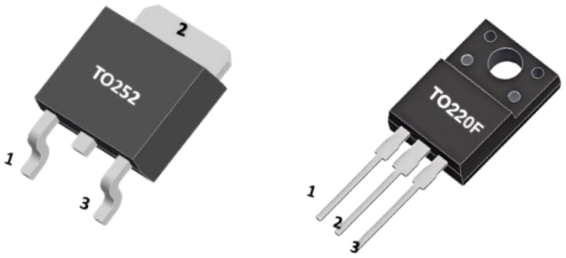
8A, 650V N-CHANNEL POWER MOSFET



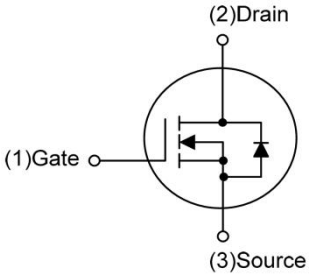
■ DESCRIPTION

The HY8N65A 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

* High Current Rating
* Lower $R_{DS(on)}$
* Lower Capacitance
* Lower Total Gate Charge
* Tighter VSD Specifications
* Avalanche Energy Specified

SYMBOL



■ MARKING

: HY LOGO

HY8N65A=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		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	±30	V
Continuous Drain Current		I_D	8	A
Pulsed Drain Current (Note 2)		I_{DM}	16	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	320	mJ
Peak Diode Recovery dv/dt(Note 4)		dv/dt	2.1	V/ns
Power Dissipation	TO-220F	P_D	36	W
	TO-252		50	
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-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. Repetitive Rating : Pulse width limited by TJ
3. L=7.1mH, I_{AS}=8A, V_{DD}= 50V, R_G=25Ω, Starting TJ=25°C
4. I_{SD} ≤8A, di/dt ≤200A/μs, V_{DD} ≤BV_{DSS}, Starting TJ=25°C

■ THERMAL DATA

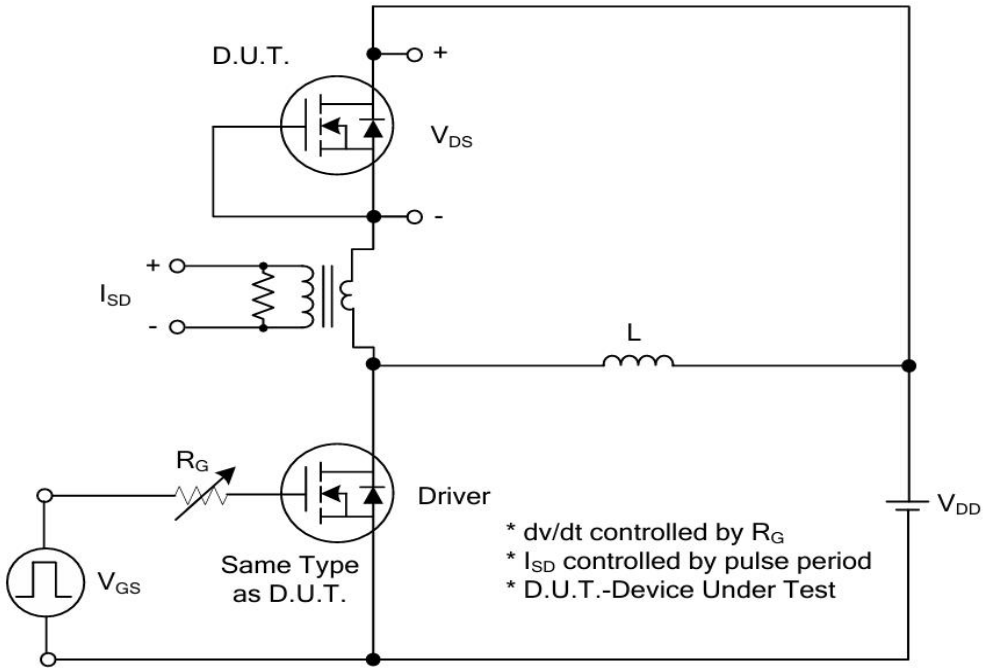
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220F	θJA	62.5	°C/W
	TO-252		100	
Junction to Case	TO-220F	θJC	3.47	°C/W
	TO-252		2.5(Note)	
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.				

