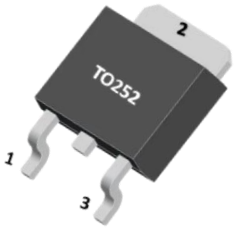
70A, 60V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

■ DESCRIPTION

The HY70N06A is N-channel enhancement mode power field effect transistors with stable off-state characteristics, fast switching speed, low thermal resistance, usually used at telecom and computer application.

The HY70N06A meet the ROHS and Green Product requirement with full function reliability approved.



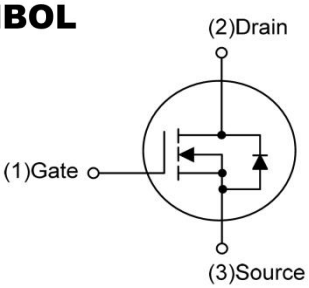
■ FEATURES

* Good stability and uniformity with high EAS
* Excellent package for good heat dissipation
* High density cell design for ultra low Rdson
* Special process technology for high ESD capability
* Fully characterized avalanche voltage and current

■ APPLICATION

* Power switching application
* Hard switched and high frequency circuits
* Uninterruptible power supply

SYMBOL



■ MARKING

: HY LOGO

HY70N06A=Device Code

XXXX=Date Code

Solid Dot=Green molding compound

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

SYMBOL	PARAMETER		VALUE	UNIT
VDSS	Drain-Source Voltage		60	V
VGSS	Gate-Source Voltage		±20	V
ID	Continuous Drain Current		70	A
IDM	Pulsed Drain Current (Note 2)		140	A
EAS	Avalanche Energy	Single Pulsed (Note 3)	165	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		2.1	V/ns
PD	Power Dissipation (Note 1)	TO-220F	36	W
		TO-252	55	
Tj	Junction temperature		+150	°C
Tstg	Operation and Storage Temperature		-55~+150	°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.Repeativity rating: pulse width limited by junction temperature.
3.L=0.1mH, IAS=57.5A, VDD=25V, RG=20Ω, Starting TJ=25°C .
4.ISD≤48A, di/dt≤300A/μs, VDD≤BVDSS, Starting TJ=25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θJA	62.5	°C/W
	TO-252		110	
Junction to Case	TO-220F	θJC	3.47	°C/W
	TO-252(Note 2)		2.2	
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.				

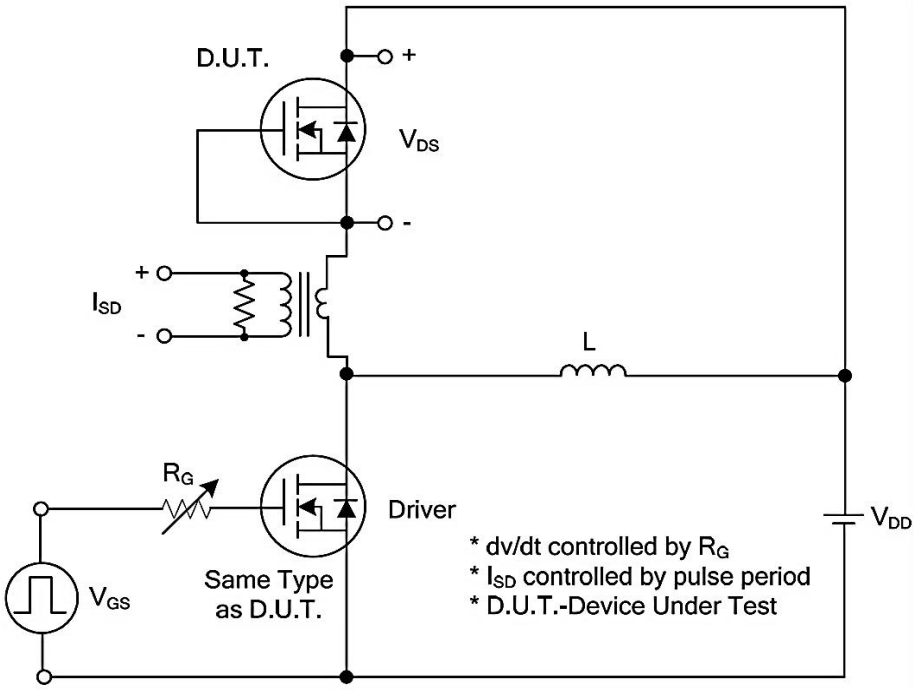
■ ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BVDSS	VGS=0V, ID=250μA	60			V
Drain-Source Leakage Current	IDSS	VDS=60V,VGS=0V			1	μA
Gate- Source Leakage Current	IGSS	VGS=±20V, VDS=0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	VGS(TH)	VDS=VGS , ID=250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=35A			12	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	CISS	VDS=25V, VGS=0V, f= 1.0MHz		3650		pF
Output Capacitance	COSS			330		
Reverse Transfer Capacitance	CRSS			286		
SWITCHING CHARACTERISTICS						
Total Gate Charge	QG	VDS=48V,VGS= 10V, ID=70A IG=1mA (Note1, 2)		90		nC
Gate-Source Charge	QGS			16		
Gate-Drain Charge	QGD			25		
Turn-on delay time	td(on)	VDD=30V,ID=70A VGS=10V,RG=3Ω (Note1, 2)		16		ns
Turn-on rise time	tr			18		
Turn-off delay time	td(off)			60		
Turn-off fall time	tf			24		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	IS				70	A
Maximum Pulsed Drain-Source Diode Forward Current	ISM				140	A
Drain-source diode forward voltage	VSD	IS=70A, VGS=0V			1.4	V
Reverse Recovery Time	trr	VGS=0V, IS=30A dIF/dt=100A/μs		45		ns
Reverse Recovery Charge	Qrr			50		nC

