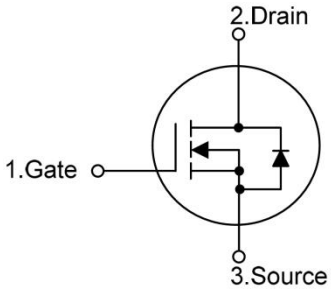
16A, 650V N-CHANNEL POWER MOSFET

■ DESCRIPTION

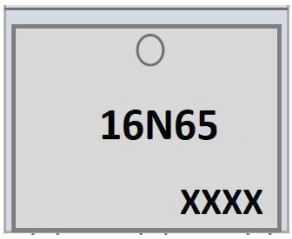
The 16N65 is a high voltage power MOSFET combines advanced planar MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.



■ FEATURES

* $R_{DS(ON)}$ < 0.65Ω @ V_{GS} = 10 V, I_D =2 A
* High switching speed
* Improved dv/dt capability

■ MARKING



16N65=Device Code

XXXX=Date Code

Solid Dot=Green molding compound

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

SYMBOL	PARAMETER		VALUE	UNIT
V_{DSS}	Drain-Source Voltage		650	V
V_{GSS}	Gate Source Voltage		±30	V
I_D	Continuous Drain Current		16	A
I_{DM}	Pulsed Drain Current (Note 2)		32	A
E_{AS}	Avalanche Energy	Single Pulsed (Note 3)	35	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 4)		3	V/ns
P_D	Power Dissipation		75	W
T_J	Junction Temperature		150	°C
T_{STG}	Storage Temperature		-55 to 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 maximum junction temperature.
3. L = 30mH, I_{AS} = 2.55A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 16A, di/dt ≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θJA	62.5	°C/W
Junction to Case	θJC	3.04	°C/W

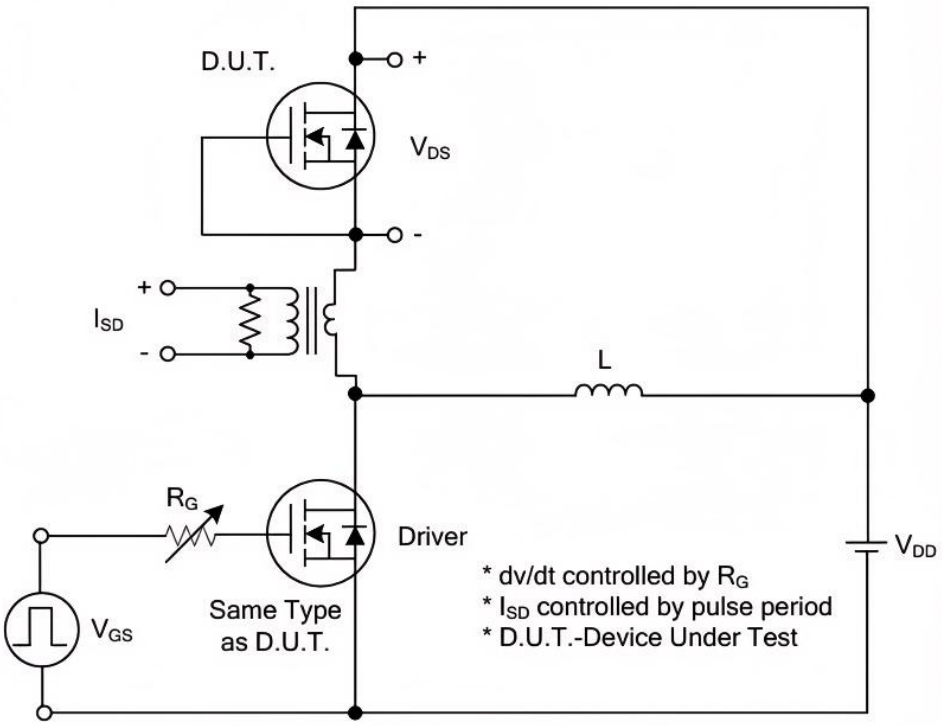
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

