

HY7N60

N-CHANNEL POWER MOSFET

7A, 600V N-CHANNEL POWER MOSFET

DESCRIPTION

The HY7N60A 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

- * $R_{DS(ON)} \leq 1.2\Omega$ @ $V_{GS}=10V$, $I_D=3.5A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

MARKING

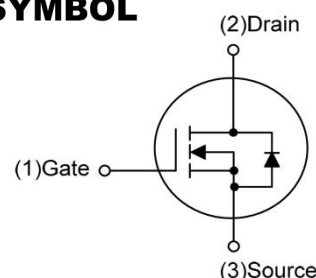


XD7N60Y=Device Code

XXX=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		600	V
V_{GS}	Gate Source Voltage		± 30	V
I_D	Continuous Drain Current		7	A
I_{DM}	Drain Current Pulsed (Note 2)		14	A
EAS	Avalanche Energy, Single Pulsed (Note 3)		115	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		3.2	V/ns
P_D	Power Dissipation	TO-220F	35	W
		TO-252	52	
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. $L = 1.0mH$, $I_{AS} = 15.2A$, $V_{DD} = 50V$, $R_G = 25\Omega$, 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	$^{\circ}\text{C/W}$
	TO-252		110	
Junction to Case	TO-220F	θ_{JC}	3.57	$^{\circ}\text{C/W}$
	TO-252 (Note)		2.4	

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

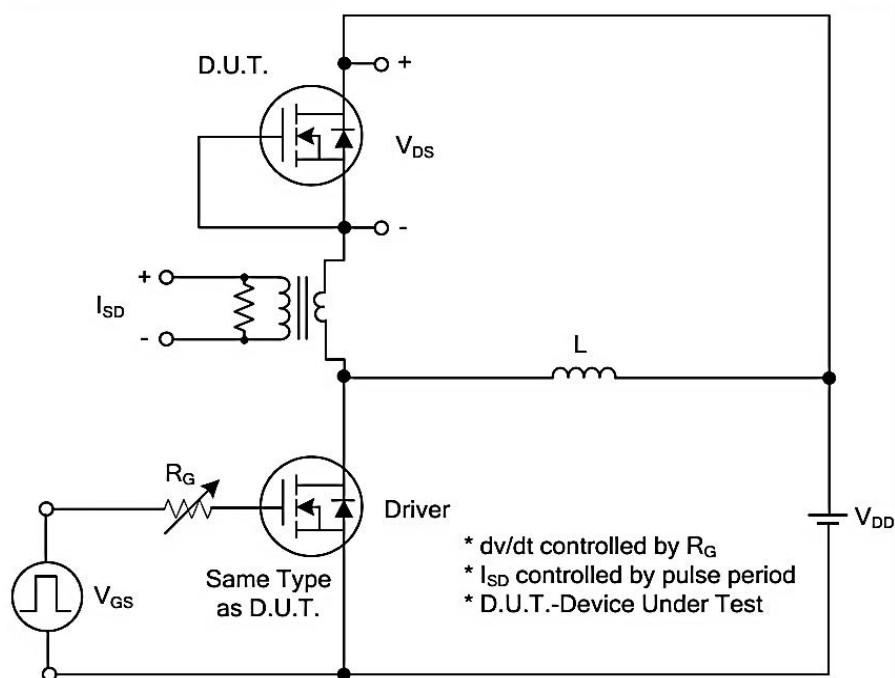
ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	600			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =600V, 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			1.2	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		1010		pF
Output Capacitance	C _{OSS}			105		
Reverse Transfer Capacitance	C _{RSS}			8		
SWITCHING PARAMETERS						
Total gate charge(Note 1)	Qg	V _{DS} =480V,V _{GS} =10V I _D =7A, I _{GM} =1mA (Note 1, 2)		25		nC
Gate-source charge	Qgs			6.5		
Gate-drain charge	Qgd			5		
Turn-On Delay Time(Note 1)	t _{D(on)}	V _{DS} =100V,V _{GS} =10V I _D =7A,R _G =25Ω (Note 1, 2)		10		nS
Turn-On Rise time	t _r			20		
Turn-Off Delay Time	t _{D(off)}			70		
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,		315		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		7		μC