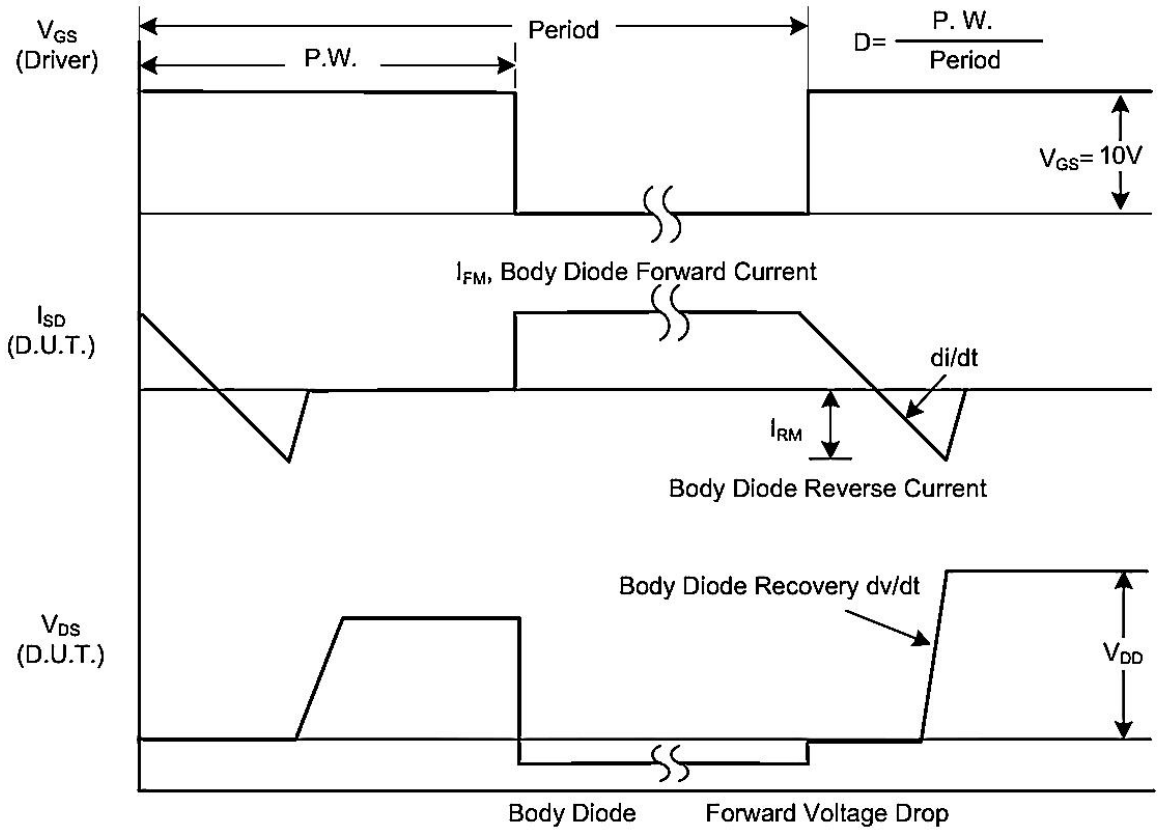
Notes:

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



1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Con.t)

