



6N65

650V N-Channel Power MOSFET

Features

- $R_{DS(ON)} < 1.7\Omega$ @ $V_{GS} = 10V$
- Fast switching capability
- Lead free in compliance with EU RoHS directive.
- Green molding compound

Mechanical Data

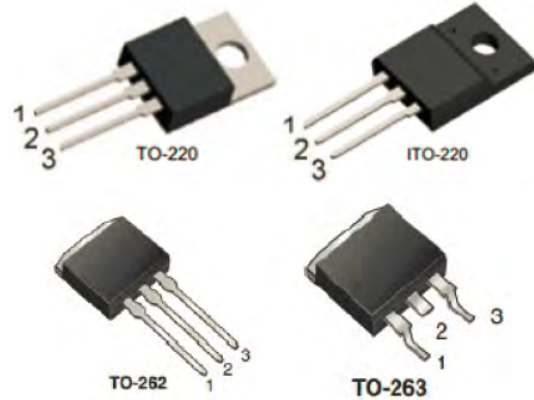
- Case: TO-220, ITO-220, TO-262, TO-263 Package

Ordering Information

Part No.	Package	Packing
DMT6N65-TU	TO-220	50pcs / Tube
DMF6N65-TU	ITO-220	50pcs / Tube
DMK6N65-TU	TO-262	50pcs / Tube
DMG6N65-TU	TO-263	50pcs / Tube
DMG6N65-TR	TO-263	800pcs / 13" Reel

PRODUCT SUMMARY

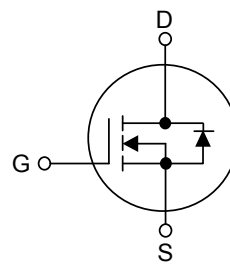
V_{DS} (V)	Current (A)	$R_{DS(on)}$ (Ω)
650	6	1.7 @ $V_{GS} = 10V$



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
Continuous Drain Current		I_D	6.0	A
Pulsed Drain Current (Note 2)		I_{DM}	24.8	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	440	mJ
	TO-220/TO-262/TO-263	P_D	125	W
Power Dissipation	ITO-220		45	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. $L = 24mH$, $I_{AS} = 6A$, $V_{DD} = 90V$, $R_G = 25\Omega$, Starting $T_J = 25^\circ C$



6N65

650V N-Channel Power MOSFET

THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/ITO-220 TO-262/TO-263	θ_{JA}	62.5	°C/W
Junction to Case	TO-220 TO-262/TO-263	θ_{JC}	3.1	
	ITO-220		3.5	

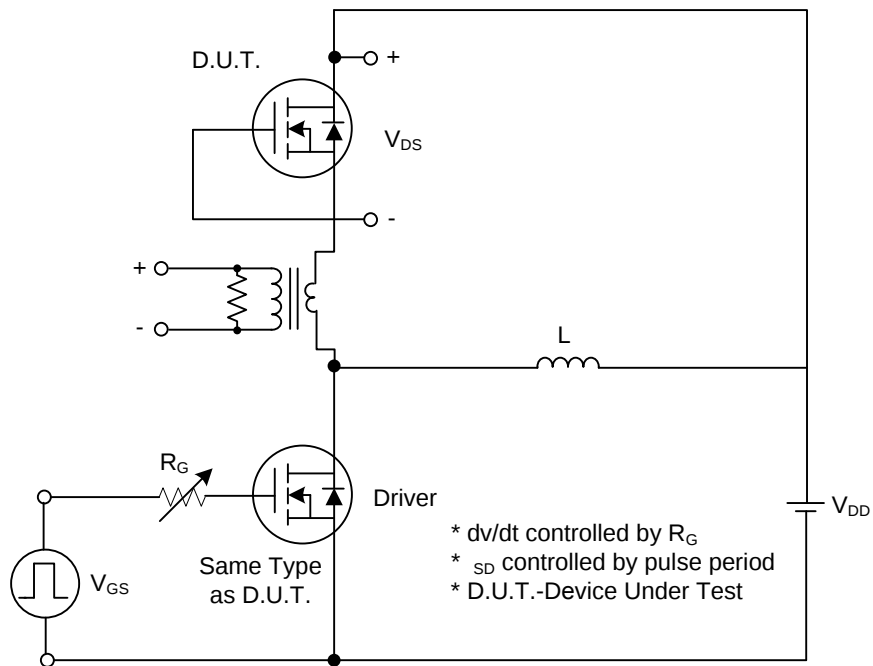
ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