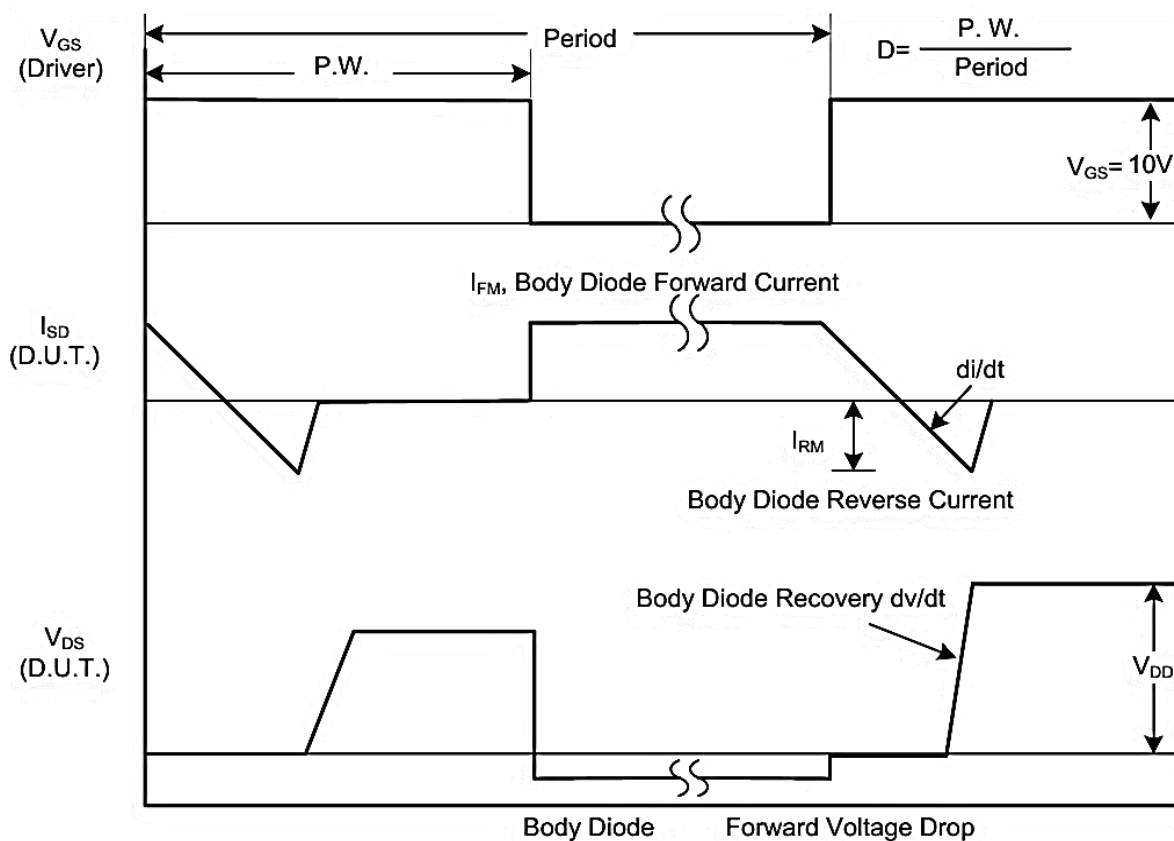
Note:

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

■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit

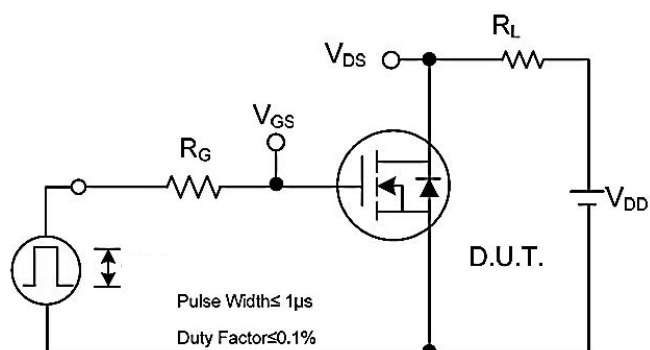


Peak Diode Recovery dv/dt Waveforms

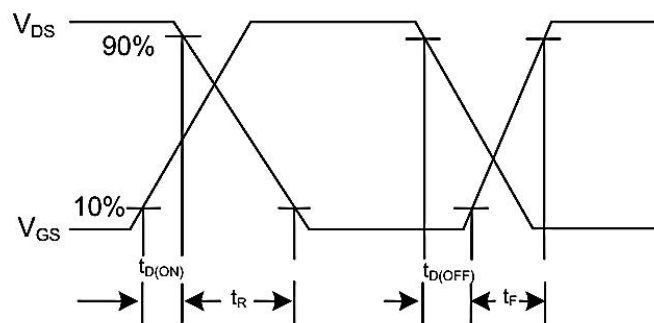
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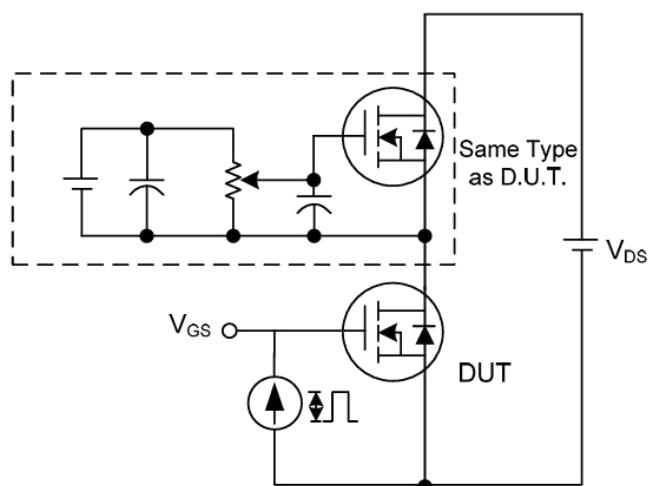
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