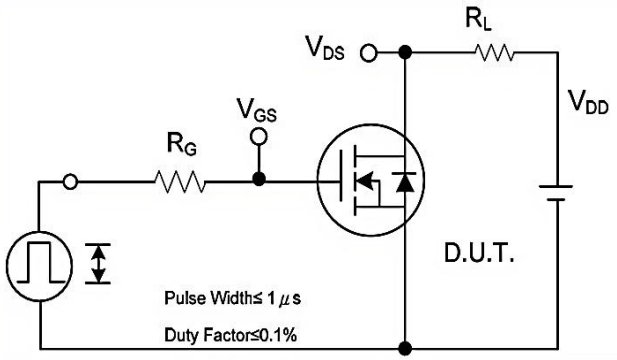


Fig. 2A Switching Test Circuit

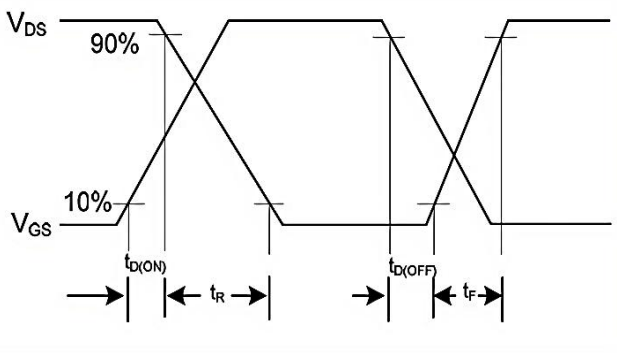


Fig. 2B Switching Waveforms

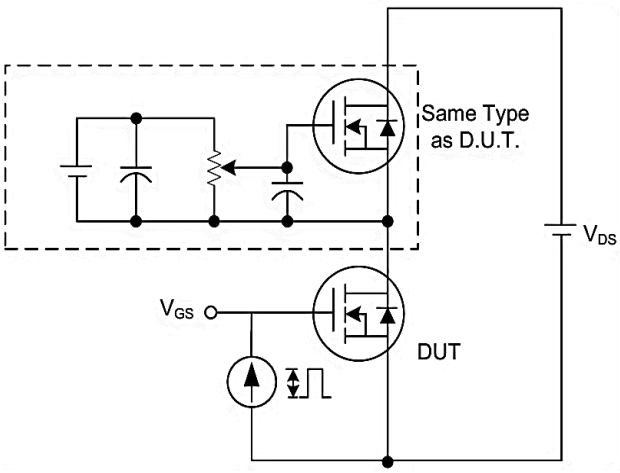


Fig. 3A Gate Charge Test Circuit

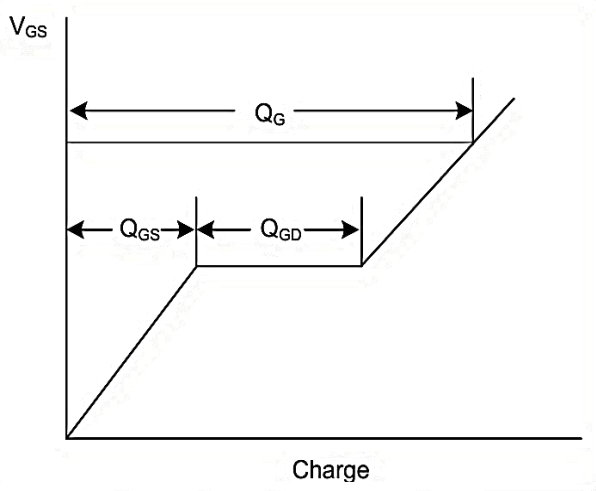


Fig. 3B Gate Charge Waveform

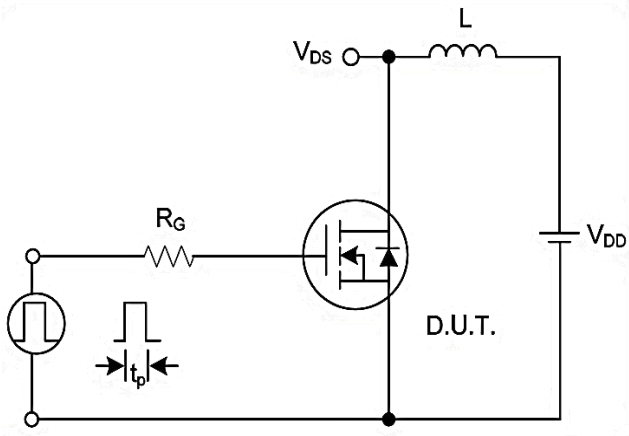


Fig. 4A Unclamped Inductive Switching Test Circuit