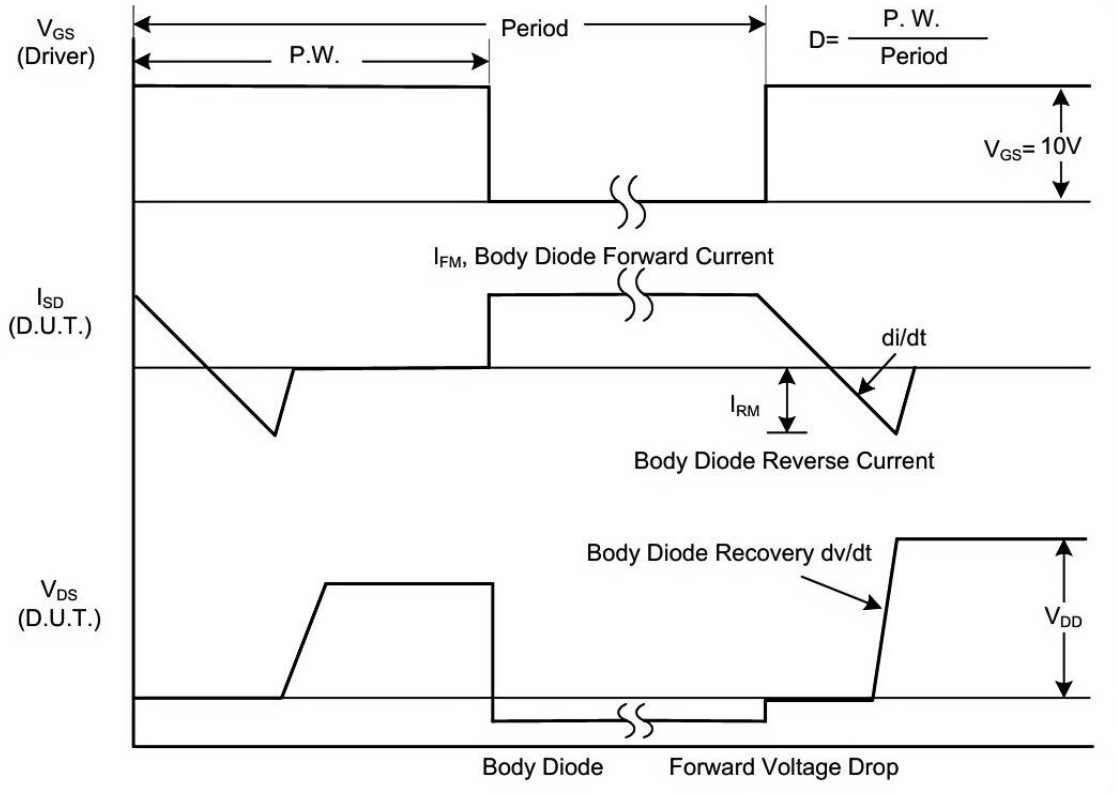
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BVDSS	VGS=0V, ID=250μA	650			V
Drain-Source Leakage Current		IDSS	VDS=650V, VGS=0V			1	μA
Gate- Source Leakage Current	Forward	IGSS	VGS=30V, VDS=0V			100	nA
	Reverse		VGS=-30V, VDS=0V			-100	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=13A			0.6	Ω
			VGS=10V, ID=2A		0.5	0.65	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		CISS	VDS=25V,VGS=0V f= 1.0MHz		3000		pF
Output Capacitance		COSS			260		pF
Reverse Transfer Capacitance		CRSS			11		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		QG	VDS=520V, VGS=10V ID=16A,IG=1mA (Note 1, 2)		59		nC
Gate-Source Charge		QGS			24		nC
Gate-Drain Charge		QGD			17		nC
Turn-On Delay Time (Note 1)		tD(ON)	VDS=100V, VGS=10V ID=16A,RG=5Ω (Note 1, 2)		44		ns
Turn-On Rise Time		tR			25		ns
Turn-Off Delay Time		tD(OFF)			122		ns
Turn-Off Fall Time		tF			35		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		IS				16	A
Maximum Body-Diode Pulsed Current		ISM				32	A
Drain-Source Diode Forward Voltage (Note 1)		VSD	IS=16A , VGS=0V			1.4	V
Reverse Recovery Time (Note 1)		trr	IS=16A,VGS=0 Vdi/dt=100A/μs		472		ns
Reverse Recovery Charge		Qrr			8.4		μC