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			10	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} = 10 V, I _D = 3.1A		1.1	1.7	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} = 25V, V _{GS} = 0V, f = 1MHz		950		pF
Output Capacitance		C _{OSS}			95		pF
Reverse Transfer Capacitance		C _{RSS}			20		pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{DD} = 325V, I _D =6.2A, R _G = 25Ω (Note 1, 2)		45		ns
Turn-On Rise Time		t _R			100		ns
Turn-Off Delay Time		t _{D(OFF)}			300		ns
Turn-Off Fall Time		t _F			220		ns
Total Gate Charge		Q _G	V _{DS} = 520V,I _D = 6.2A, V _{GS} = 10V (Note 1, 2)		180		nC
Gate-Source Charge		Q _{GS}			8		nC
Gate-Drain Charge		Q _{GD}			20		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0V, I _S = 6A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I _S				6.0	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				24.8	A
Reverse Recovery Time		t _{rr}	V _{GS} = 0 V, I _S = 6.2A,		260		ns
Reverse Recovery Charge		Q _{RR}	dl _F /dt = 100 A/ μs (Note 1)		2.5		μC

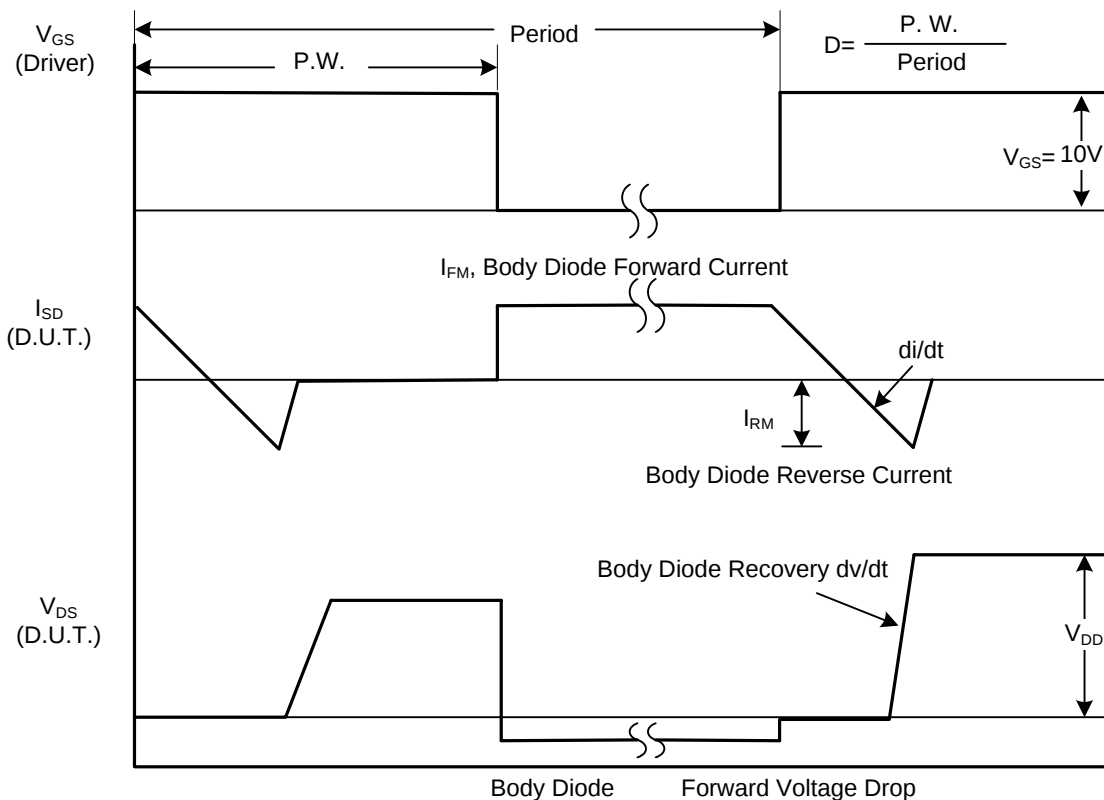
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature



TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit



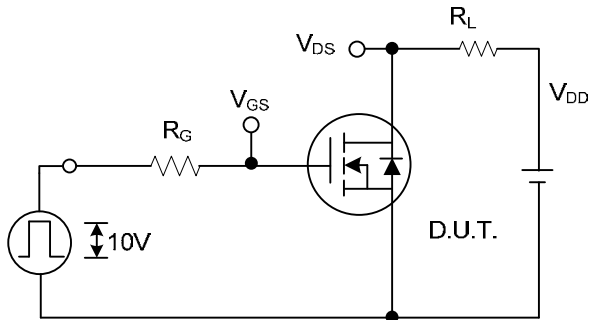
Peak Diode Recovery dv/dt Waveforms



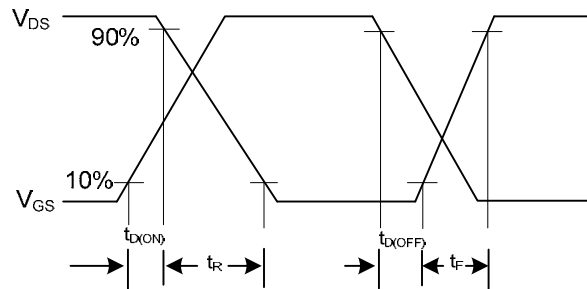
6N65

650V N-Channel Power MOSFET

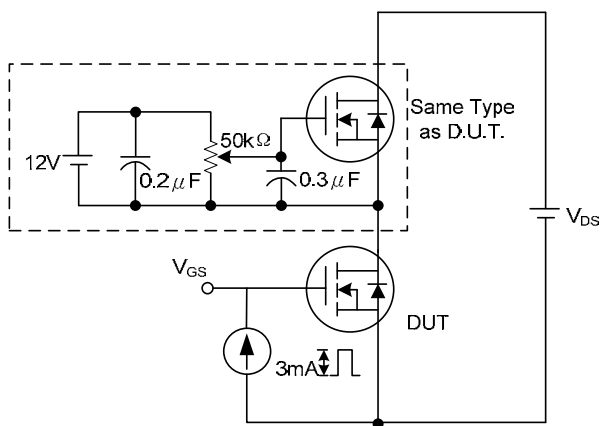
TEST CIRCUITS AND WAVEFORMS(Cont.)



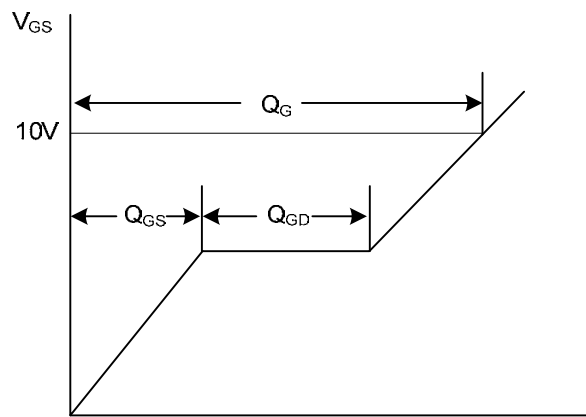
Switching Test Circuit



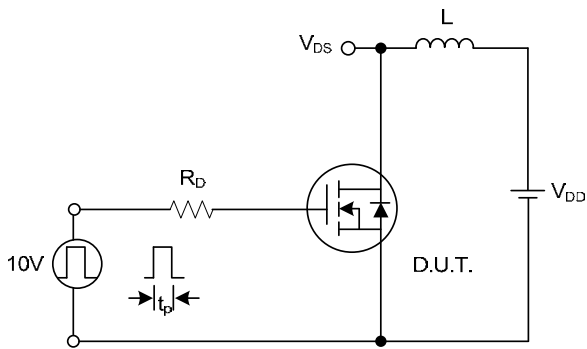
Switching Waveforms



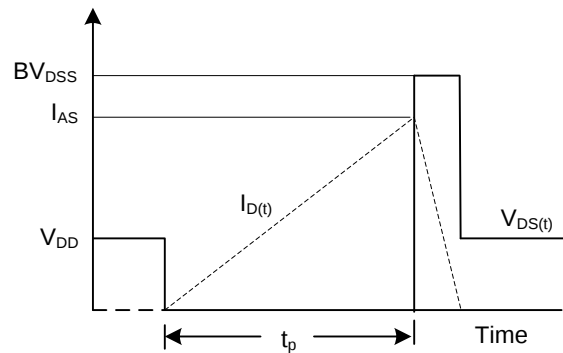
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



