



HY50N06

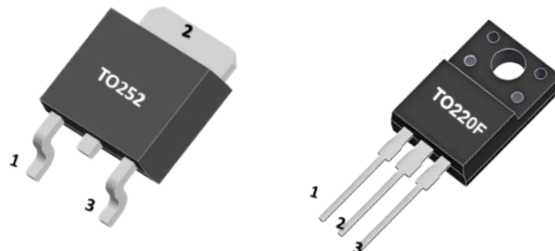
N-CHANNEL POWER MOSFET

50A, 60V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

The HY50N06A is an N-channel power MOSFET using our advanced technology to provide customers with a minimum on-state resistance and superior switching performance. The HY50N06A is generally applied in low power switching mode power appliances and electronic ballast.

The HY50N06A meet the ROHS and Green Product requirement with full function reliability approved.



FEATURES

- * $R_{DS(ON)} \leq 15 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=25\text{A}$
- * $R_{DS(ON)} \leq 20 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=25\text{A}$
- * High Switching Speed
- * Improved dv/dt capability

MARKING



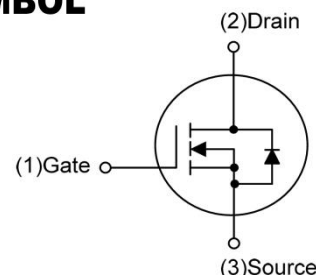
: HY LOGO

HY50N06A=Device Code

XXXX=Date Code

Solid Dot=Green molding compound

SYMBOL



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

SYMBOL	PARAMETER		VALUE	UNIT
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current		50	A
I_{DM}	Pulsed Drain Current (Note 2)		100	A
EAS	Avalanche Energy (Note 3)	Single Pulsed	32	mJ
PD	Power Dissipation	TO-220F	36	W
		TO-252	51	
T_j	Junction temperature		+150	$^\circ\text{C}$
T_{stg}	Operation and Storage Temperature		-55~+150	$^\circ\text{C}$
R_{θJA}	Thermal Resistance from Junction to Ambient (Note 6)	TO-220F	62.5	$^\circ\text{C/W}$
		TO-252	110	
R_{θJC}	Thermal Resistance From Junction To Case (Note 5)	TO-220F	3.47	$^\circ\text{C/W}$
		TO-252	2.45	

- 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. $L=0.1\text{mH}$, $I_{AS}=25\text{A}$, $V_{DD}=30\text{V}$, $R_G=20\Omega$, Starting $T_J=25^\circ\text{C}$
4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq B_{VDSS}$, Starting $T_J=25^\circ\text{C}$
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.



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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	60			V
Drain-Source Leakage Current	IDSS	VDS=60V,VGS=0V			10	μA
Gate- Source Leakage Current	IGSS	VGS=±20V, VDS=0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	VGS(TH)	VDS=VGS , ID=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=25A			15	mΩ
		VGS=4.5V, ID=25A			20	
DYNAMIC CHARACTERISTICS						
Input Capacitance	CISS	VDS=25V, VGS=0V, f= 1.0MHz		2315		pF
Output Capacitance	COSS			181		
Reverse Transfer Capacitance	CRSS			144		
SWITCHING CHARACTERISTICS						
Total Gate Charge	QG	VDS=48V,VGS= 10V, ID=50A (Note1, 2)		56		nC
Gate-Source Charge	QGS			8.4		
Gate-Drain Charge	QGD			16		
Turn-on delay time	td(on)	VDS=30V,ID=50A VGS=10V,RG=6Ω (Note1, 2)		9		ns
Turn-on rise time	tr			18		
Turn-off delay time	td(off)			54		
Turn-off fall time	tf			28		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	IS				50	A
Maximum Pulsed Drain-Source Diode Forward Current	ISM				100	A
Drain-source diode forward voltage	VSD	IS=50A, VGS=0V			1.5	V
Reverse Recovery Time	trr	Is = 30A,VGS = 0V		60		ns
Reverse Recovery Charge	Qrr	dIs/dt = 100A/μs		30		nC