Note: 1.Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%； 2.Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

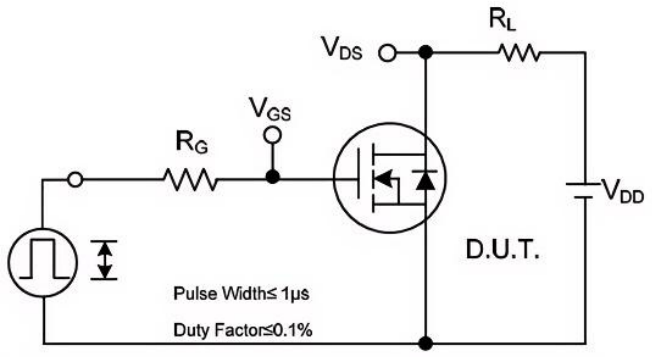


Peak Diode Recovery dv/dt Test Circuit

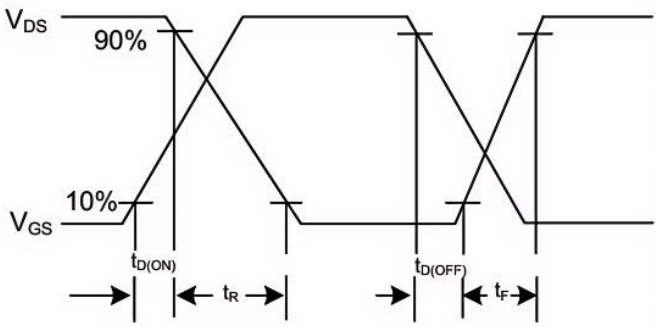


Peak Diode Recovery dv/dt Waveforms

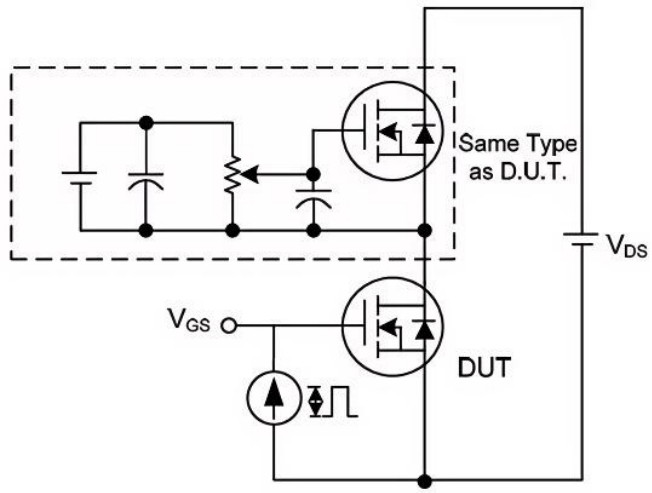
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



