



HY7N65

N-CHANNEL POWER MOSFET

7A, 650V N-CHANNEL POWER MOSFET

DESCRIPTION

The HY7N65A is a high voltage power MOSFET combines advanced planar MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} \leq 1.25 \Omega$ @ $V_{GS}=10V$, $I_D=3.5A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

MARKING



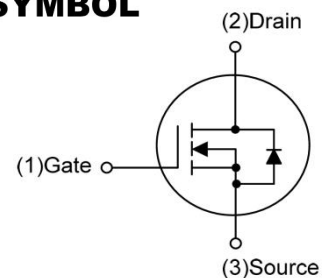
: HY LOGO

HY7N65A=Device Code

XXXX=Date Code

Solid Dot=Green molding compound

SYMBOL



ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ C$, unless otherwise specified.)

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage		650	V
V_{GS}	Gate Source Voltage		± 30	V
I_D	Continuous Drain Current		7	A
I_{DM}	Drain Current Pulsed (Note 2)		14	A
E_{AS}	Avalanche Energy, Single Pulsed (Note 3)		109	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		3.2	V/ns
P_D	Power Dissipation	TO-220F	36	W
		TO-252	50	
T_J	Junction Temperature		150	$^\circ C$
T_{STG}	Storage Temperature		-55 to 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. $L = 1.0mH$, $I_{AS} = 14.8A$, $V_{DD} = 50V$, $R_G = 25 \Omega$, Starting $T_J = 25^\circ C$

4. $I_{SD} \leq 7.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq BV_{DS}$, Starting $T_J = 25^\circ C$



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■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θ_{JA}	62.5	°C/W
	TO-252		100	
Junction to Case	TO-220F	θ_{JC}	3.4	°C/W
	TO-252 (Note)		2.5	

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS (TA=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	I _{GSS}	V _{GS} =±30V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =3.5A			1.25	Ω
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} ,I _D =250μA	2.0		4.0	V
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1095		pF
Output Capacitance	C _{OSS}			101		
Reverse Transfer Capacitance	C _{RSS}			8		
SWITCHING PARAMETERS						
Total gate charge(Note 1)	Q _g	V _{DS} =520V,V _{GS} =10V I _D =7A, I _{GM} =1mA (Note 1, 2)		25		nC
Gate-source charge	Q _{gs}			6.5		
Gate-drain charge	Q _{gd}			5.5		
Turn-On Delay Time(Note 1)	t _{D(on)}	V _{DD} =100V,V _{GS} =10V I _D =7A,R _G =25Ω (Note 1, 2)		10		nS
Turn-On Rise time	t _r			19		
Turn-Off Delay Time	t _{D(off)}			68		
Turn-Off Fall time	t _f			32		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				7	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				14	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0 V, I _{SD} =7A			1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} = 0 V, I _{SD} =7A,		325		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		7.5		μC

Note:

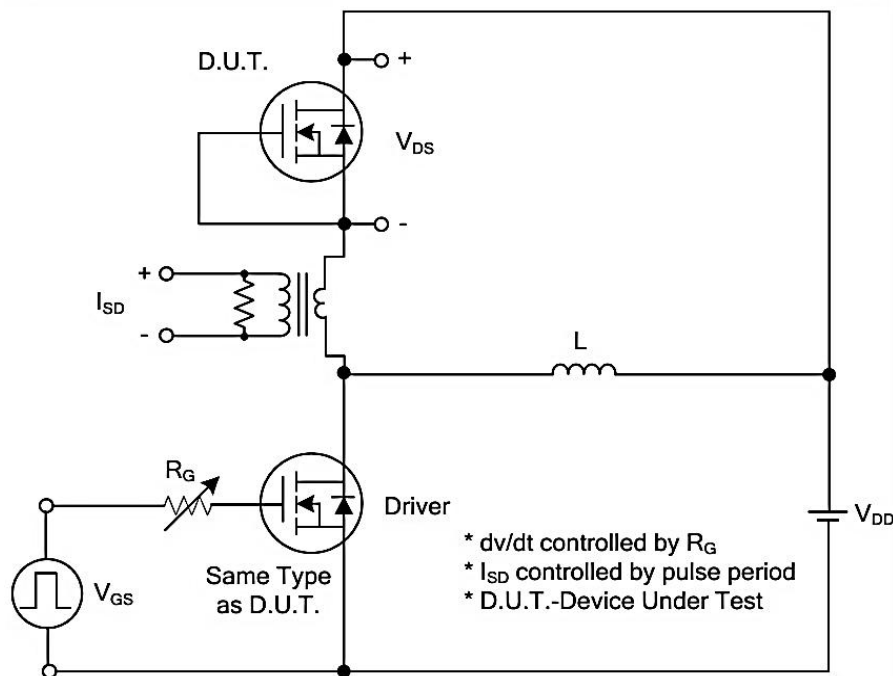
1. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$;
2. Essentially independent of operating temperature.



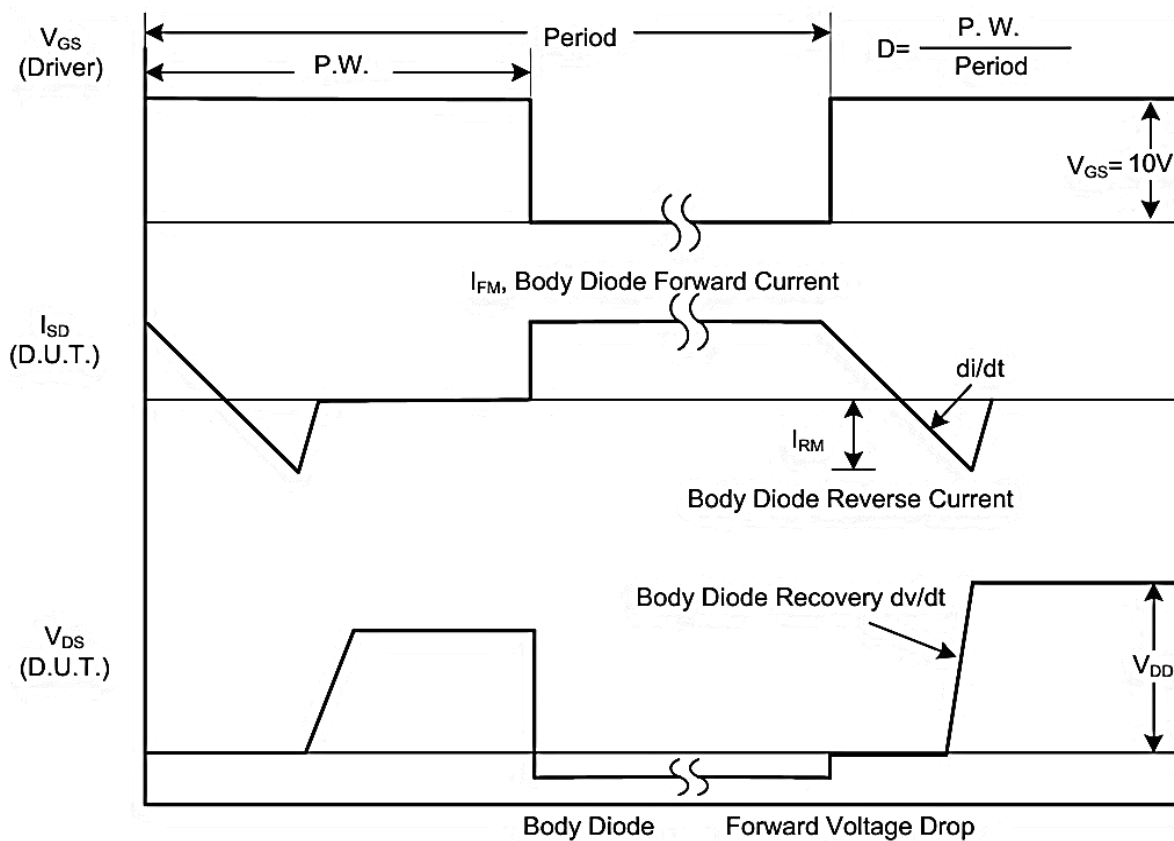
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■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit



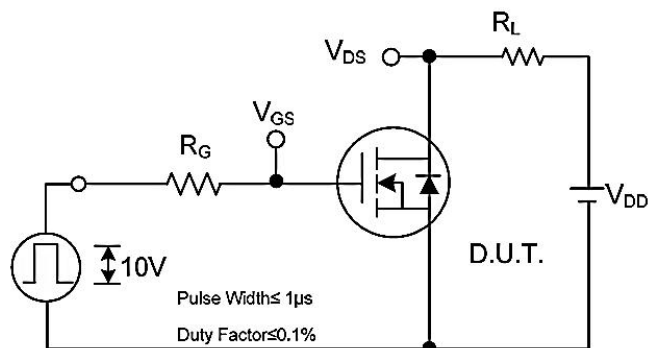
Peak Diode Recovery dv/dt Waveforms



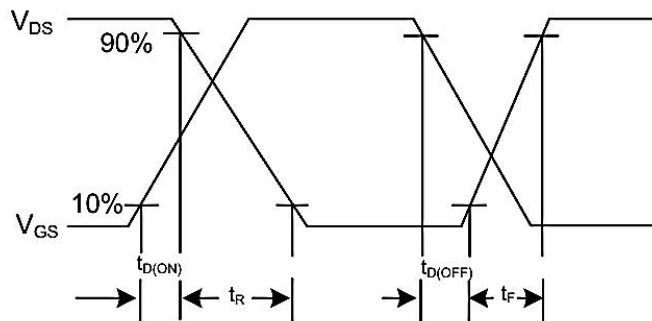
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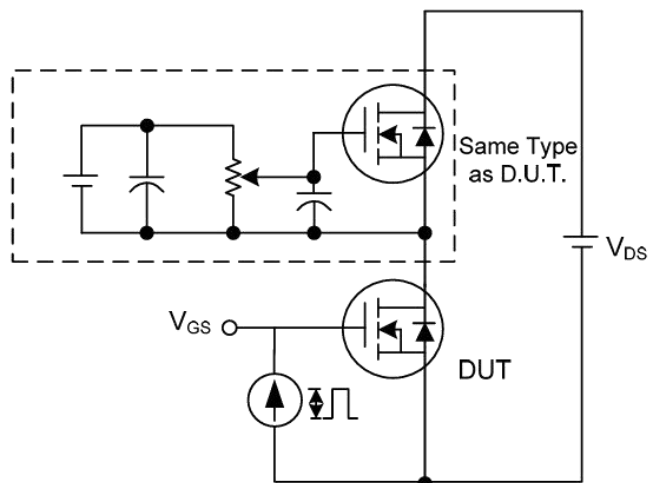
■ **TEST CIRCUITS AND WAVEFORMS(Con.t)**