Notes:

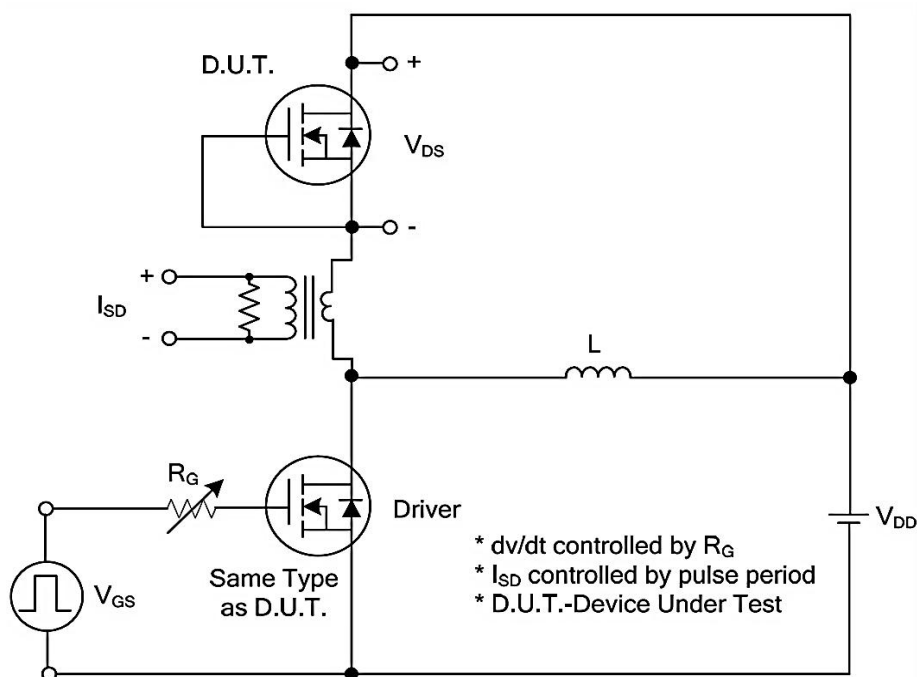
1. Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.
2. Essentially independent of operating temperature.



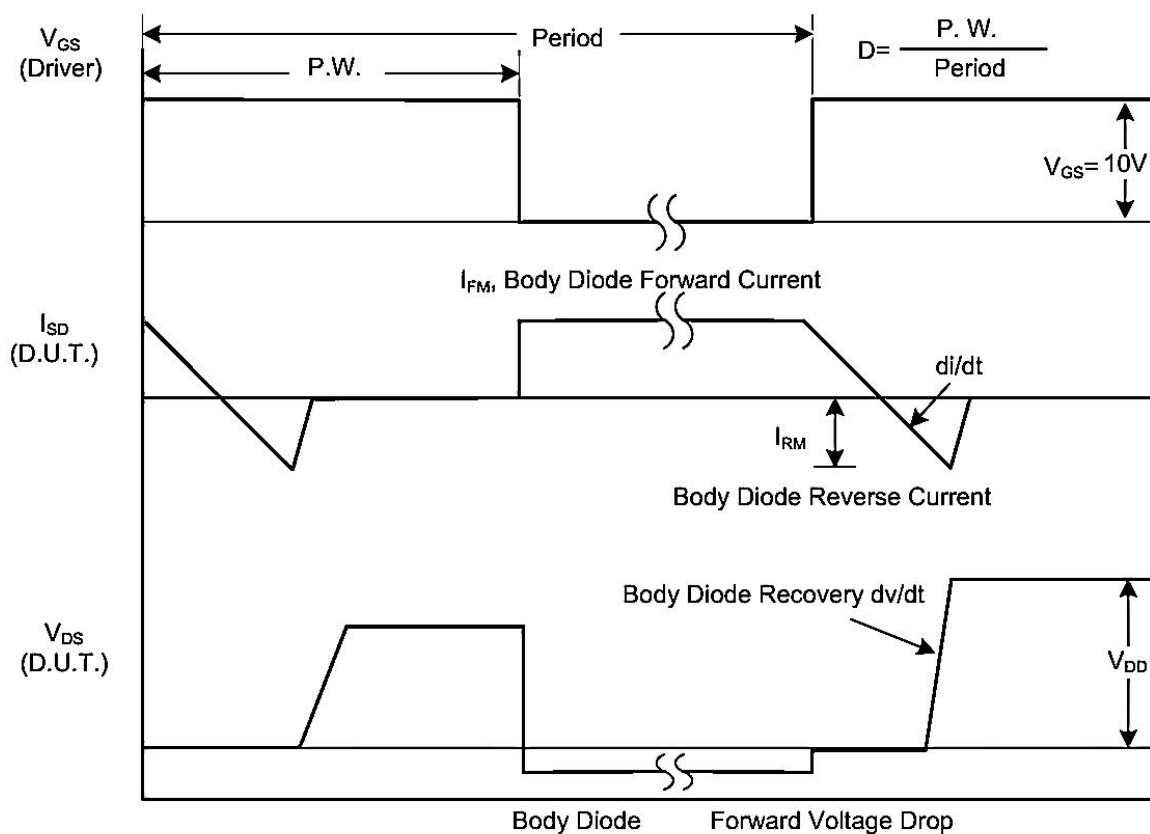
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■ **TEST CIRCUITS AND WAVEFORMS**