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

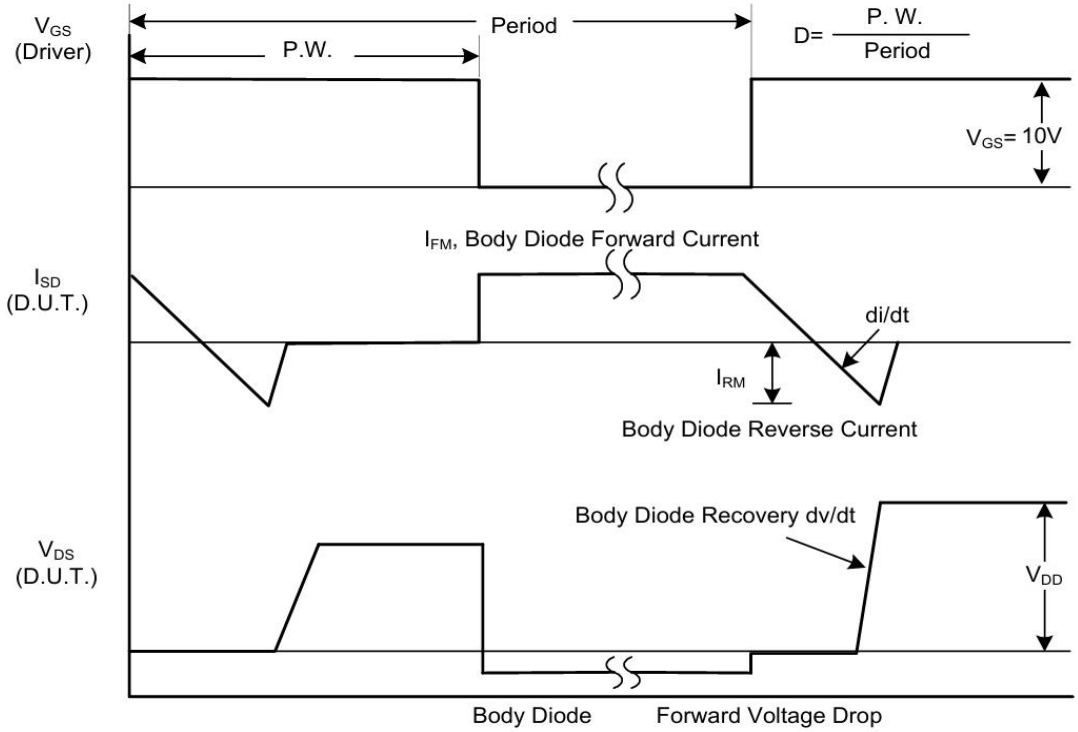
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	650			V
Zero gate voltage drain current	I_{DSS}	V_{DS}=650V, V_{GS}=0V			10	μA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS} , I_D=250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4A			1.2	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=25V,V_{GS}=0V f= 1.0MHz		1070		pF
Output Capacitance	C_{OSS}			114		pF
Reverse Transfer Capacitance	C_{RSS}			15.5		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	V_{DS}=520V, V_{GS}= 10V I_D=8A ,I_G=1mA (Note 1, 2)		29		nC
Gate-Source Charge	Q_{GS}			5.5		nC
Gate-Drain Charge	Q_{GD}			9.2		nC
Turn-On Delay Time	$t_{D(ON)}$	V_{DS}=100V, V_{GS}= 10V I_D=8A ,R_G=25Ω (Note 1, 2)		12		ns
Turn-On Rise Time	t_R			23		ns
Turn-Off Delay Time	$t_{D(OFF)}$			105		ns
Turn-Off Fall Time	t_F			43		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage(Note 1)	V_{SD}	VGS = 0 V, IS = 8A			1.4	V
Continuous Drain-Source Current	I_S				8	A
Pulsed drain-source diode forward current	I_{SM}				16	A
Reverse Recovery Time(Note 1)	trr	I_S =8A,V_{GS} = 0V dIF/dt = 100A/μs		384		ns
Reverse Recovery Charge	Qrr			3.4		μC