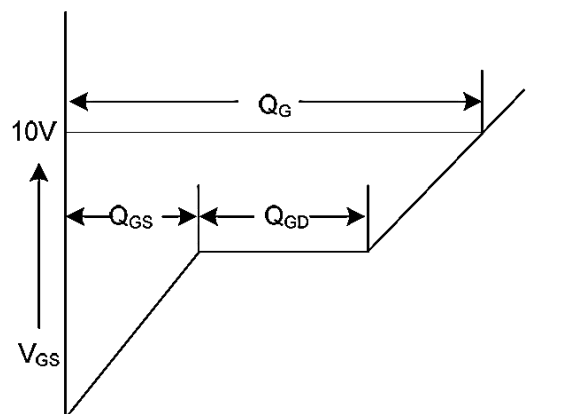
Switching Test Circuit



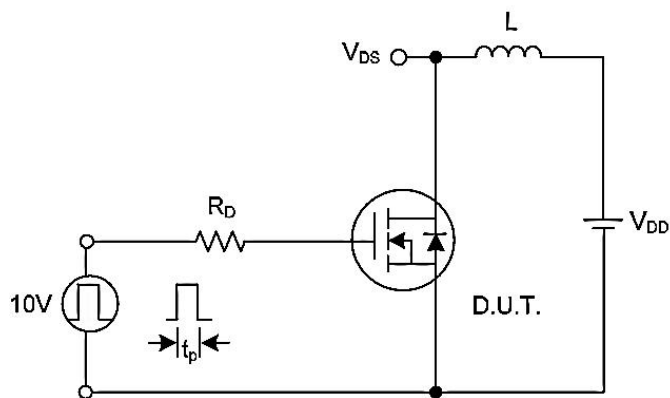
Switching Waveforms



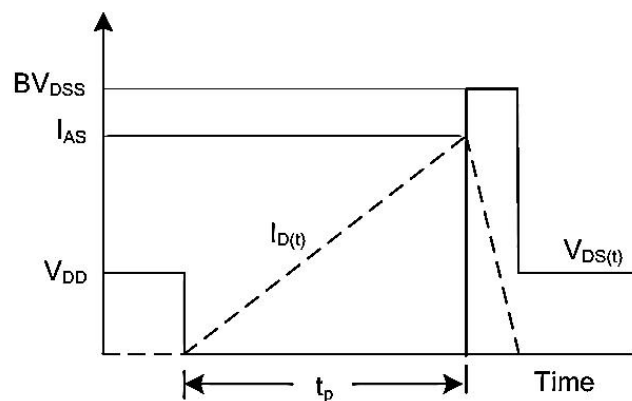
Gate Charge Test Circuit



**Charge
Gate Charge Waveform**



Unclamped Inductive Switching Test Circuit