Peak Diode Recovery dv/dt Test Circuit



Peak Diode Recovery dv/dt Waveforms



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■ TEST CIRCUITS AND WAVEFORMS(Con.t)

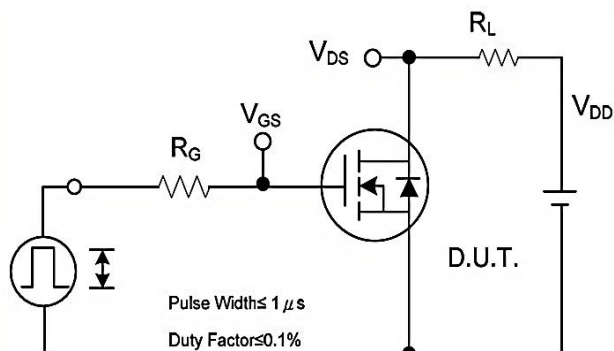


Fig. 2A Switching Test Circuit

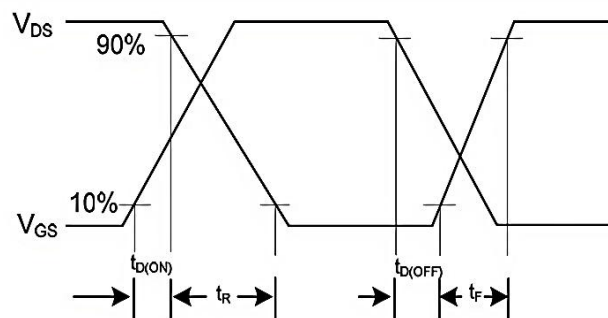