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

■ TEST CIRCUITS AND WAVEFORMS

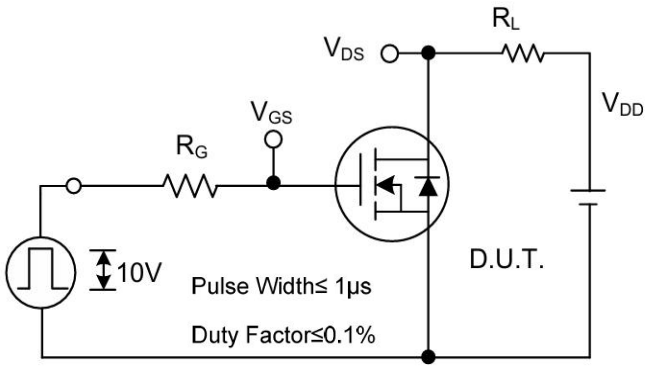


Peak Diode Recovery dv/dt Test Circuit

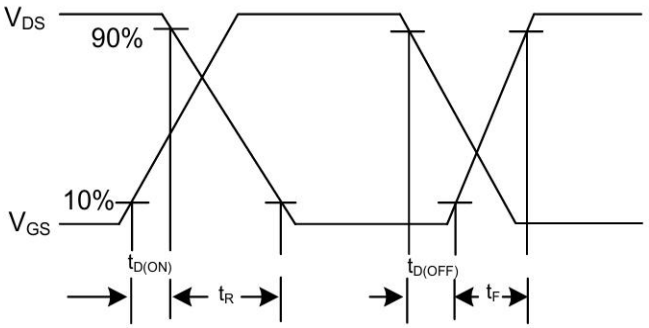


Peak Diode Recovery dv/dt Waveforms

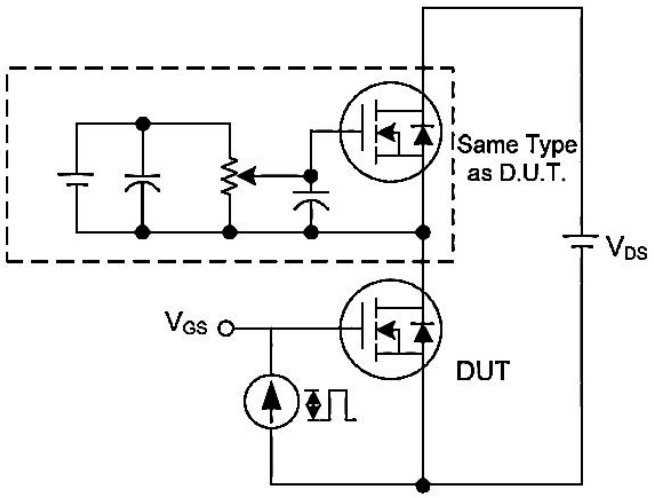
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



