



HY10N65

N-CHANNEL POWER MOSFET

10A, 650V N-CHANNEL POWER MOSFET

DESCRIPTION

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

FEATURES

- *High Current Rating
- *Low Gate Charge
- *Lower RDS(on)
- *Low Reverse Transfer Capacitance
- *Fast Switching Capability Tighter VSD Specifications
- *Avalanche Energy Specified

MARKING

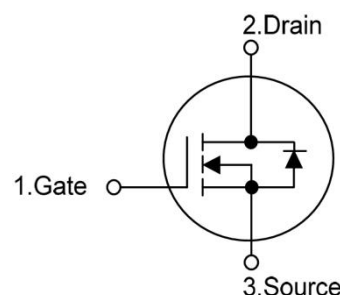


HY LOGO

HY10N65A=Device Code

XXXX=Date Code

Solid Dot=Green molding compound



ABSOLUTE MAXIMUM RATINGS(TA=25°C, unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	VDSS	650	V
Gate-Source Voltage	VGSS	±30	V
Continuous Drain Current (Note 1)	ID	10	A
Pulsed Drain Current (Note 2)	IDM	40	A
Single Pulsed Avalanche Energy (Note 3)	EAS	380	mJ
Power Dissipation (Note 1)	PD	50	W
Junction Temperature	TJ	+150	°C
Storage Temperature	TSTG	-55 ~ +150	°C
Thermal Resistance from Junction to Ambient (Note 6)	RθJA	62.5	°C/W
Thermal Resistance from Junction to Case (Note 1)	RθJC	2.5	°C/W

Notes: 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.



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

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BVDSS	VGS=0V, ID=250μA	650			V
Zero gate voltage drain current		IDSS	VDS=650V, VGS=0V			1	μA
Gate- Source Leakage Current	Forward	IGSS	VGS=30V, VDS=0V			100	nA
	Reverse		VGS=-30V, VDS=0V			-100	nA
ON CHARACTERISTICS (Note 4)							
Gate Threshold Voltage		VGS(TH)	VDS=VGS , ID=250μA	2.0	3.0	4.0	V
Static Drain-Source On-State Resistance		RDS(ON)	VGS=10V, ID=5A		0.75	1	Ω
DYNAMIC CHARACTERISTICS (Note 4,5)							
Input Capacitance		CISS	VDS=25V,VGS=0V f= 1.0MHz		1570	2040	pF
Output Capacitance		COSS			166	215	pF
Reverse Transfer Capacitance		CRSS			18	24	pF
SWITCHING CHARACTERISTICS (Note 4,5)							
Total Gate Charge (Note 1)		QG	VDS=520V, VGS= 10V ID=10A		44	57	nC
Gate-Source Charge		QGS			6.7		nC
Gate-Drain Charge		QGD			18.5		nC
Turn-On Delay Time (Note 1)		tD(ON)	VDD= 325V, ID=10A, RG=25Ω,VGS= 10V		23	55	ns
Turn-On Rise Time		tR			69	150	ns
Turn-Off Delay Time		tD(OFF)			144	300	ns
Turn-Off Fall Time		tF			77	165	ns
DRAIN-SOURCE DIODE CHARACTERISTICS							
Drain-source diode forward voltage(Note 4)		VSD	VGS = 0V, IS =10A			1.4	V
Maximum continuous drain-source diode forward current(Note 1)		IS				10	A
Maximum pulsed drain-source diode forward current (Note 2)		ISM				38	A

Note:

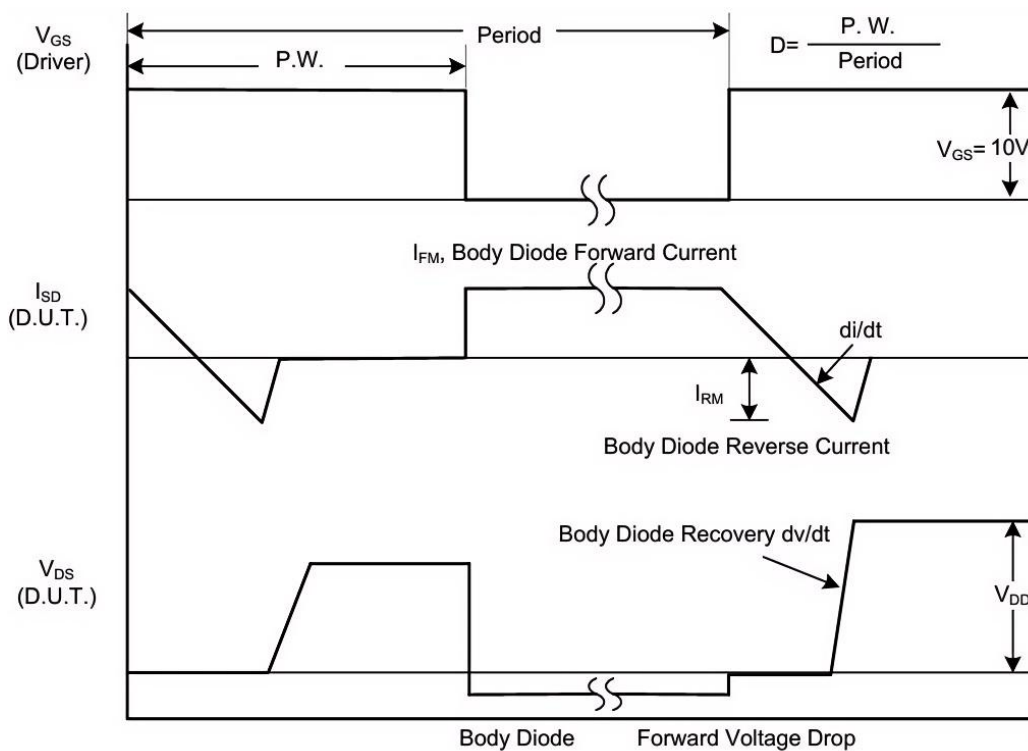
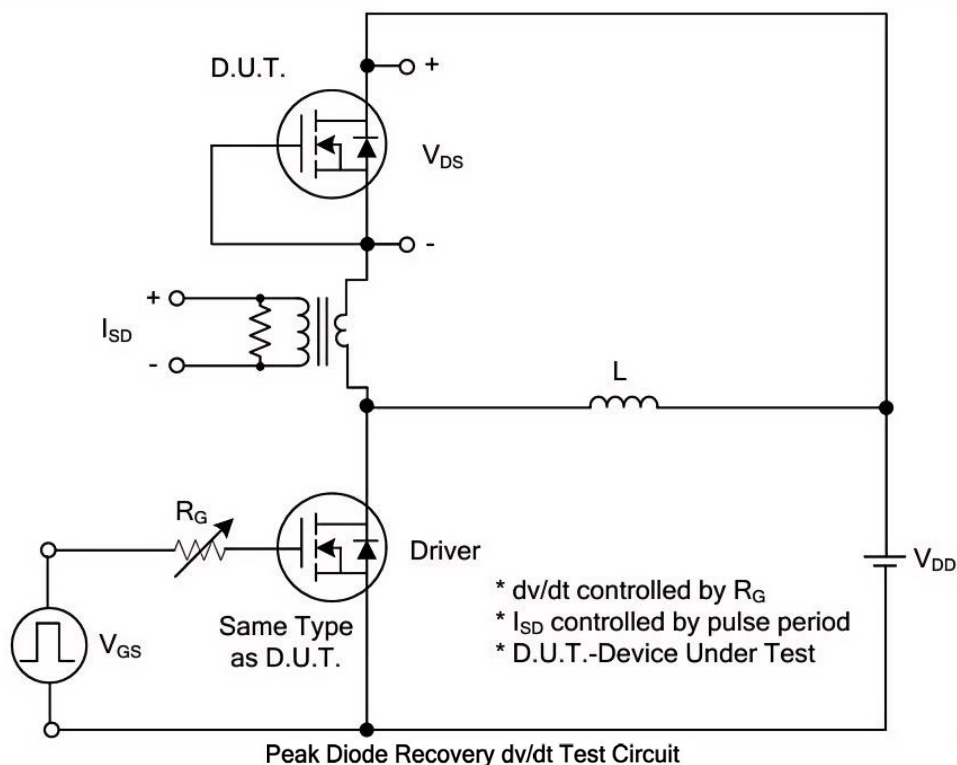
1. Tc=25°C Limited only by maximum temperature allowed.
2. Pw≤10μs, Duty cycle≤1%.
3. EAS condition: VDD=50V, VGS=10V, L=10mH, Rg=25Ω Starting TJ = 25°C.
4. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
5. Guaranteed by design, not subject to production.
6. The value of RθJA is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with Ta=25°C.