Fig. 2B Switching Waveforms

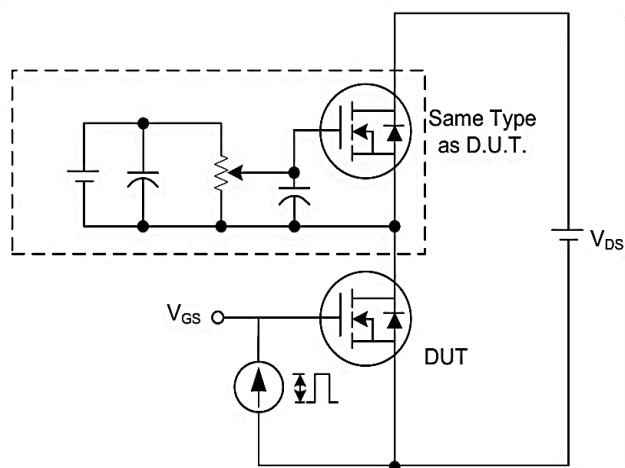


Fig. 3A Gate Charge Test Circuit

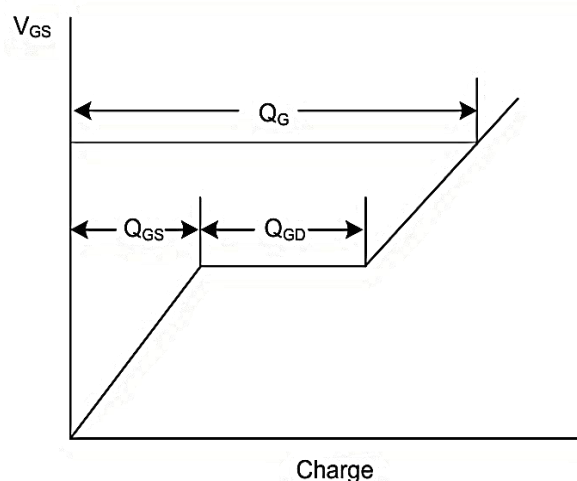


Fig. 3B Gate Charge Waveform

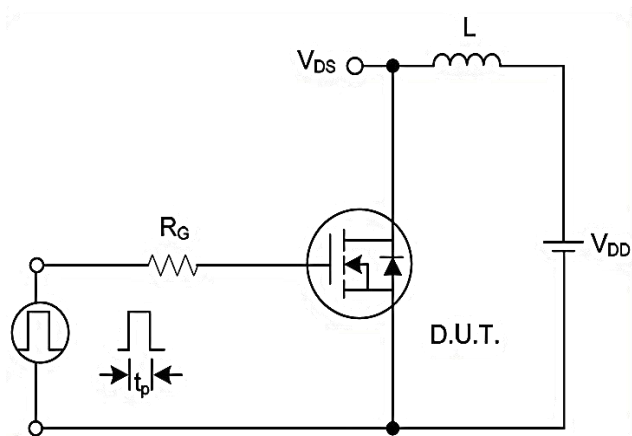


Fig. 4A Unclamped Inductive Switching Test Circuit

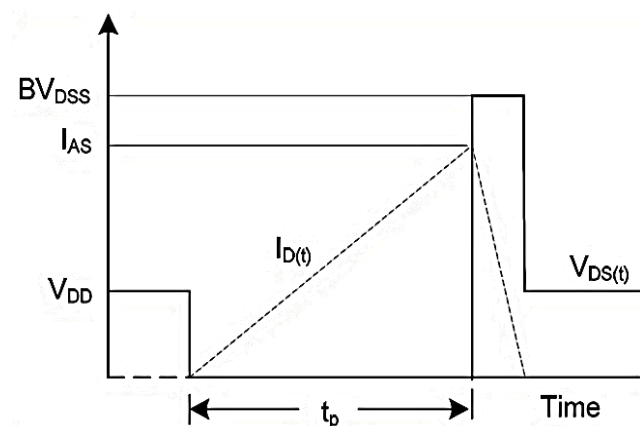