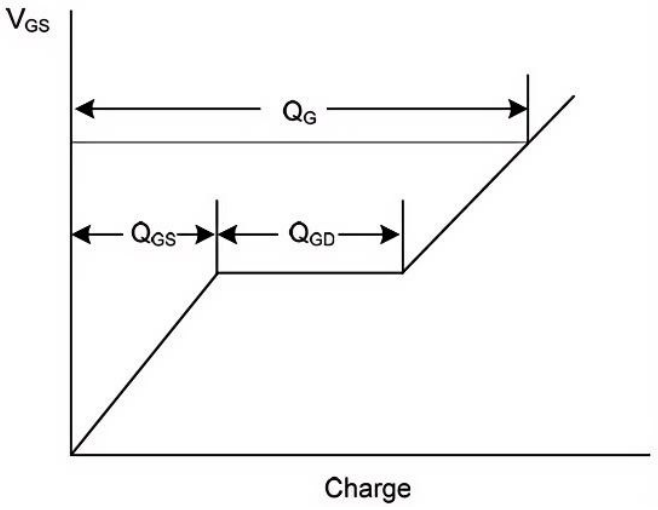
Switching Test Circuit



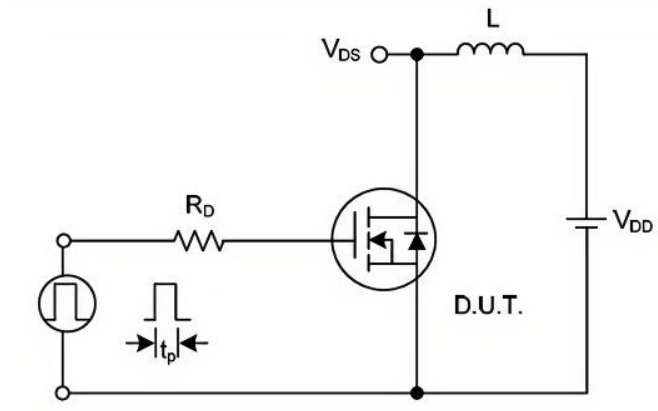
Switching Waveforms



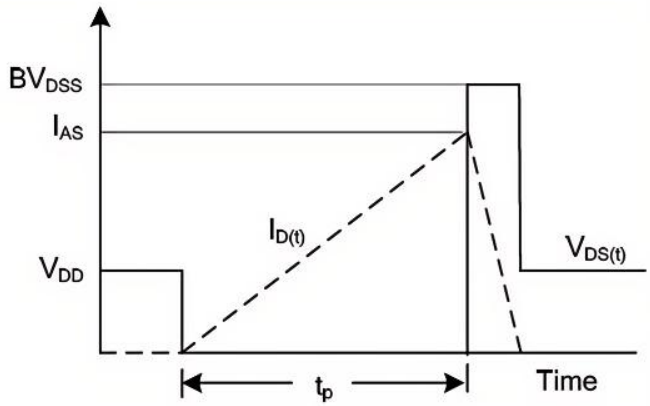
Gate Charge Test Circuit



Gate Charge Waveform

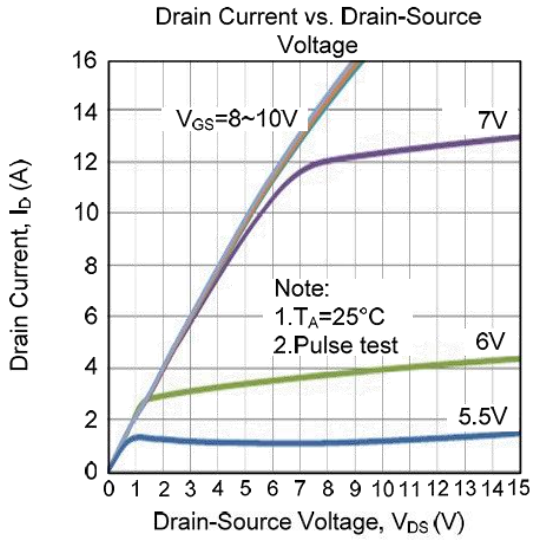


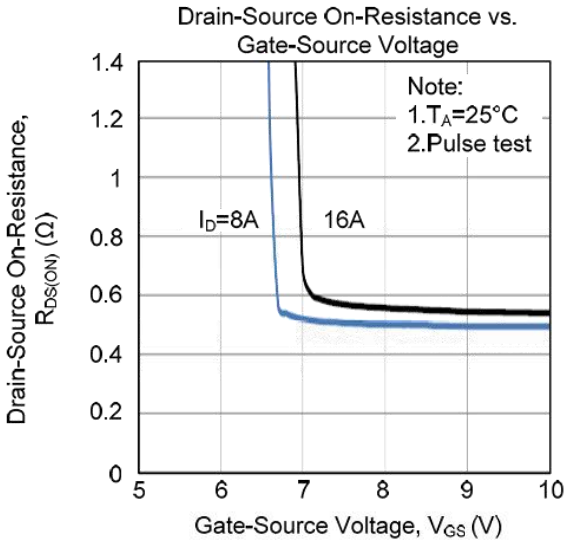
Unclamped Inductive Switching Test Circuit