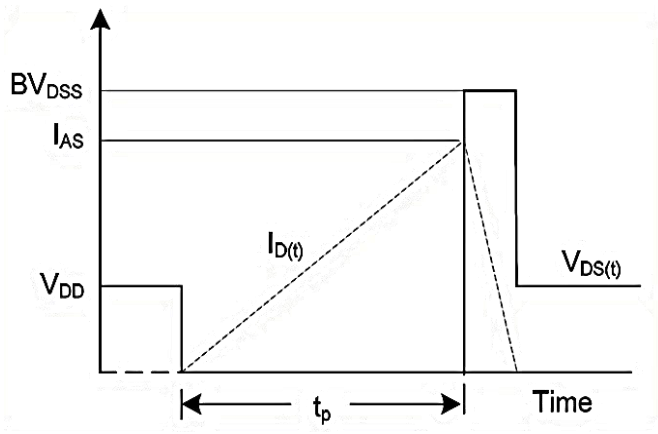
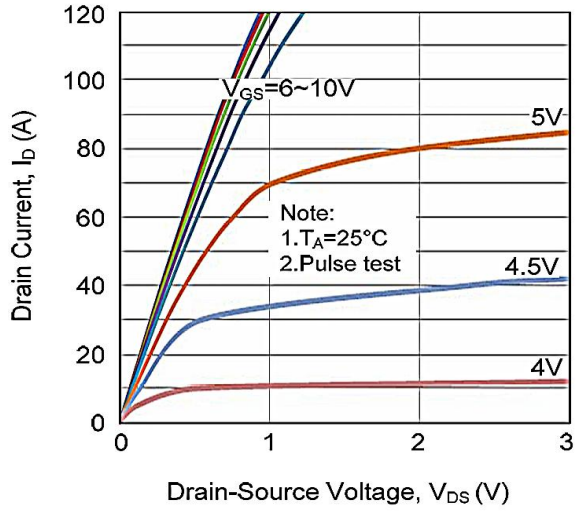


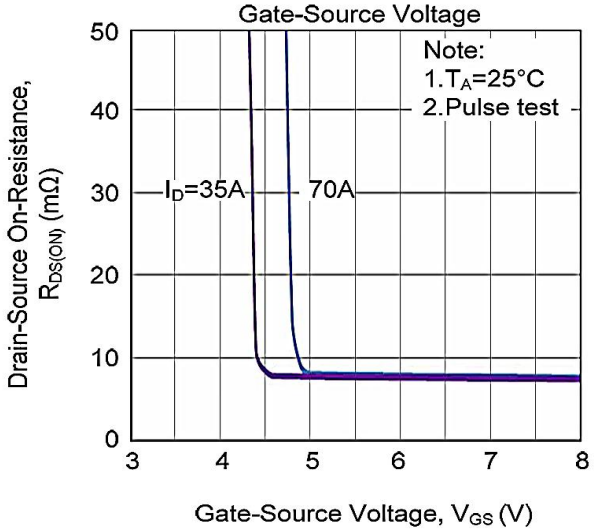
Fig. 4B Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS(1)

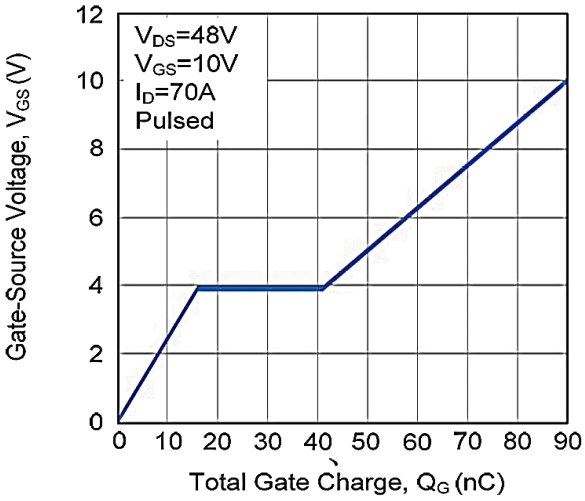
Drain Current vs. Drain-Source Voltage



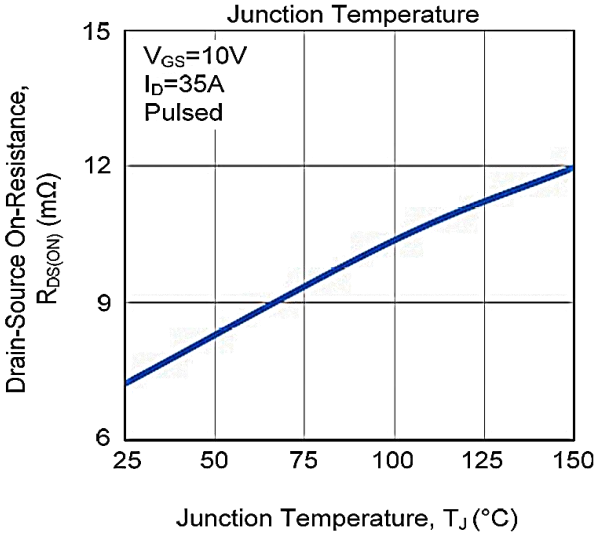
Drain-Source On-Resistance vs. Gate-Source Voltage