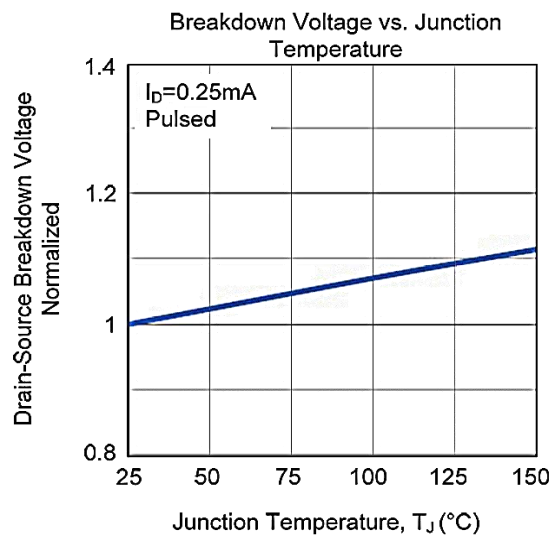
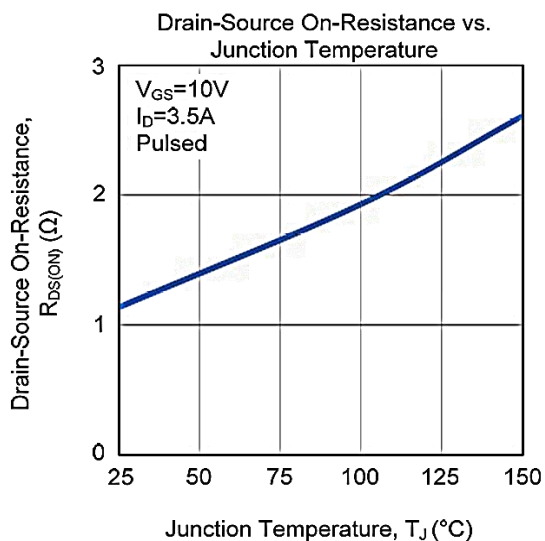
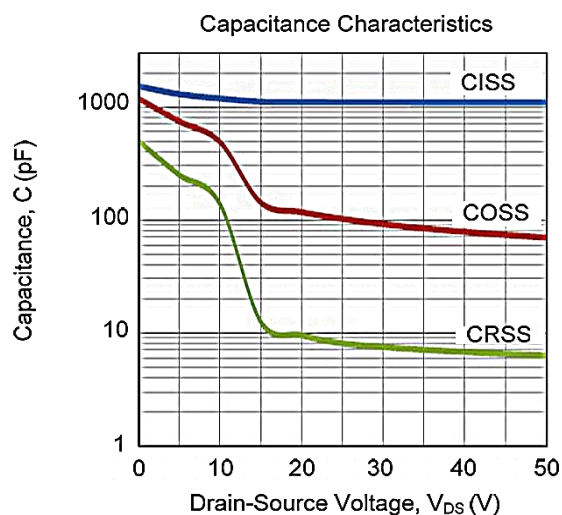
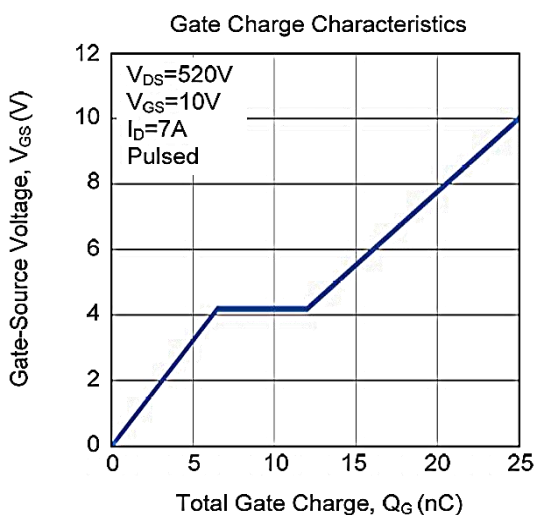
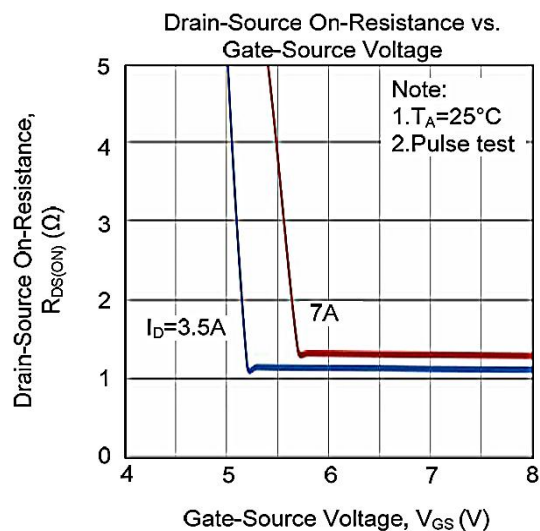
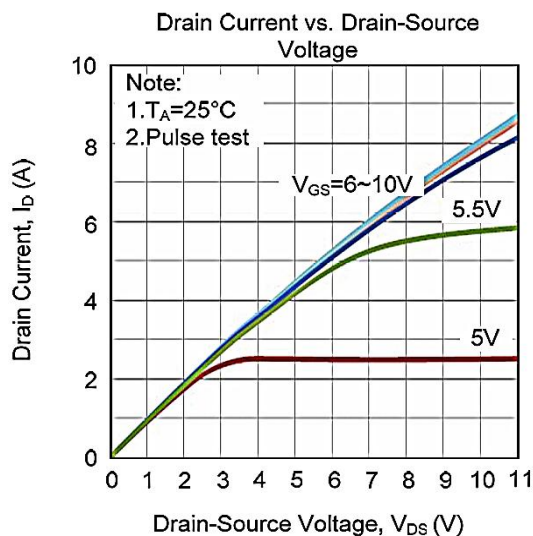
Unclamped Inductive Switching Waveforms