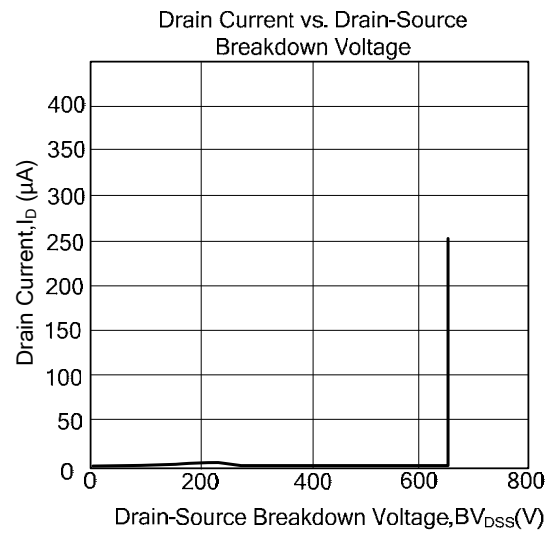
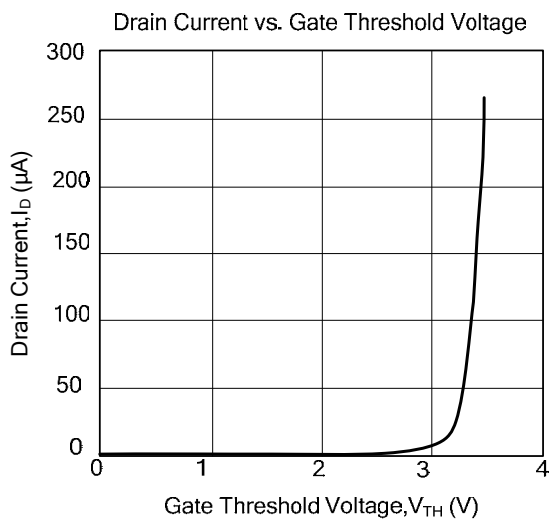
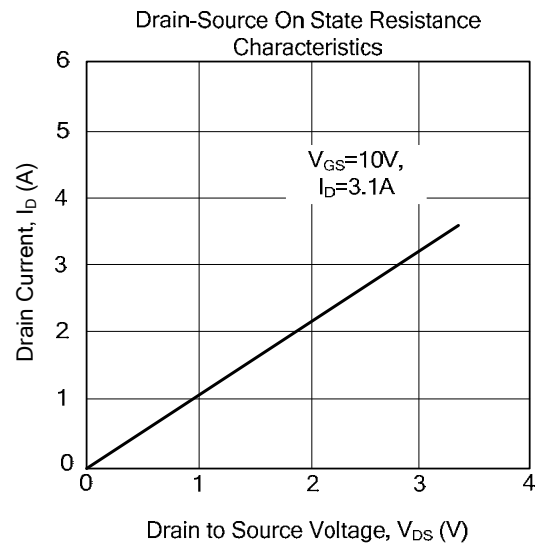
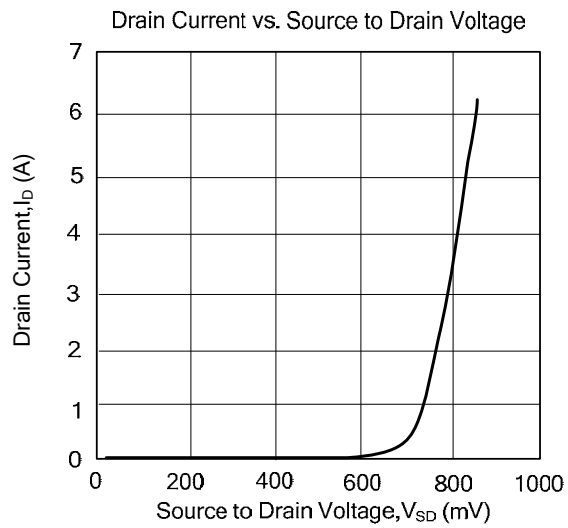
Unclamped Inductive Switching Waveforms