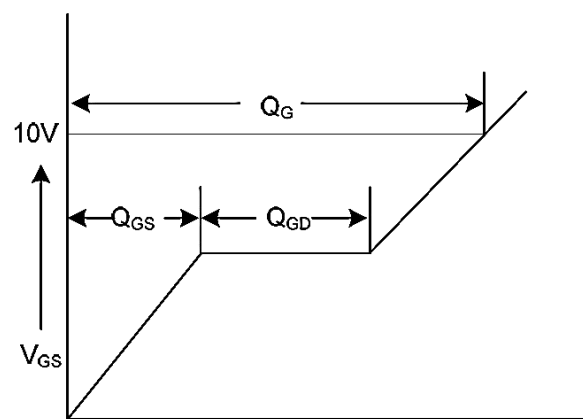
Switching Test Circuit



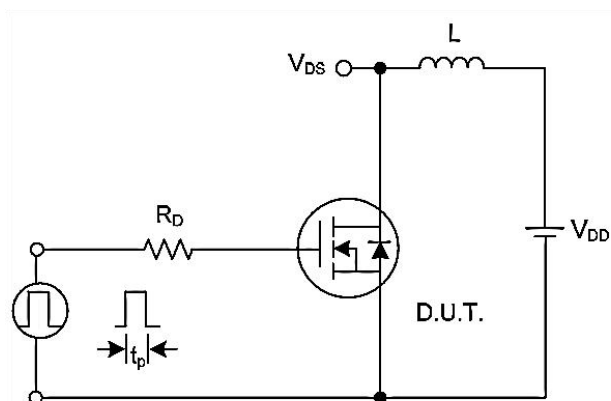
Switching Waveforms



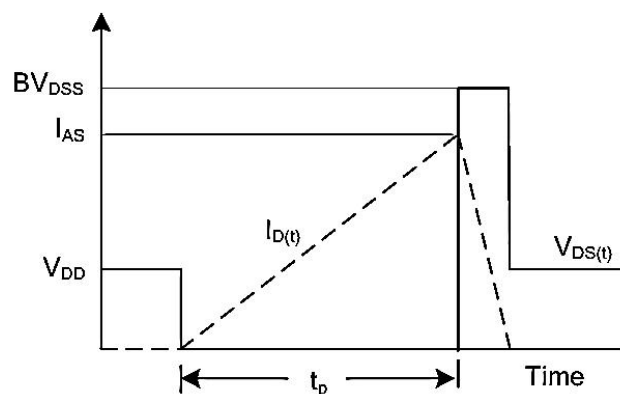
Gate Charge Test Circuit



Charge Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