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■ TYPICAL CHARACTERISTICS(1)

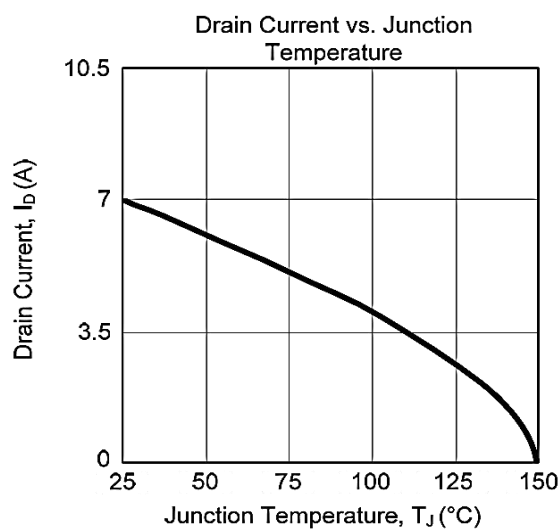
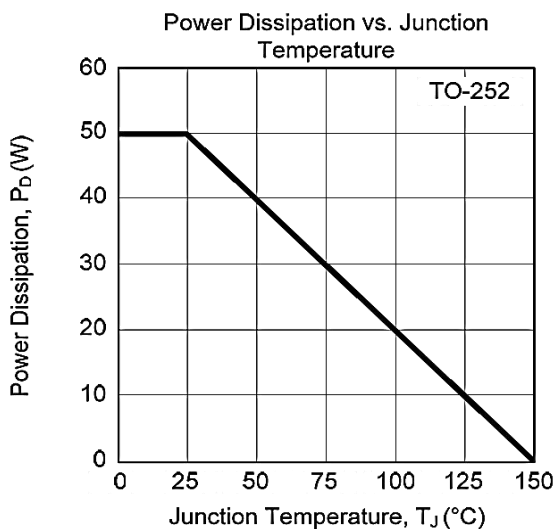
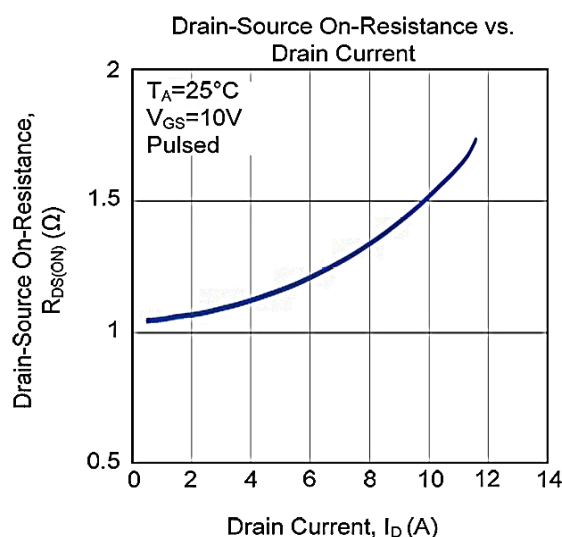
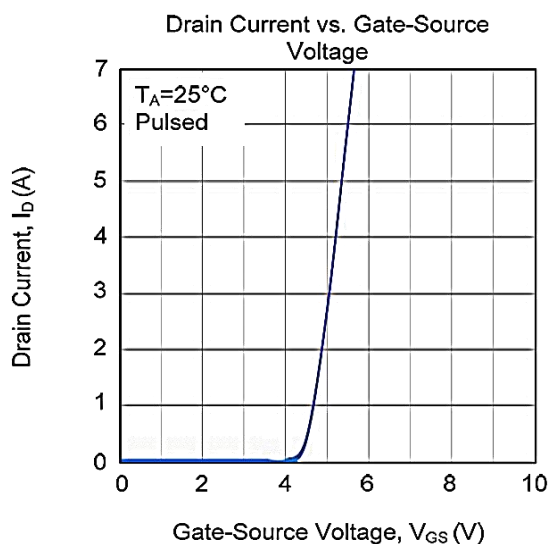
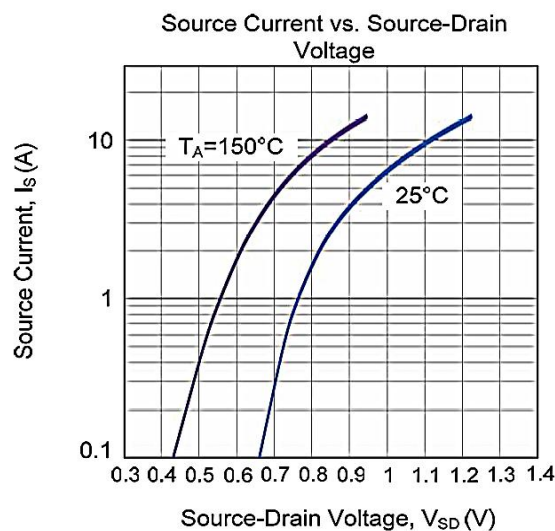
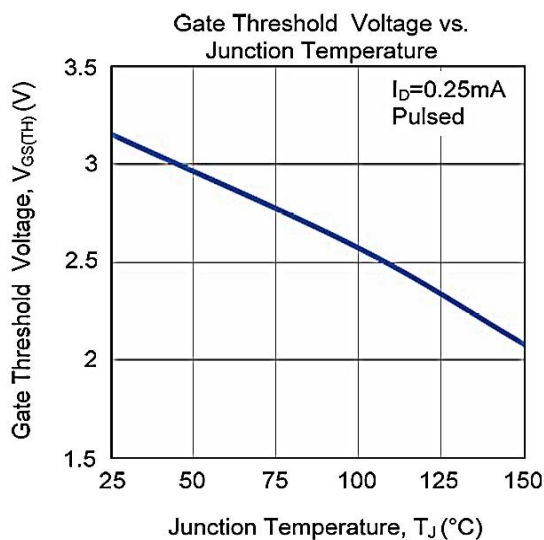