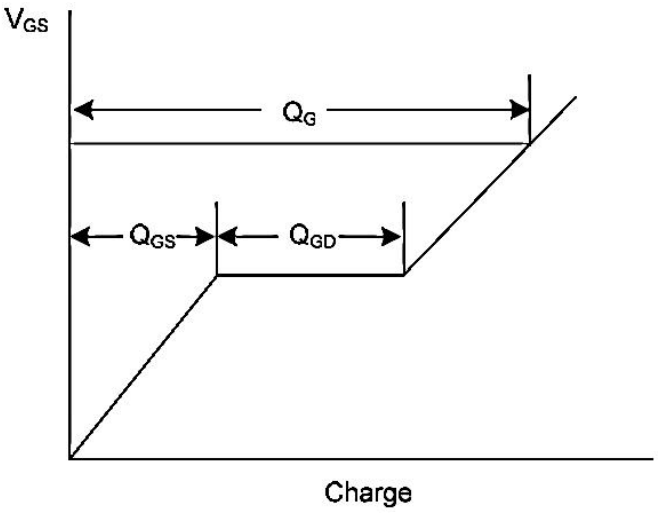
Switching Test Circuit



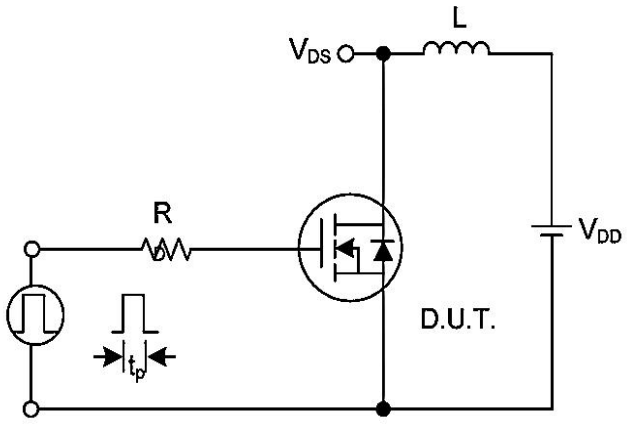
Switching Waveforms



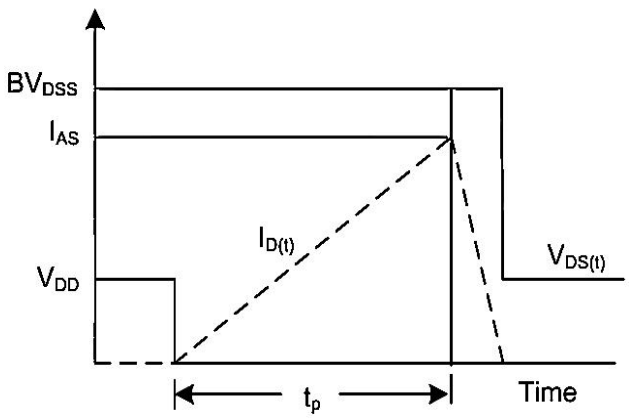
Gate Charge Test Circuit



Gate Charge Waveform



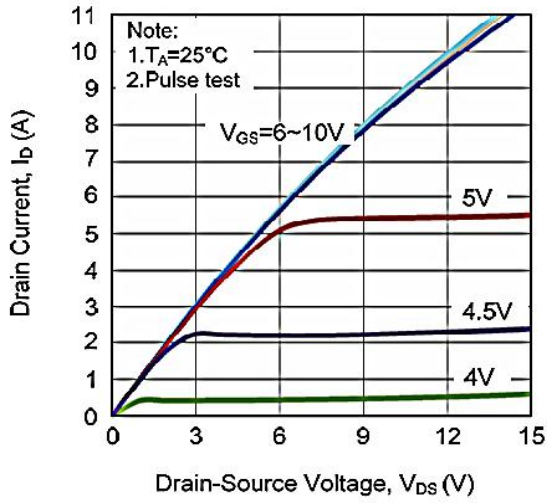
Unclamped Inductive Switching Test Circuit



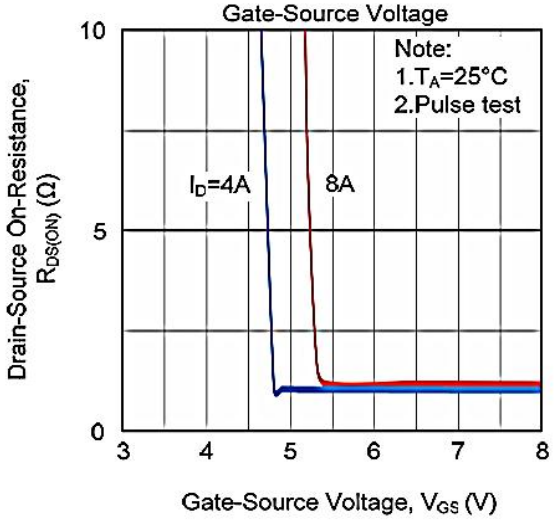
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