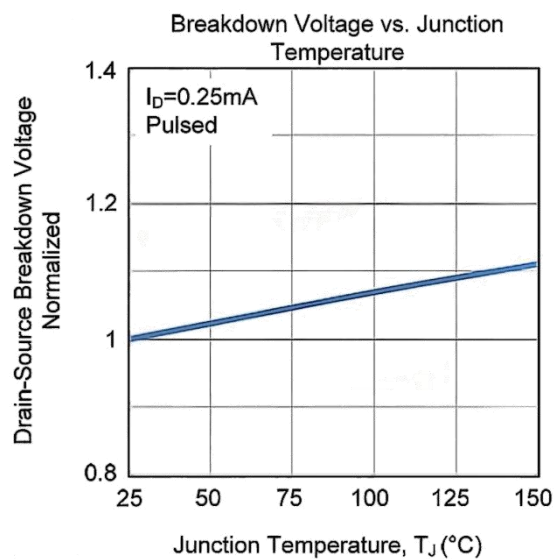
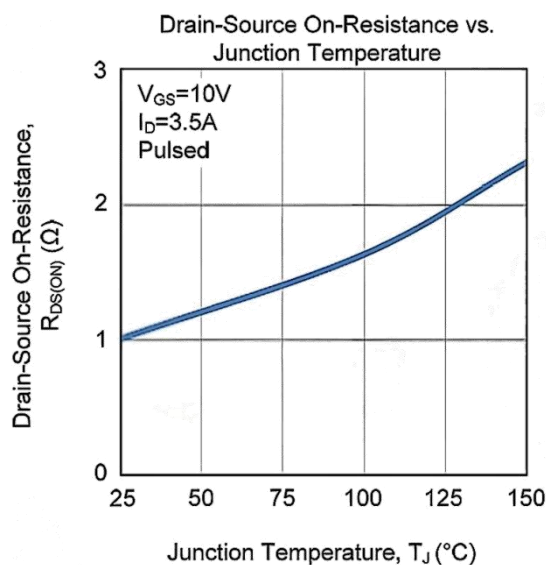
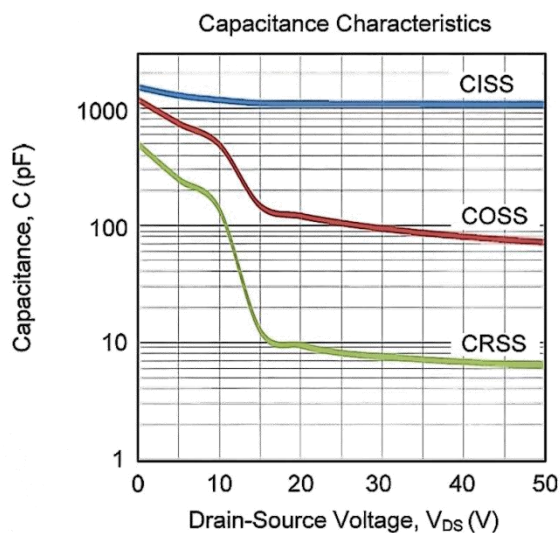
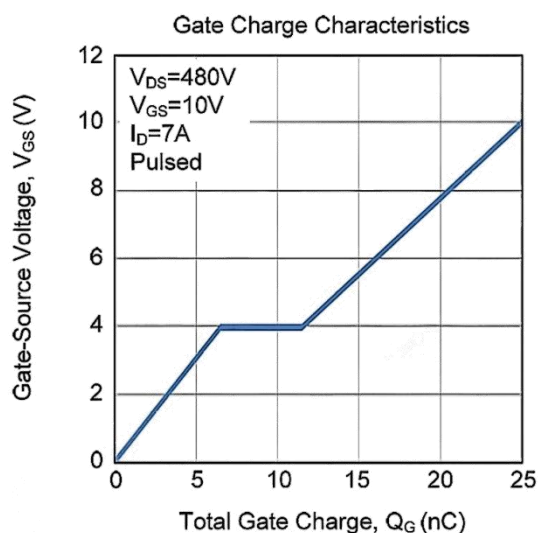
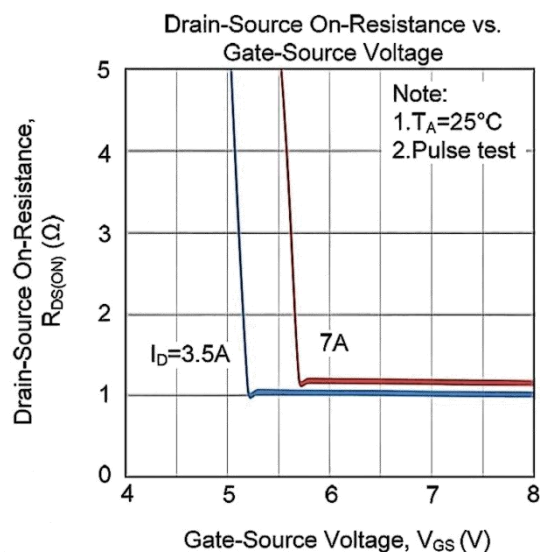
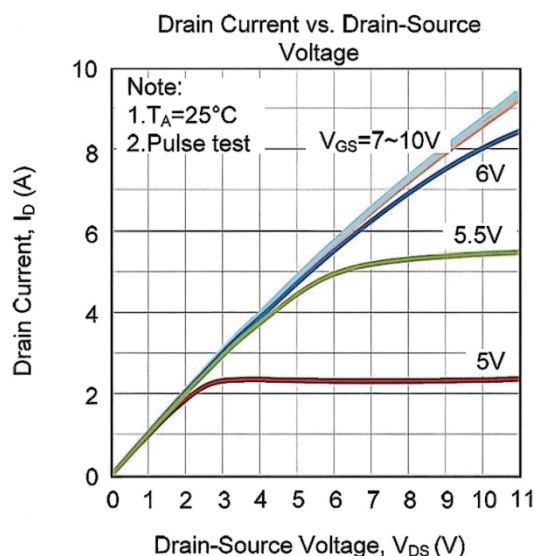