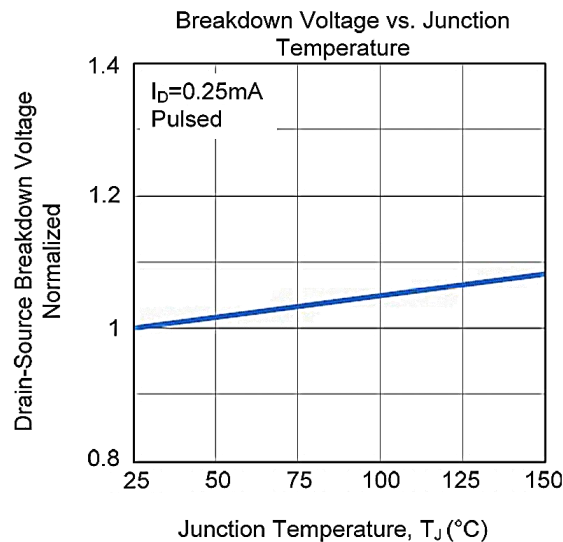
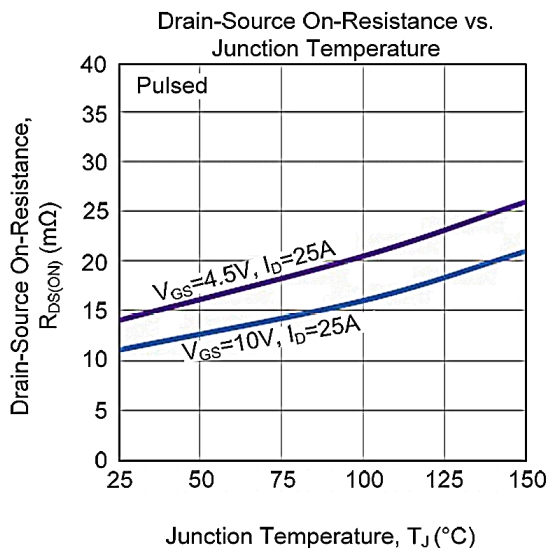
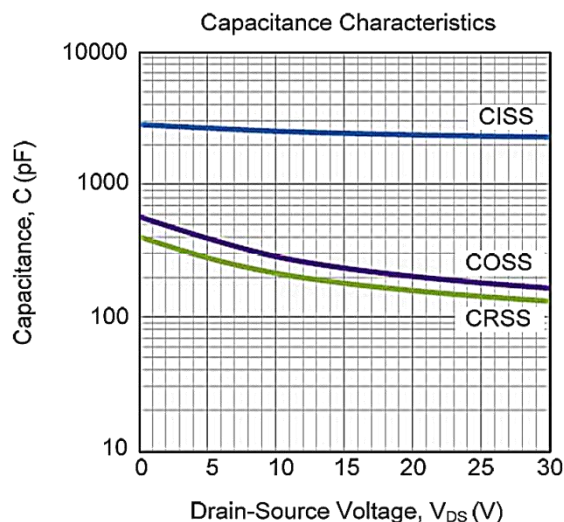
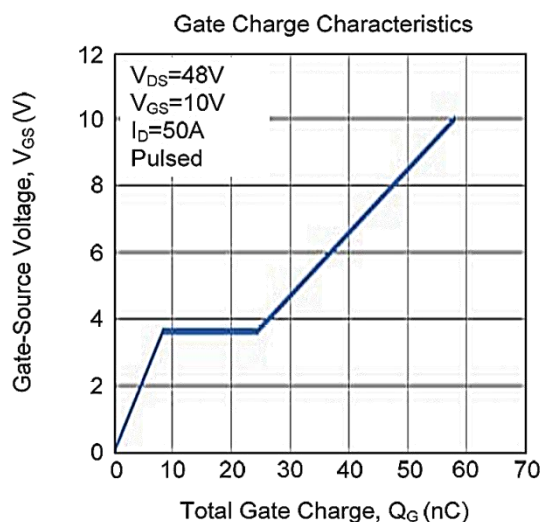
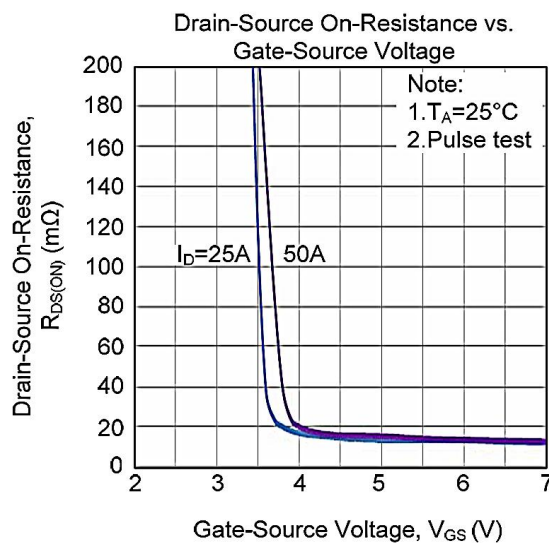
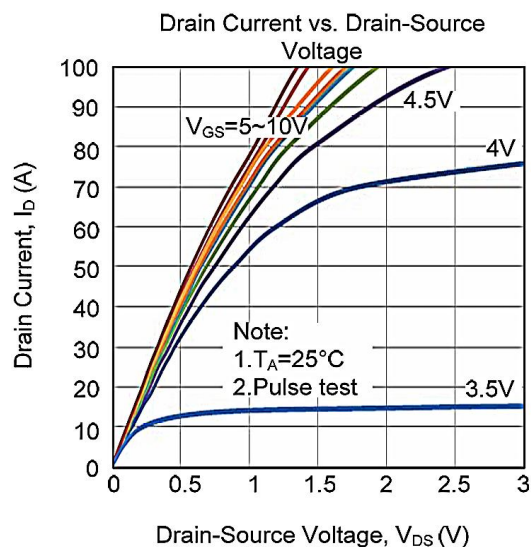
Fig. 4B Unclamped Inductive Switching Waveforms



