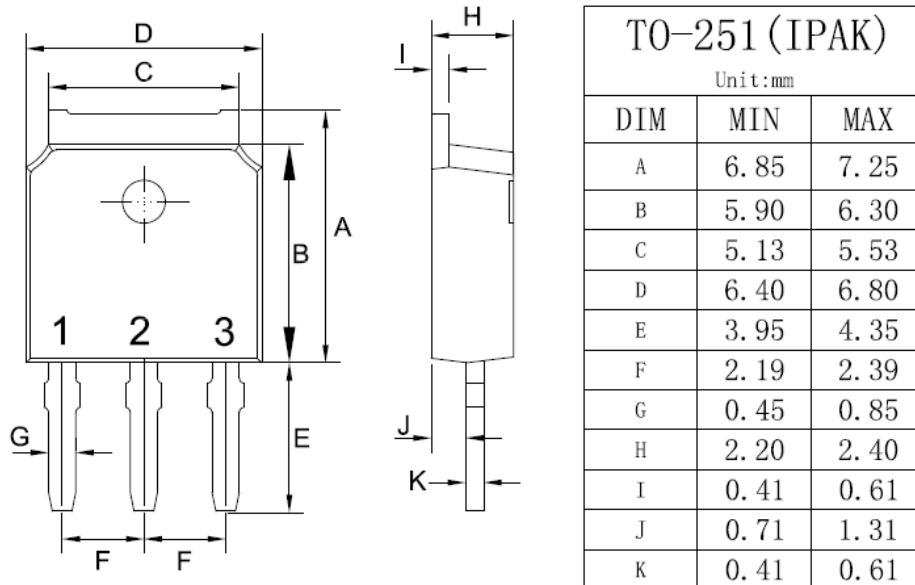


TO-263 Mechanical Drawing





TO-251 Mechanical Drawing



TO-252 Mechanical Drawing