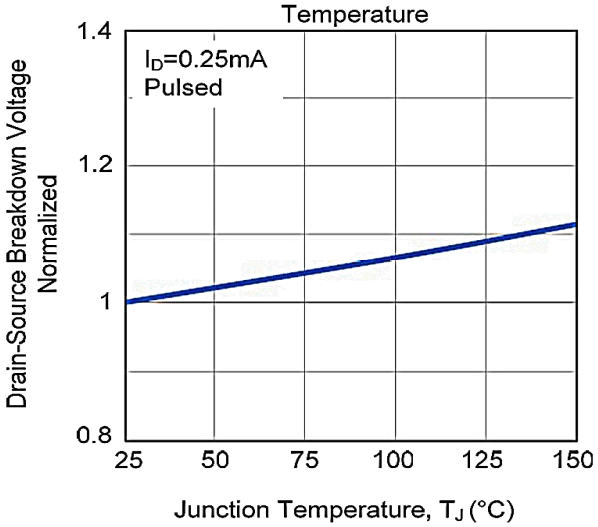
Gate Charge Characteristics



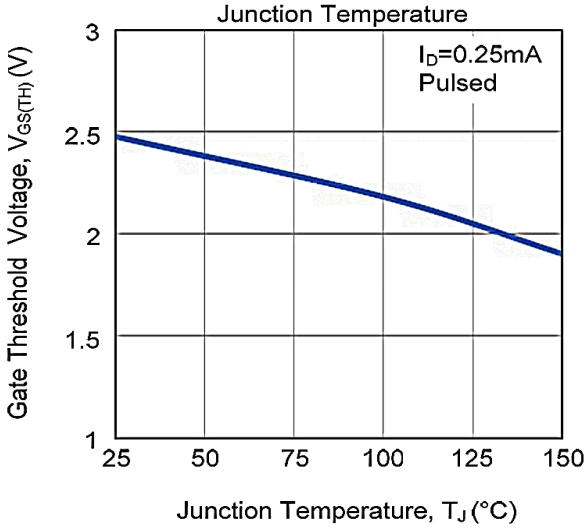
Drain-Source On-Resistance vs. Junction Temperature



Breakdown Voltage vs. Junction Temperature

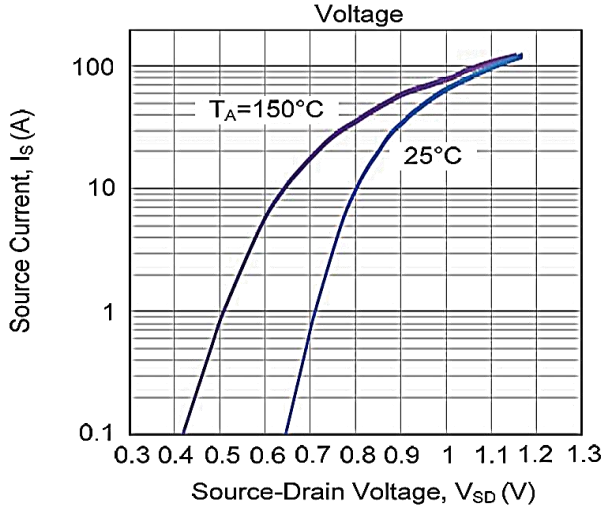


Gate Threshold Voltage vs. Junction Temperature

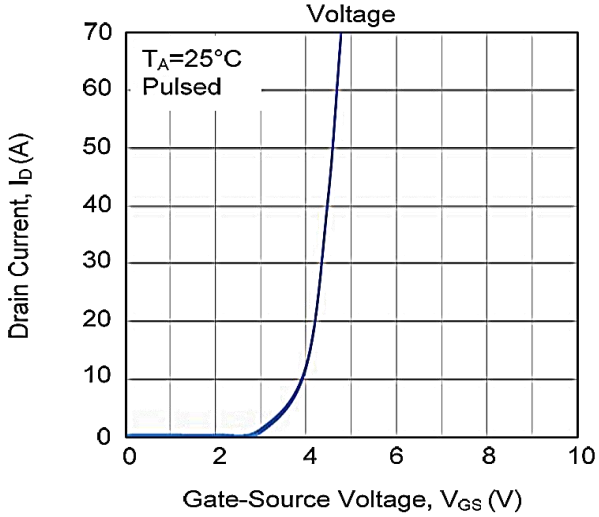


■ TYPICAL CHARACTERISTICS(2)