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TYPICAL CHARACTERISTICS

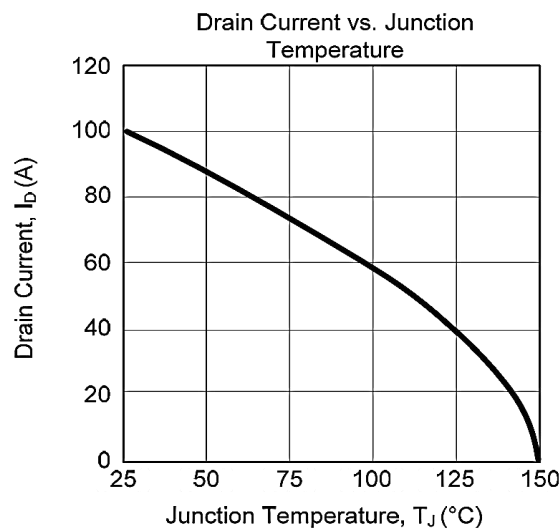
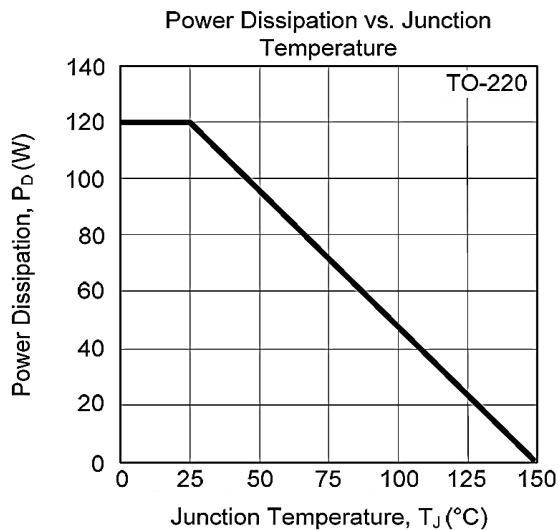