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■ TEST CIRCUITS AND WAVEFORMS



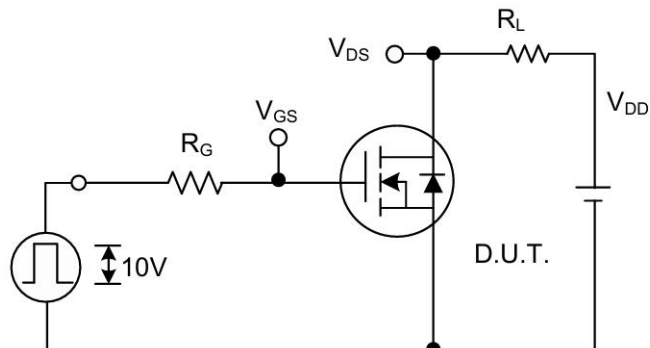
Peak Diode Recovery dv/dt Waveforms



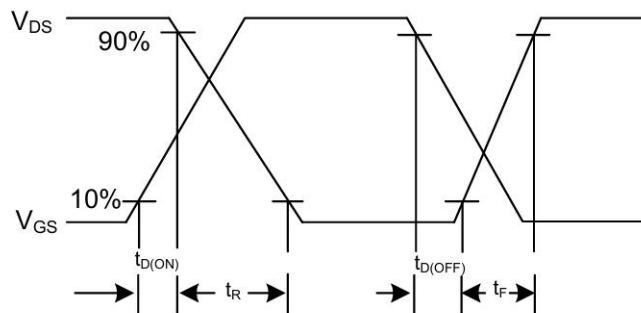
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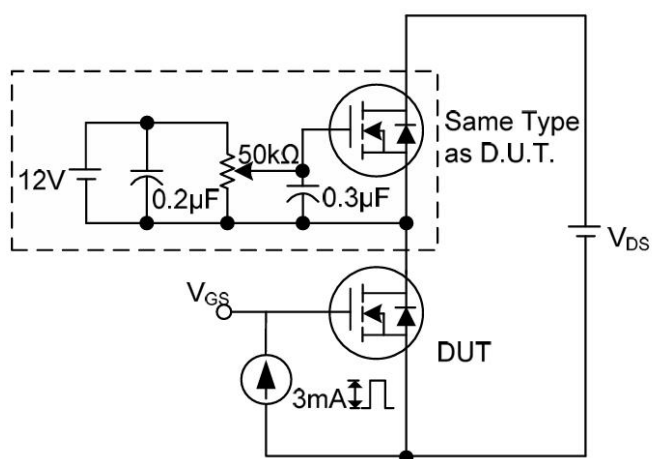
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