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■ TYPICAL CHARACTERISTICS(Con.t)

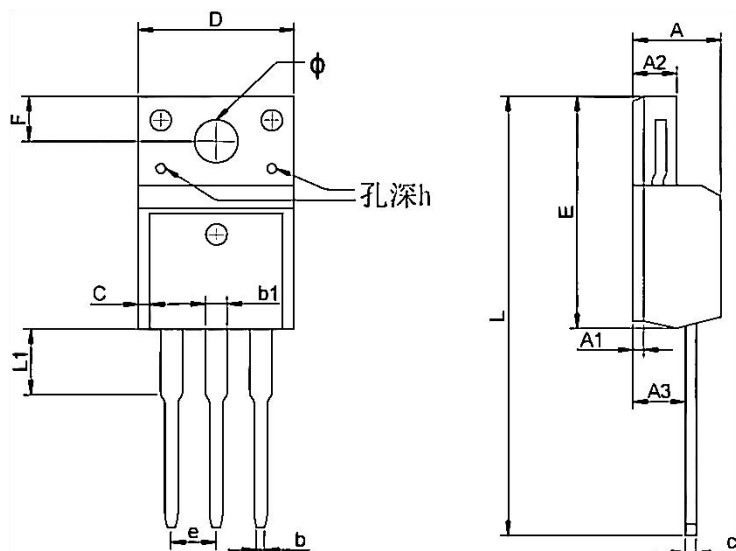




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TO-220F PACKAGE OUTLINE DIMENSIONS