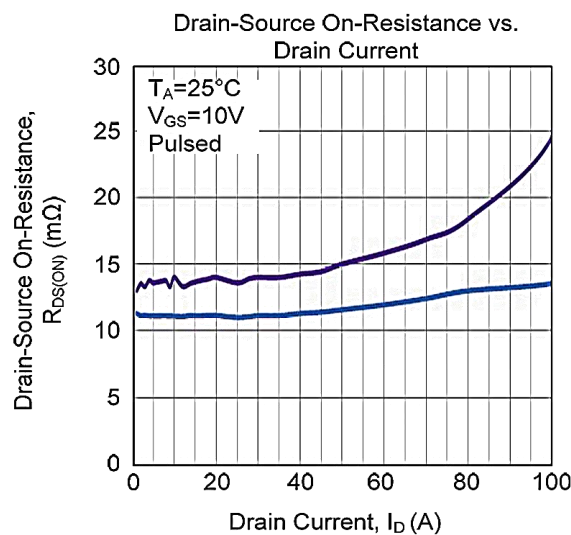
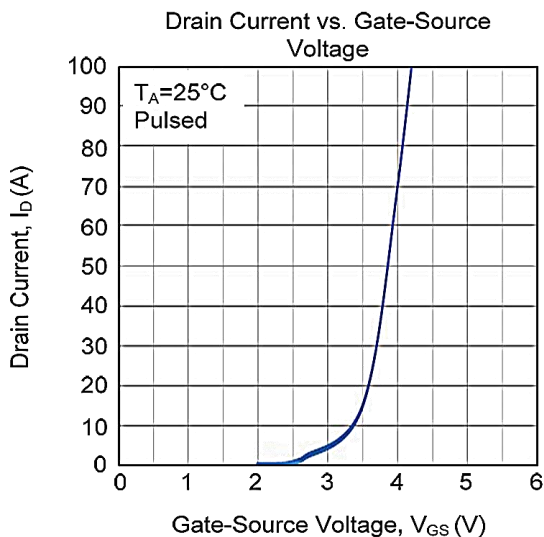
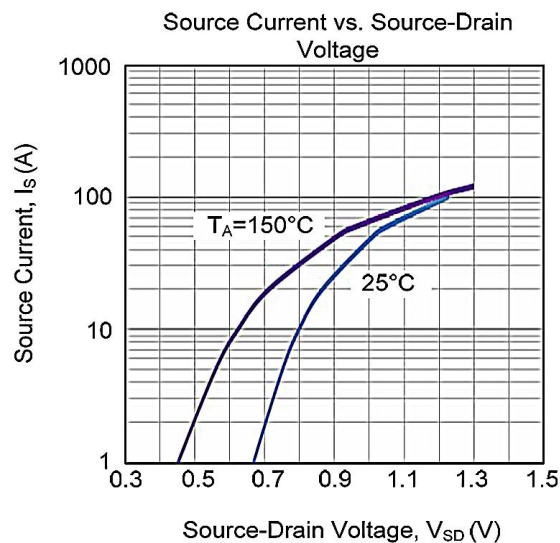
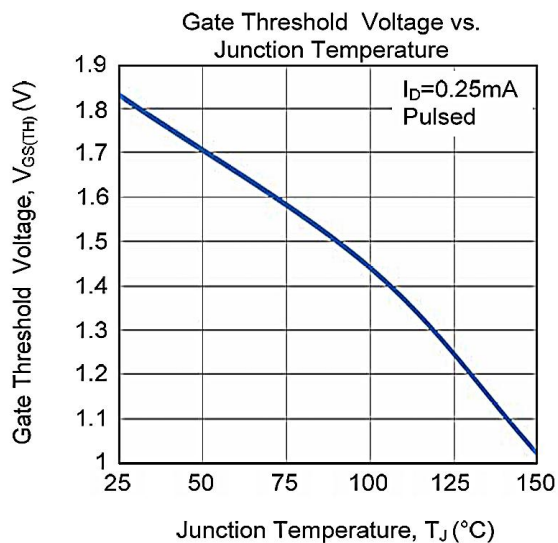