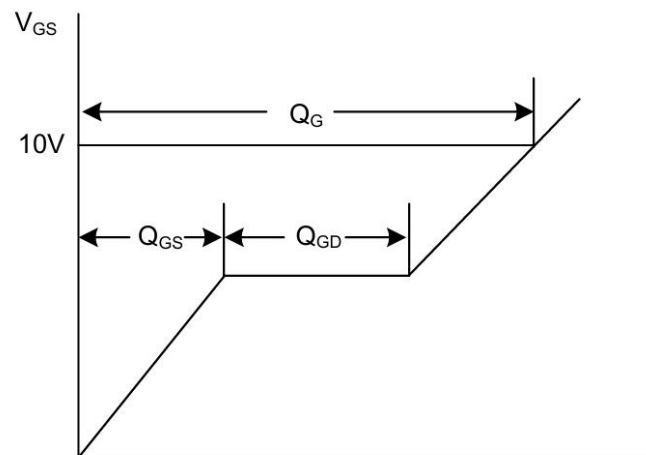
Switching Test Circuit



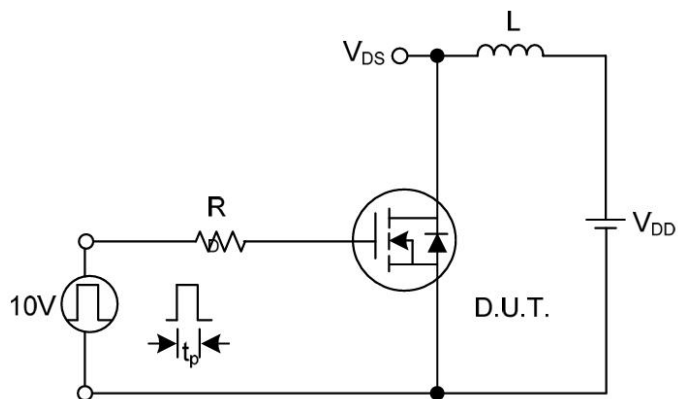
Switching Waveforms



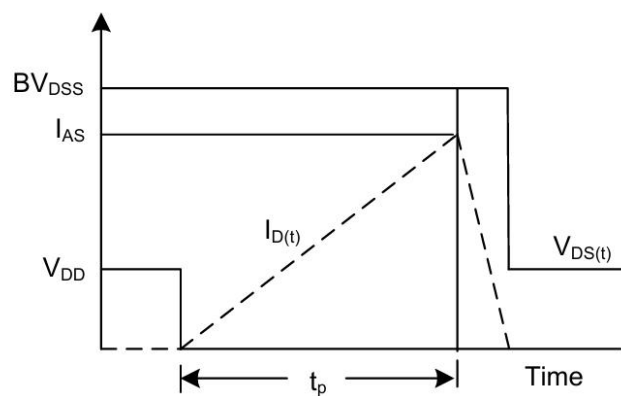
Gate Charge Test Circuit



Charge
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

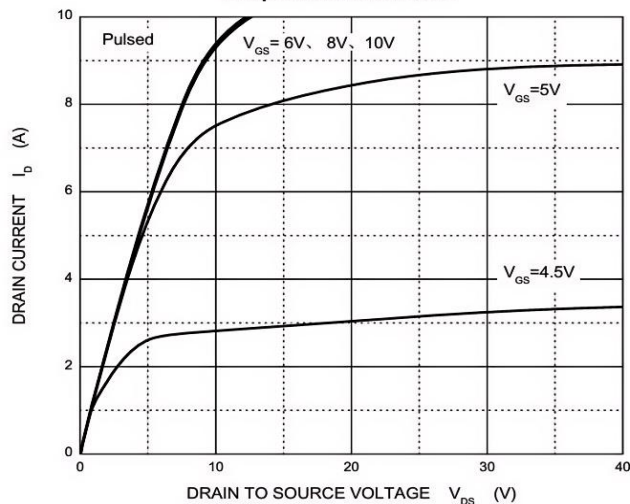


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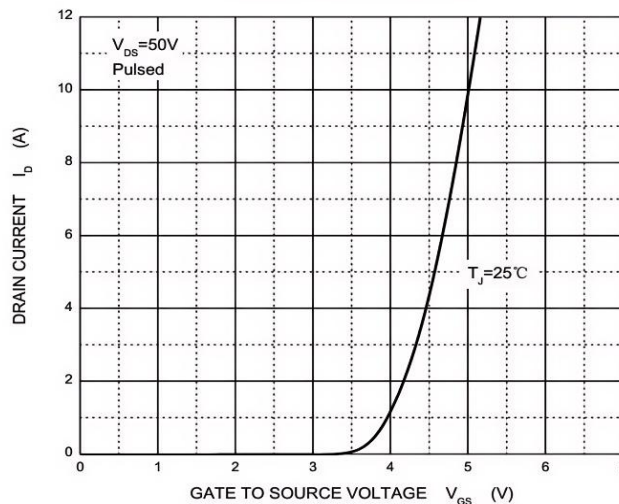
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TYPICAL CHARACTERISTICS