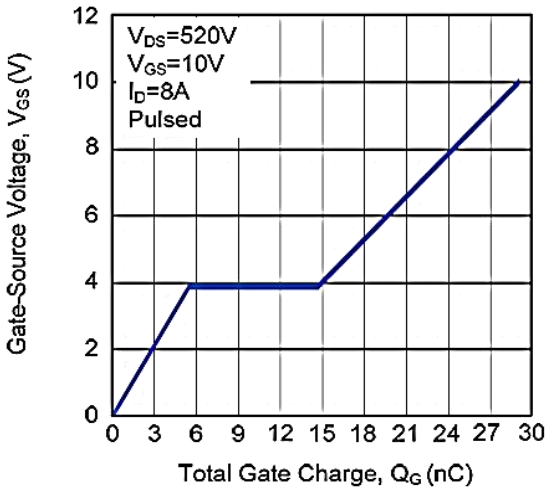
Drain Current vs. Drain-Source Voltage



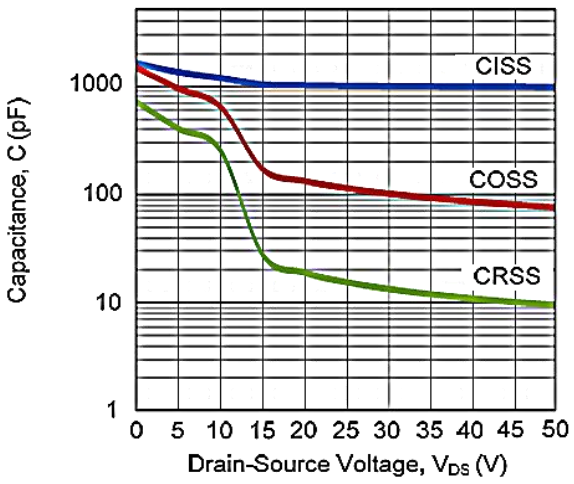
Drain-Source On-Resistance vs. Gate-Source Voltage



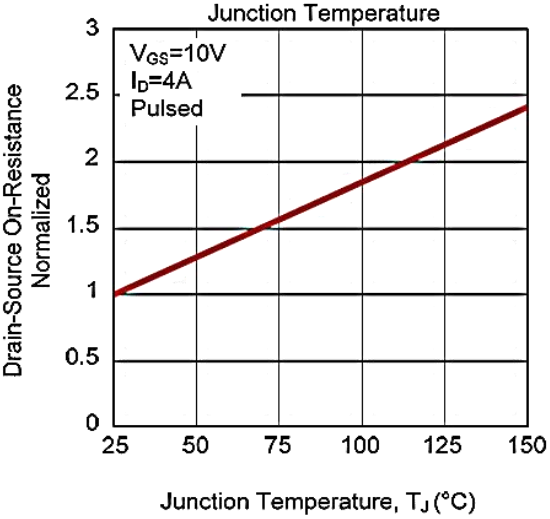
Gate Charge Characteristics



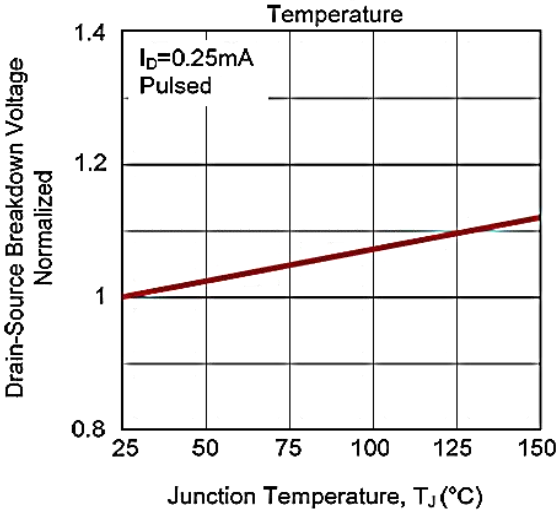
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