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

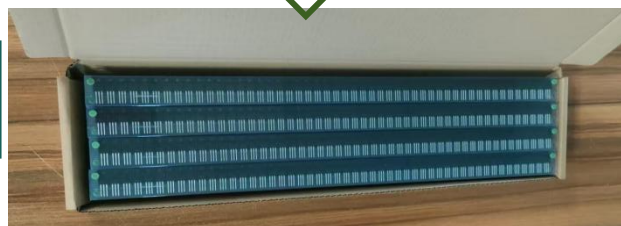


20 Tube



Outer Box

5 Inner
Box



Inner Box

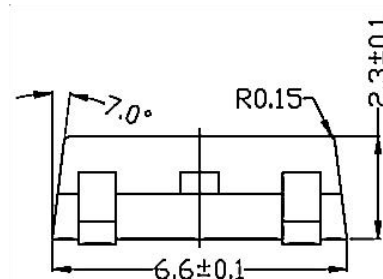
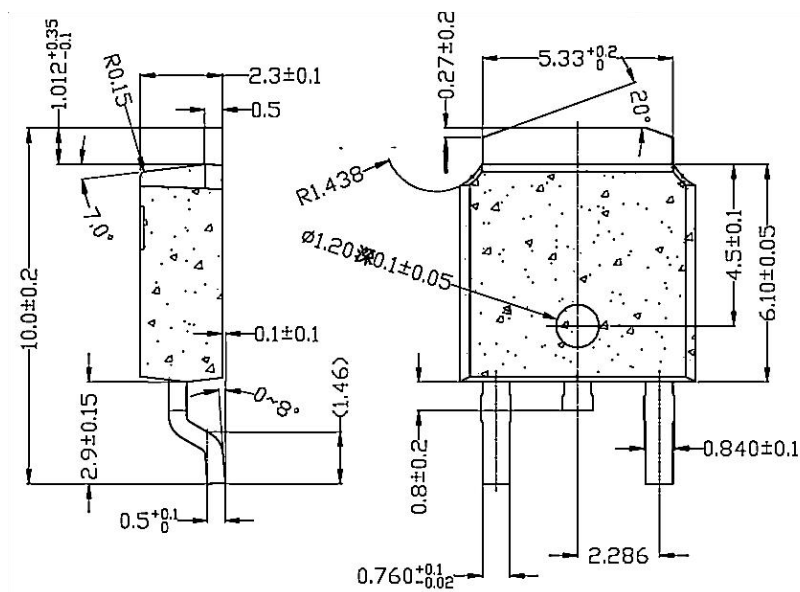
Package version	Tube dimensions LxW×H (mm)	Per Tube (pcs)	Tube per box	Inner box dimensions LxW×H (mm)	PCS/ Inner box	Outer box dimensions L×W×H(mm)	PCS/ Outer box
TO-220F	530*32*7	50	20	580*155*50	1000	602*277*188	5000



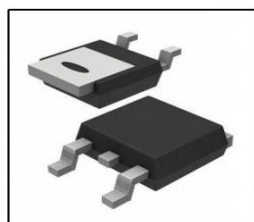
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N-CHANNEL POWER MOSFET

TO - 252 PACKAGE OUTLINE DIMENSIONS



TO - 252 PACKING INFORMATION



2500PC
S/reel



2 Reel/BOX



Outer box

5 Inner
Box



Inner box

Package version	Reel dimensions $\Phi \times H$ (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions $L \times W \times H$ (mm)	Outer box (pcs)	Outer box dimensions $L \times W \times H$ (mm)
TO-252	$\Phi 330 \times 20$	2500	2	360*340*50	25000	375*375*280