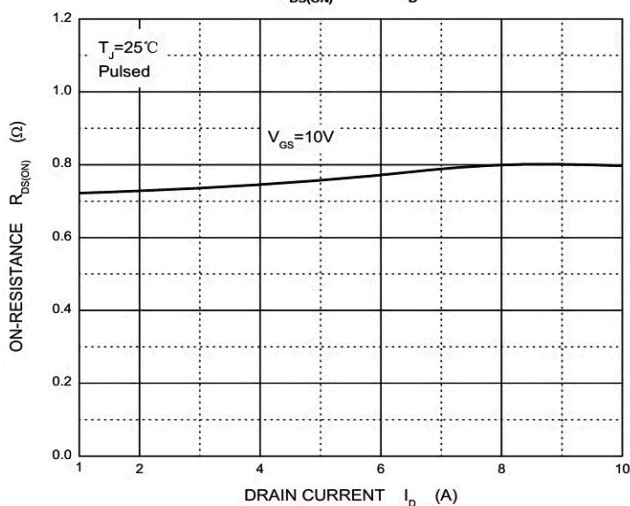
Output Characteristics



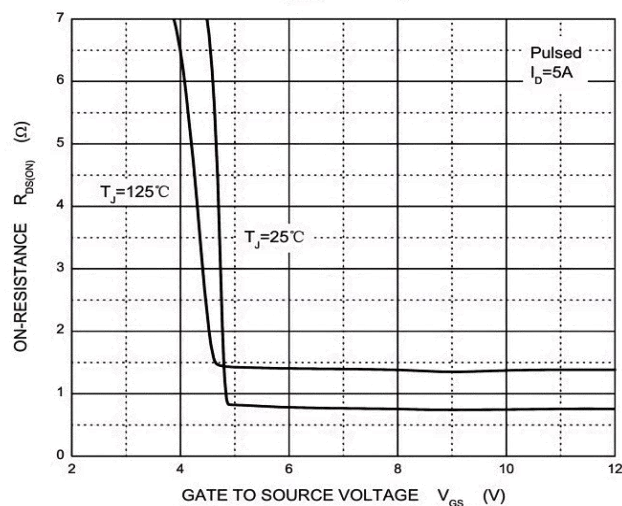
Transfer Characteristics



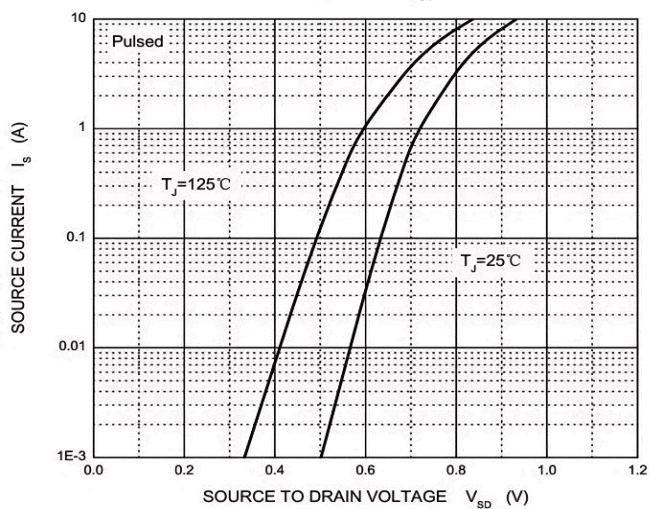
$R_{DS(ON)}$ — I_D



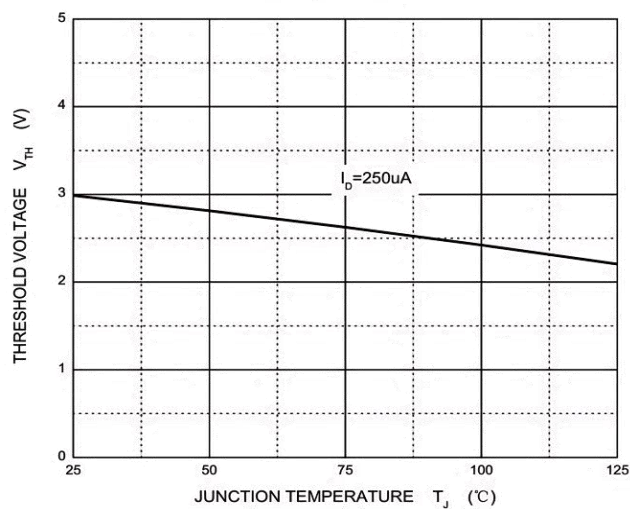
$R_{DS(ON)}$ — V_{GS}



I_S — V_{SD}



Threshold Voltage

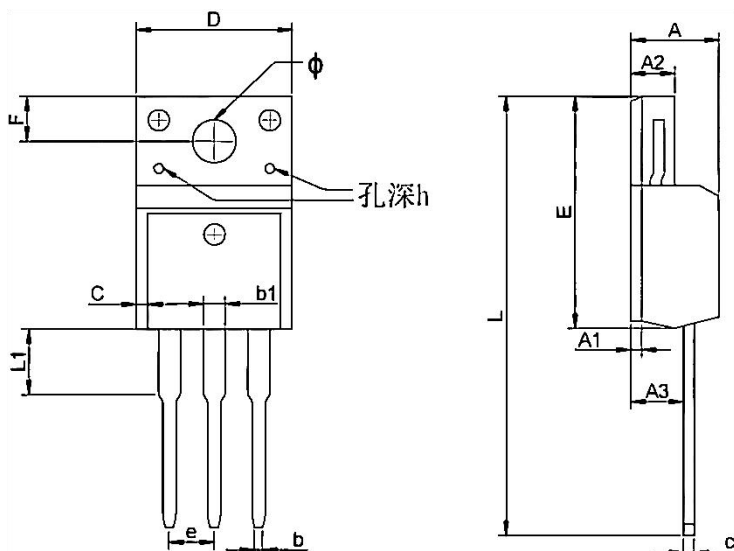




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TO - 220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max	Min	Max
A	4.300	4.750	0.169	0.185
A1	1.830 REF		0.072 REF	
A2	2.300	2.850	0.090	0.112
A3	2.500	2.900	0.098	0.114
b	0.400	0.420	0.016	0.016
b1	1.220	1.280	0.048	0.050