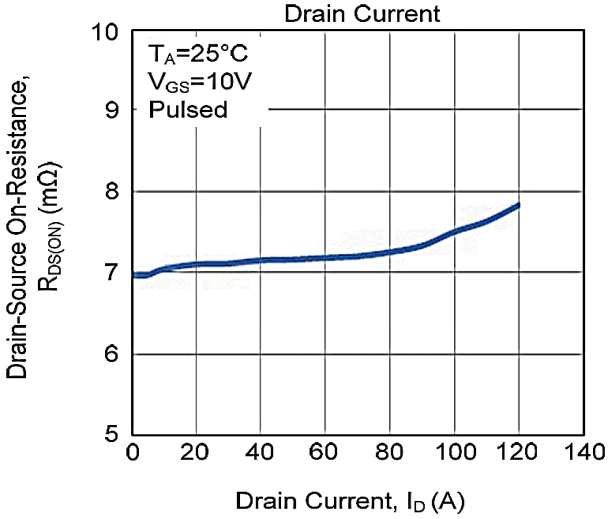
Source Current vs. Source-Drain Voltage



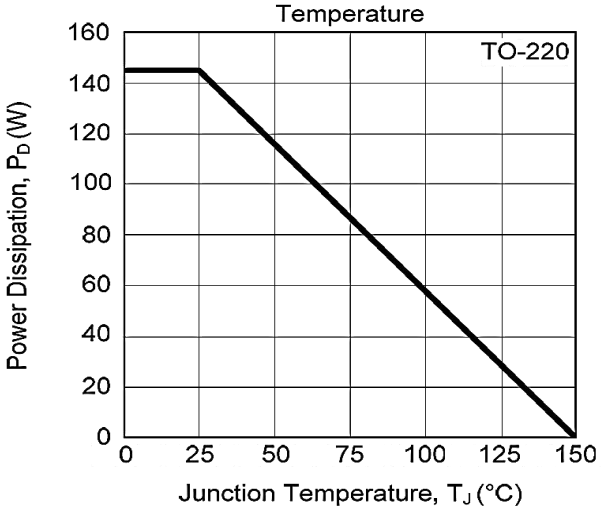
Drain Current vs. Gate-Source Voltage



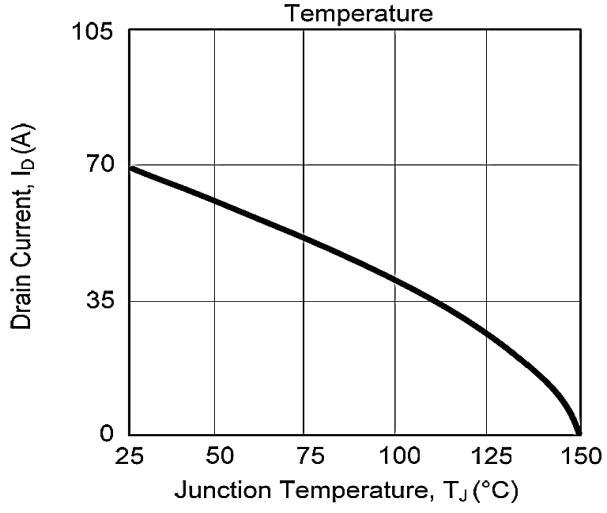
Drain-Source On-Resistance vs. Drain Current



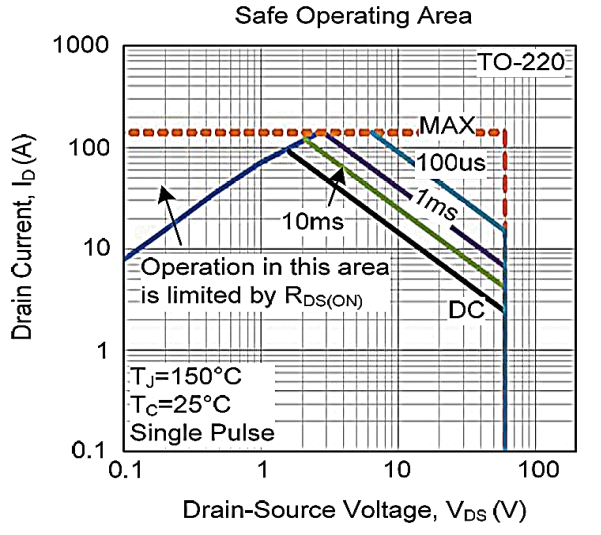
Power Dissipation vs. Junction Temperature