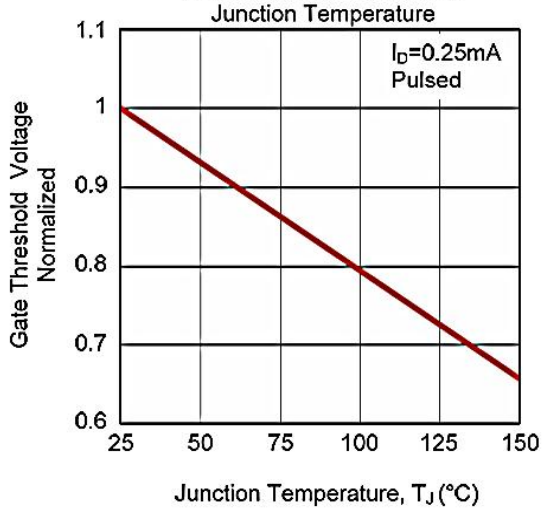


Breakdown Voltage vs. Junction Temperature

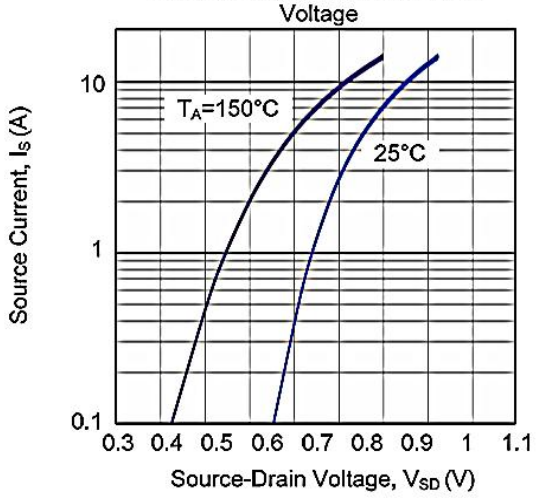


■ TYPICAL CHARACTERISTICS(Con.t)

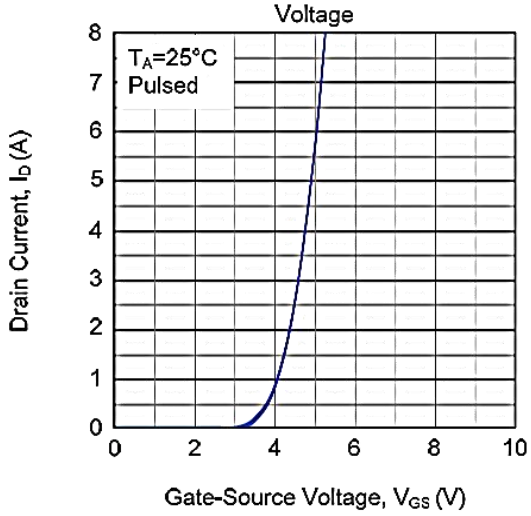
Gate Threshold Voltage vs. Junction Temperature