C	0.690	0.720	0.027	0.028
c	0.490	0.510	0.019	0.020
D	9.960	10.200	0.392	0.400
E	15.000	15.950	0.588	0.625
e	2.574 TYP		0.101TYP	
F	3.470 REF		0.136 REF	
y	3.200 REF		0.125 REF	
h	0.000	0.300	0.000	0.012
L	28.780	28.900	1.128	1.133
L1	2.990	3.100	0.117	0.122

TO - 220F PACKING INFORMATION



50PCS

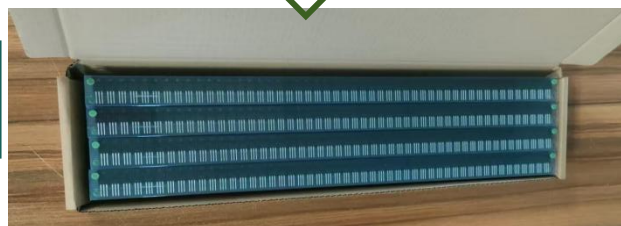


20 Tube



Outer Box

5 Inner
Box



Inner Box

Package version	Tube dimensions LxWxH (mm)	Per Tube (pcs)	Tube per box	Inner box dimensions LxWxH (mm)	PCS/ Inner box	Outer box dimensions LxWxH(mm)	PCS/ Outer box
TO-220F	530*32*7	50	20	580*155*50	1000	602*277*188	5000