Unclamped Inductive Switching Waveforms

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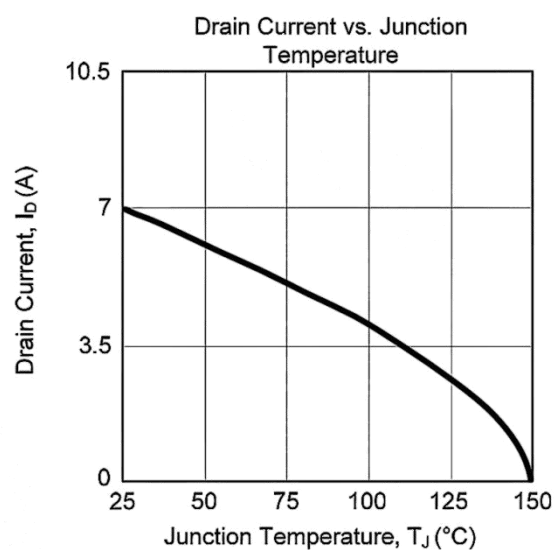
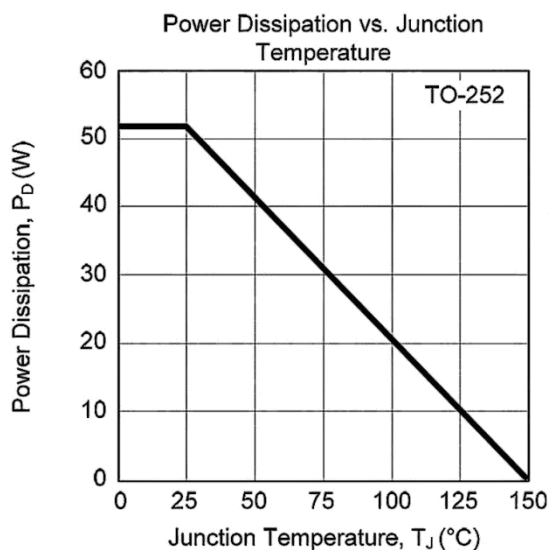
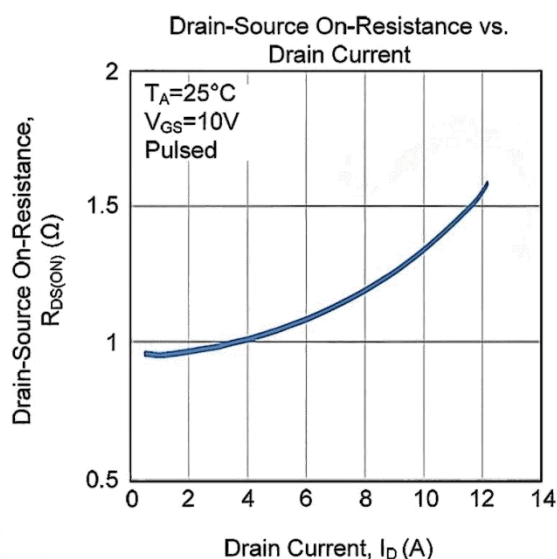
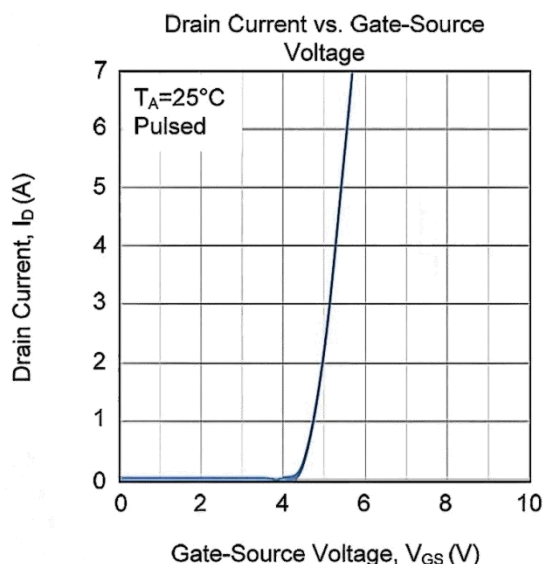
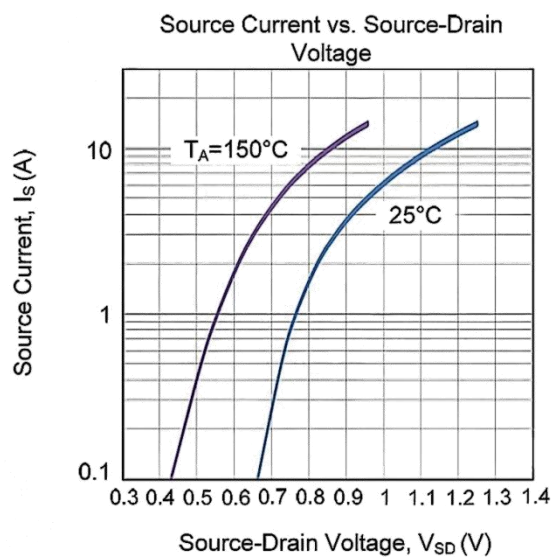
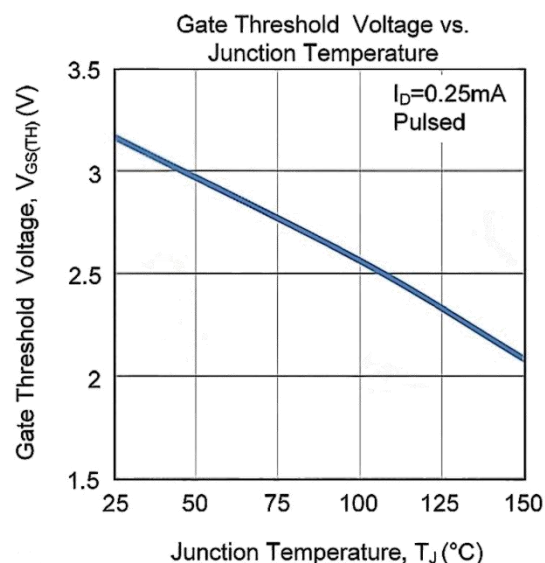
TYPICAL CHARACTERISTICS(1)