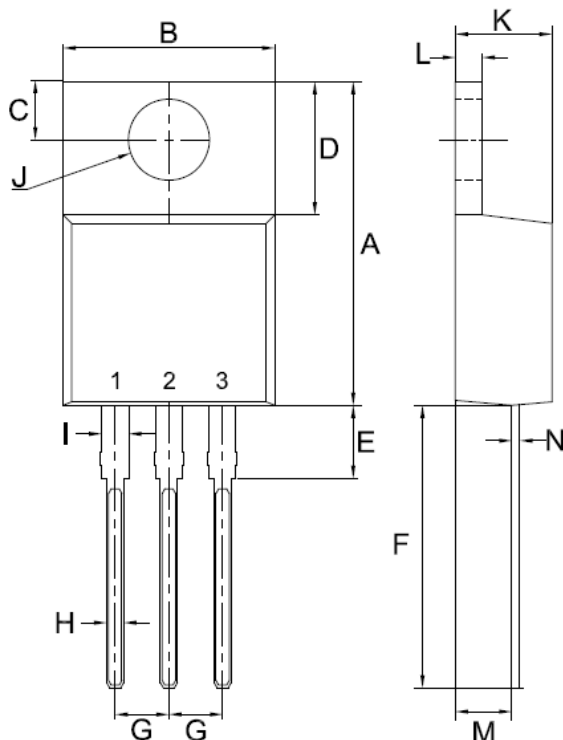


6N65

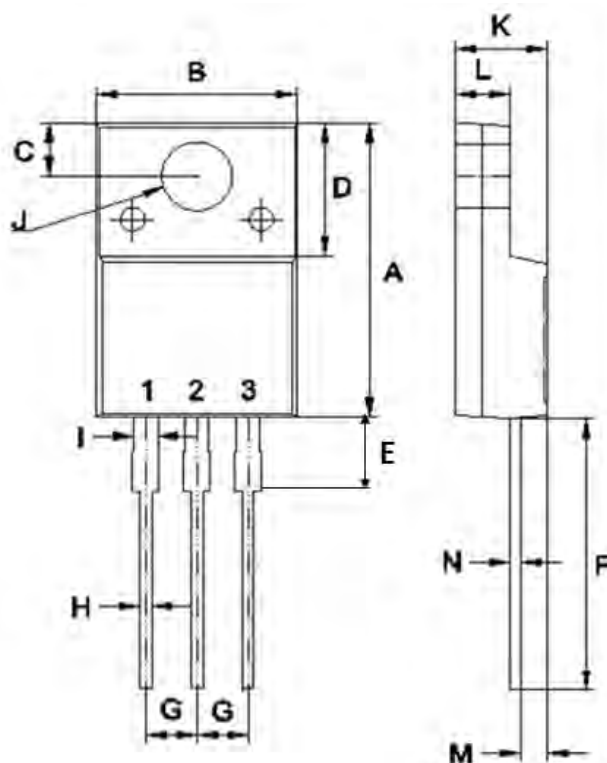
650V N-Channel Power MOSFET

TYPICAL CHARACTERISTICS



**TO-220 Mechanical Drawing**

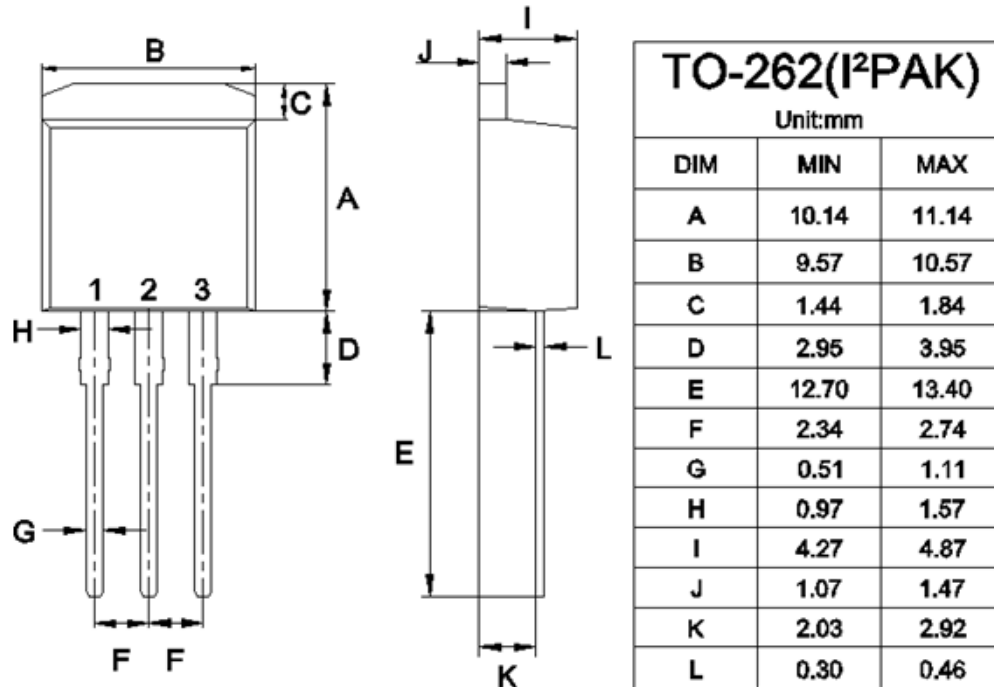
TO-220AB		
Unit:mm		
DIM	MIN	MAX
A	14.80	15.80
B	9.57	10.57
C	2.54	2.94
D	5.80	6.80
E	2.95	3.95
F	12.70	13.40
G	2.34	2.74
H	0.51	1.11
I	0.97	1.57
J	3.54 ϕ	4.14 ϕ
K	4.27	4.87
L	1.07	1.47
M	2.03	2.92
N	0.30	0.64

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



TO-262 Mechanical Drawing



TO-263 Mechanical Drawing