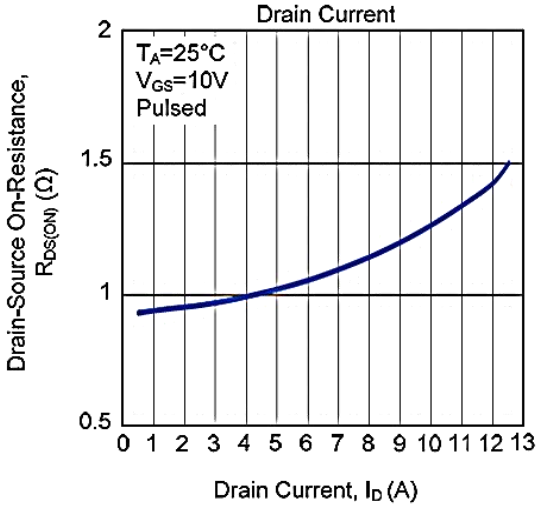
Source Current vs. Source-Drain Voltage



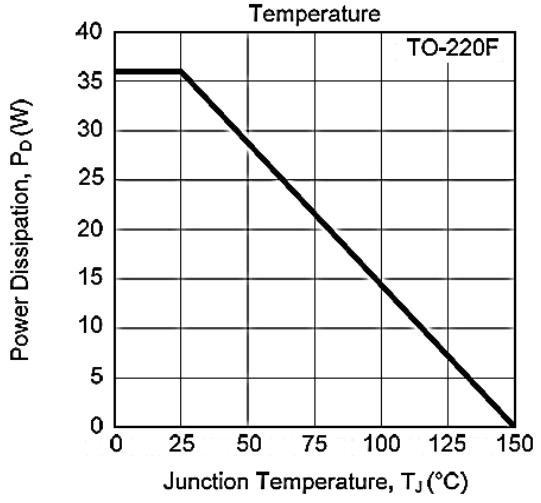
Drain Current vs. Gate-Source Voltage



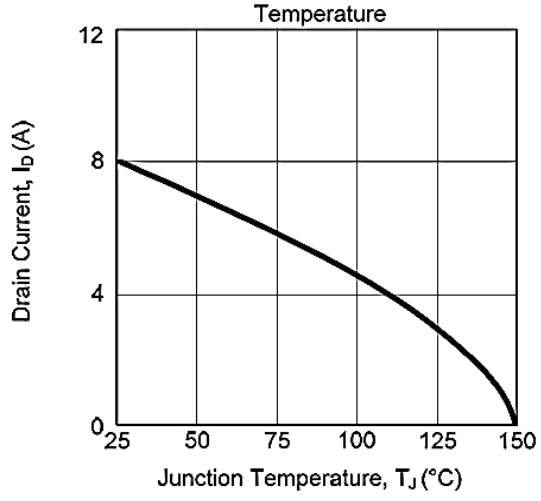
Drain-Source On-Resistance vs. Drain Current



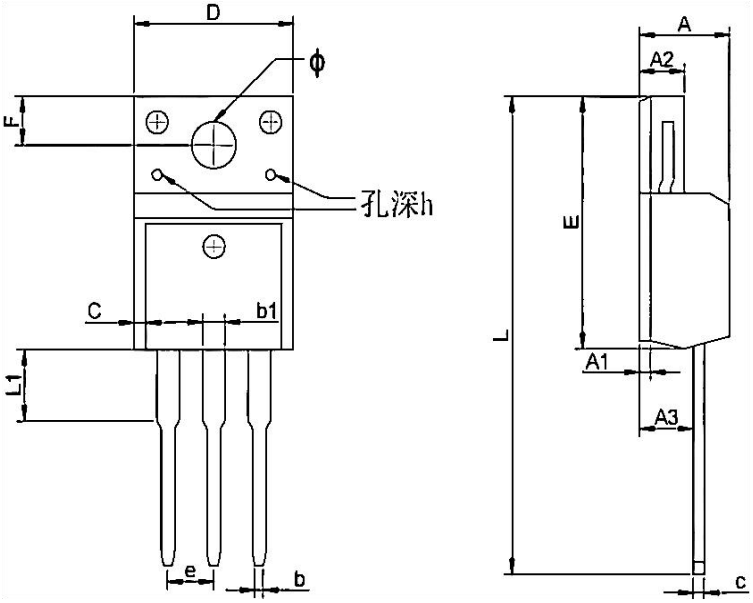
Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TO - 220F PACKAGE OUTLINE DIMENSIONS

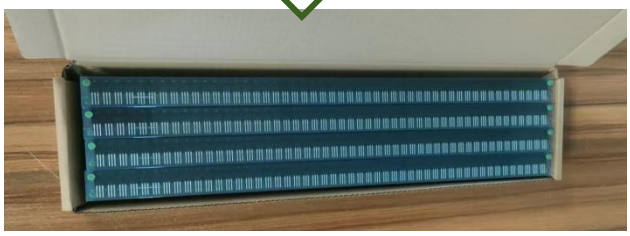


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max	Min	Max
A	4.300	4.750	0.169	0.185
A1	1.830 REF		0.072 REF	
A2	2.300	2.850	0.090	0.112
A3	2.500	2.900	0.098	0.114
b	0.400	0.420	0.016	0.016
b1	1.220	1.280	0.048	0.050
C	0.690	0.720	0.027	0.028
c	0.490	0.510	0.019	0.020
D	9.960	10.200	0.392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