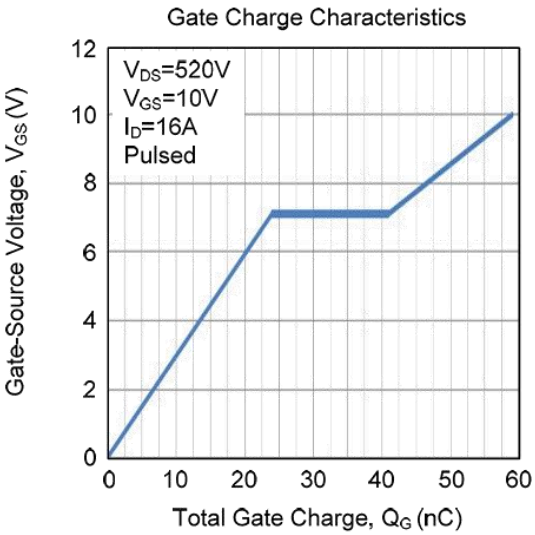


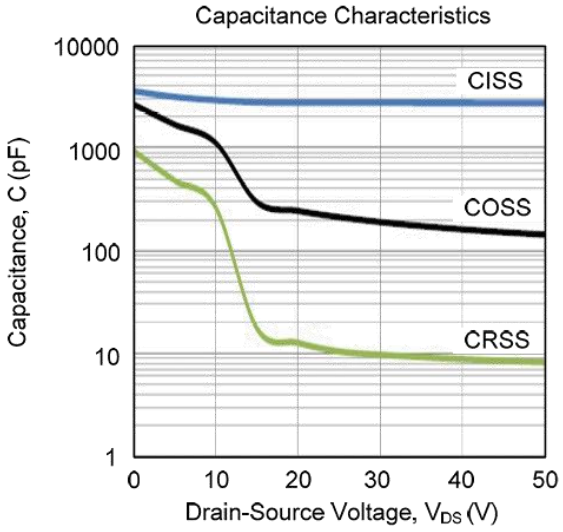
Unclamped Inductive Switching Waveforms

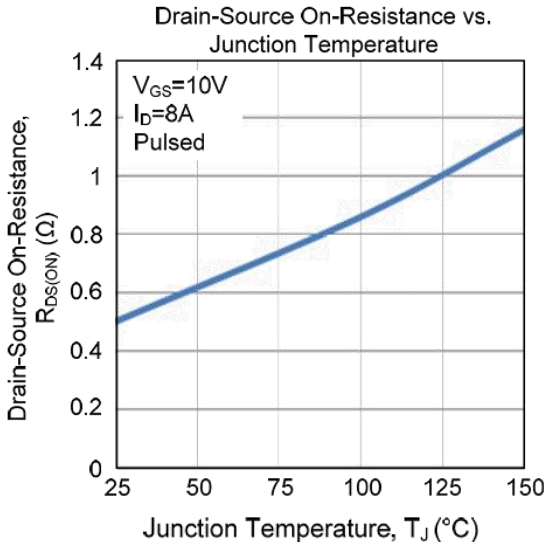
■ TYPICAL CHARACTERISTICS