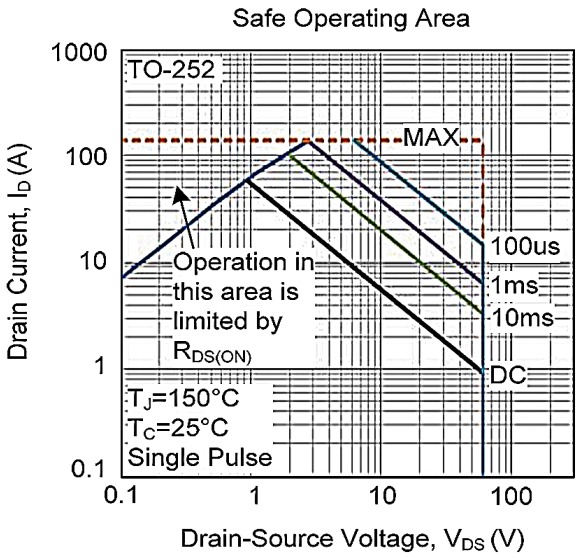
Drain Current vs. Junction Temperature



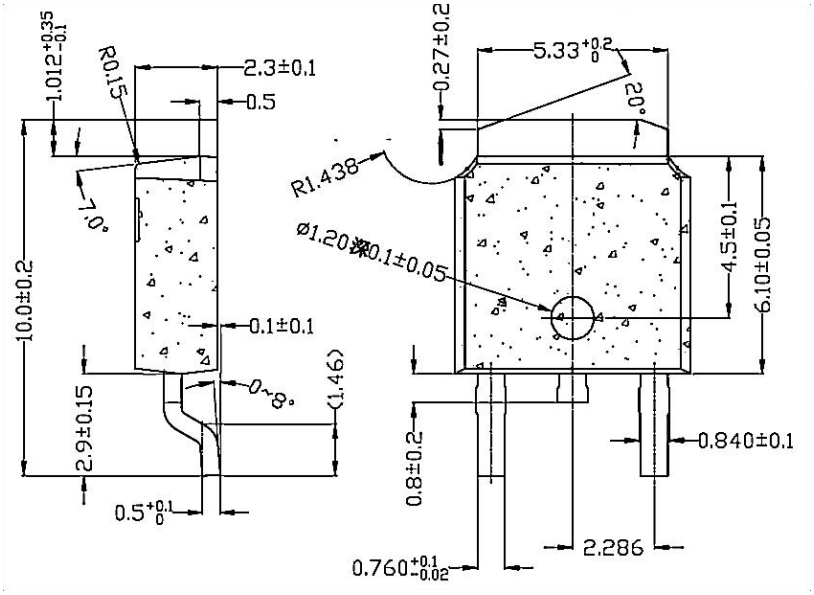
Safe Operating Area

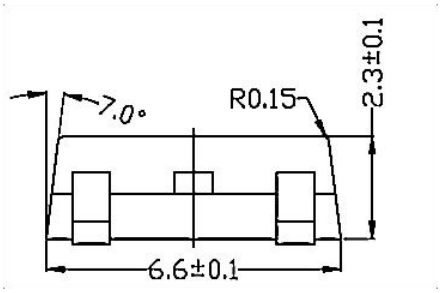


■ TYPICAL CHARACTERISTICS(Con.t)