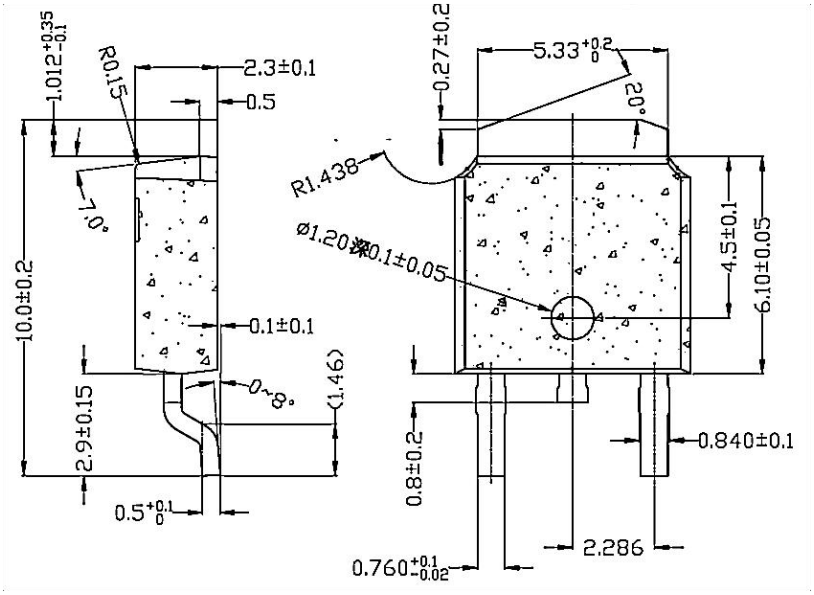
5 Inner Box

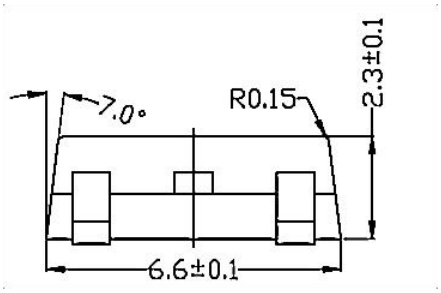
Outer Box

Inner Box

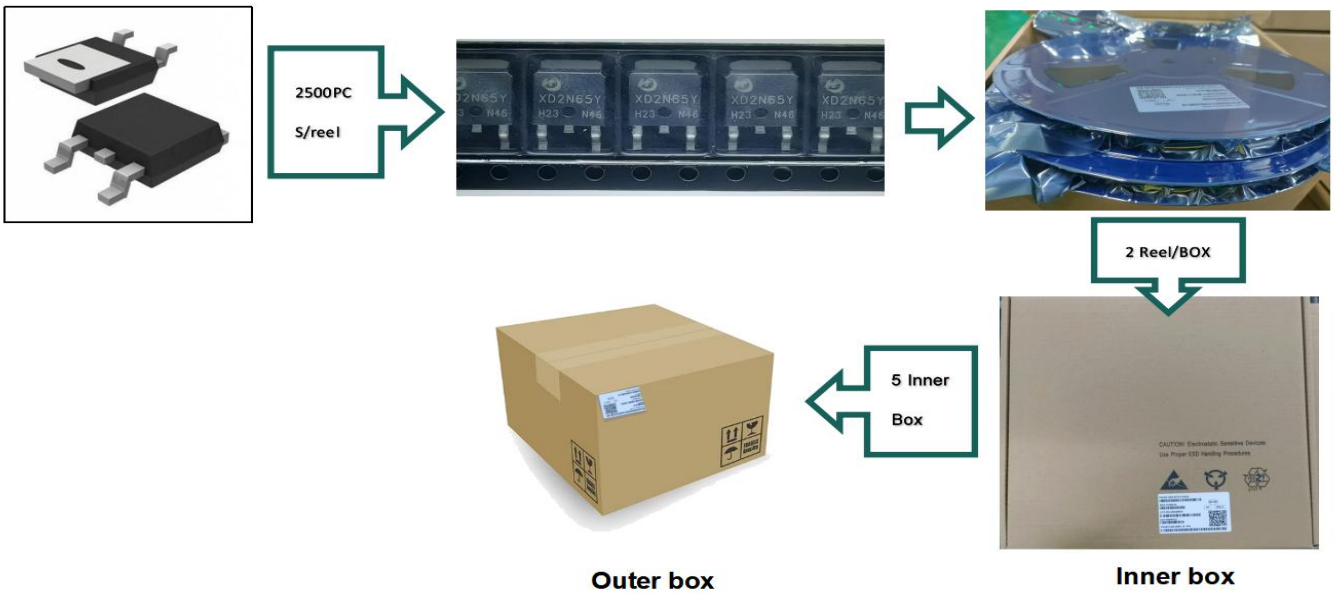
Package version	Tube dimensions LxW×H (mm)	Per Tube (pcs)	Tube per box	Inner box dimensions LxW×H (mm)	PCS/ Inner box	Outer box dimensions L×W×H(mm)	PCS/ Outer box
TO-220F	530*32*7	50	20	580*155*50	1000	602*277*188	5000

■ 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