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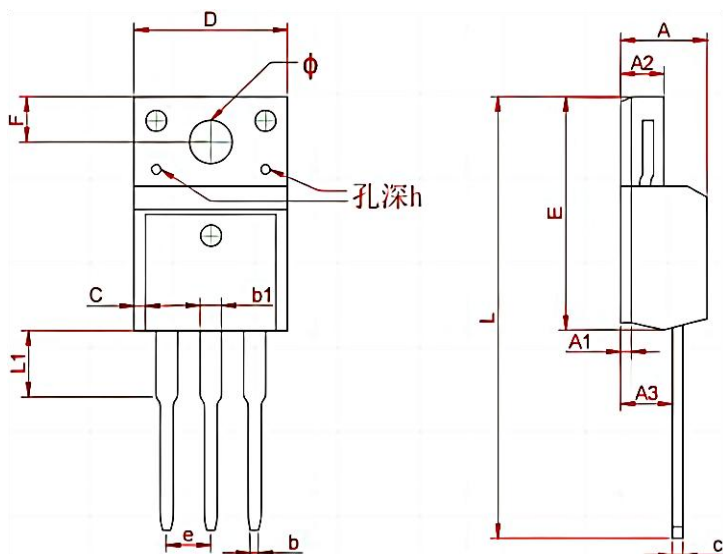
■ TYPICAL CHARACTERISTICS(Con.t)



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TO-220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters	
	Min	Max
A	4.300	4.750
A1	0.7 REF	
A2	2.300	2.850
A3	2.500	2.900
b	0.380	0.420
b1	1.220	1.280
C	1.08	1.200
c	0.480	0.520
D	10.15	10.450
E	15.700	15.950
e	2.574 TYP	
F	3.470 REF	
y	3.200 REF	
h	0.000	0.800
L	28.780	28.900
L1	2.990	3.100

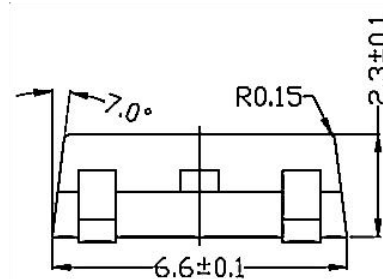
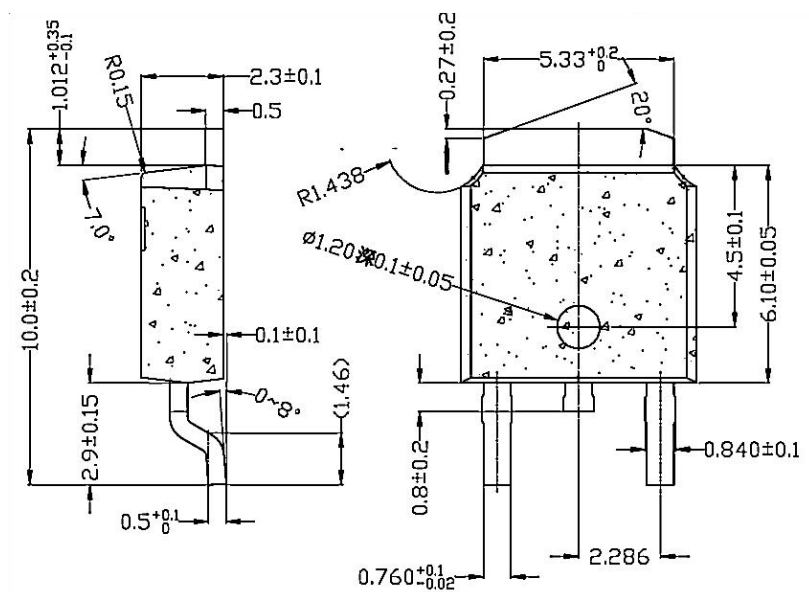
TO - 220F PACKING INFORMATION

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

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TO - 252 PACKAGE OUTLINE DIMENSIONS



TO - 252 PACKING INFORMATION

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