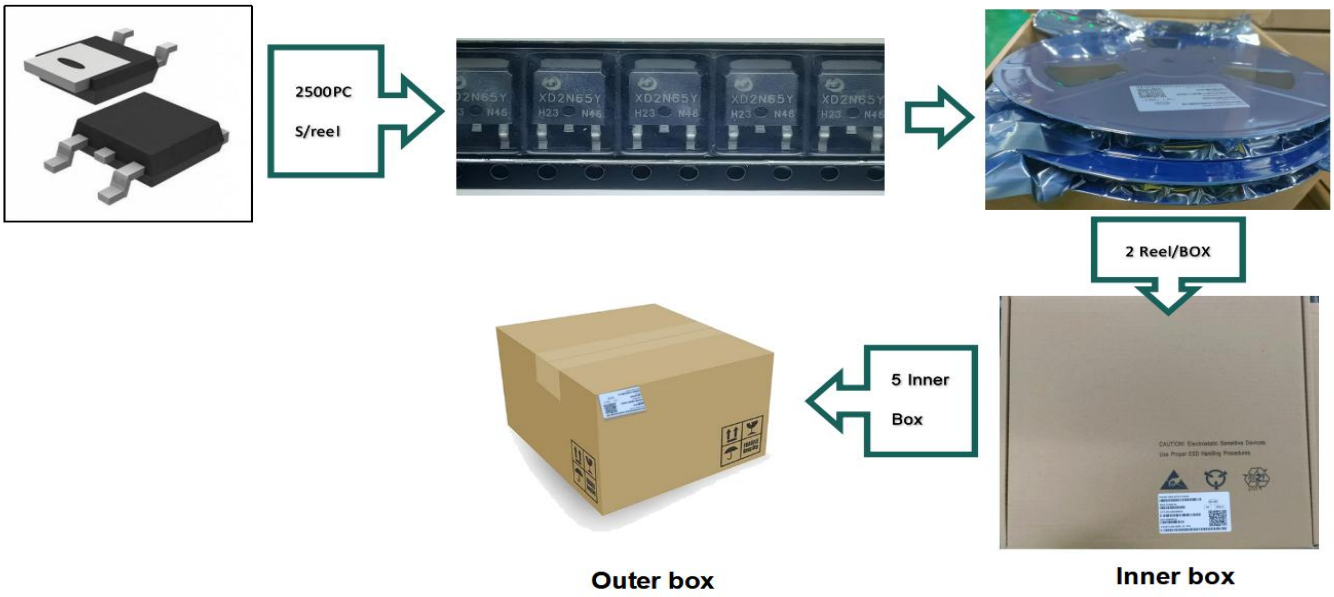


■ TO - 252 PACKAGE OUTLINE DIMENSIONS



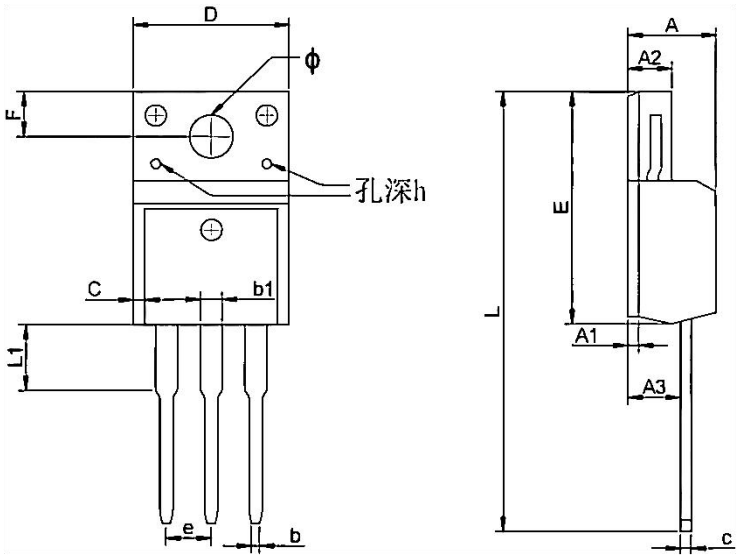


■ TO - 252 PACKING INFORMATION



Package version	Reel dimensions Φ×H (mm)	Per Reel (pcs)	Reels per box	Inner box dimensions L×W×H(mm)	Outer box (pcs)	Outer box dimensions L×W×H (mm)
TO-252	Φ330*20	2500	2	360*340*50	25000	375*375*280

■ TO- 220F PACKAGE OUTLINE DIMENSIONS

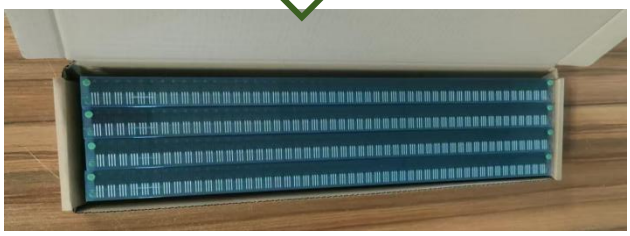


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max	Min	Max
A	4.300	4.750	0.169	0.185
A1	1.830 REF		0.072 REF	
A2	2.300	2.850	0.090	0.112
A3	2.500	2.900	0.098	0.114
b	0.400	0.420	0.016	0.016
b1	1.220	1.280	0.048	0.050
C	0.690	0.720	0.027	0.028
c	0.490	0.510	0.019	0.020
D	9.960	10.200	0.392	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



5 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
		Outer Box				Inner Box	
TO-220F	530*32*7	50	20	580*155*50	1000	602*277*188	5000