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TYPICAL CHARACTERISTICS

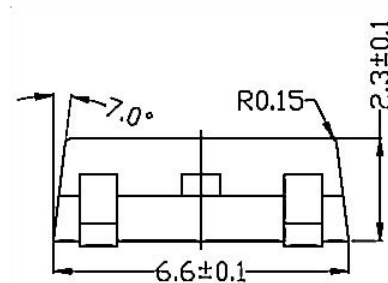
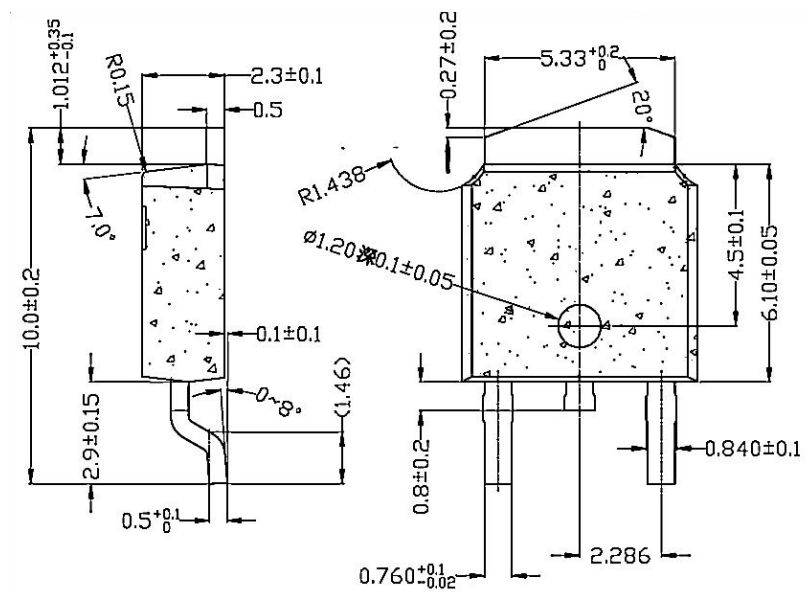




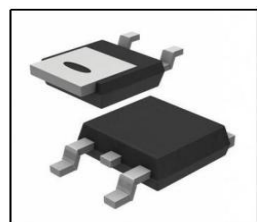
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TO - 252 PACKAGE OUTLINE DIMENSIONS



TO - 252 PACKING INFORMATION



2500PC
S/reel



2 Reel/BOX



Outer box

5 Inner
Box



Inner box

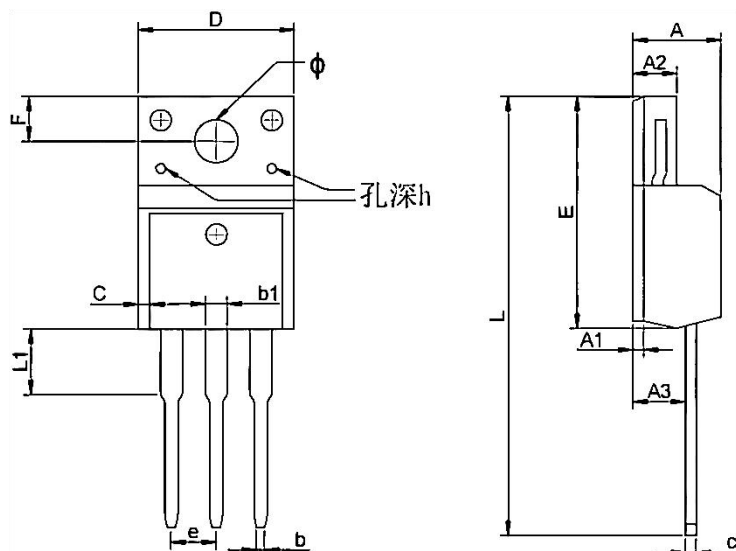
Package version	Reel dimensions $\Phi \times H$ (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions $L \times W \times H$ (mm)	Outer box (pcs)	Outer box dimensions $L \times W \times H$ (mm)
T0-252	$\Phi 330 \times 20$	2500	2	360*340*50	25000	375*375*280



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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

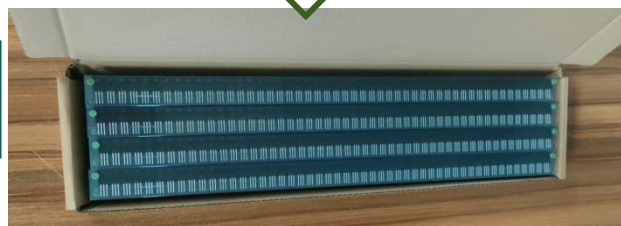


20 Tube



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