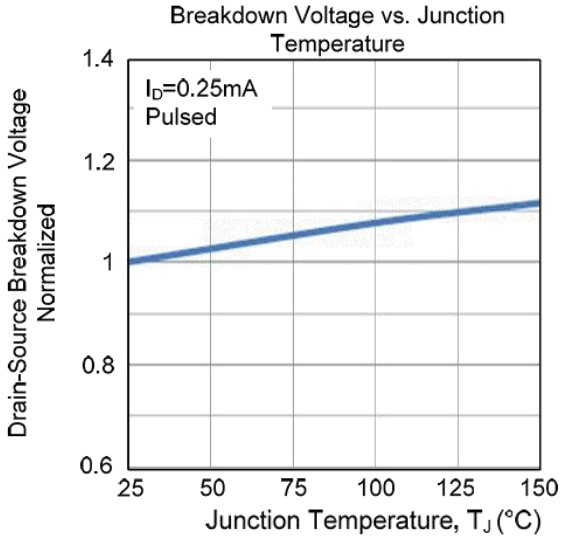




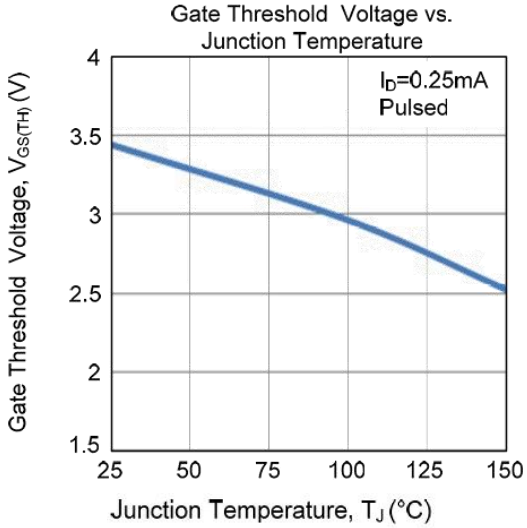


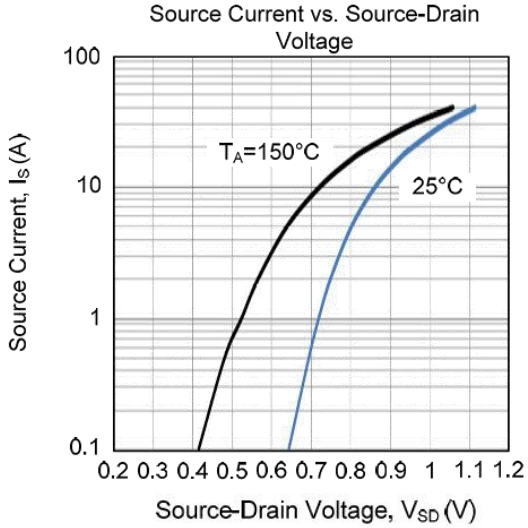


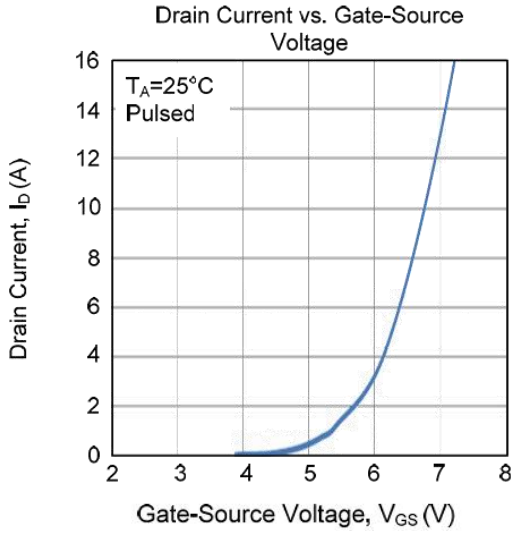


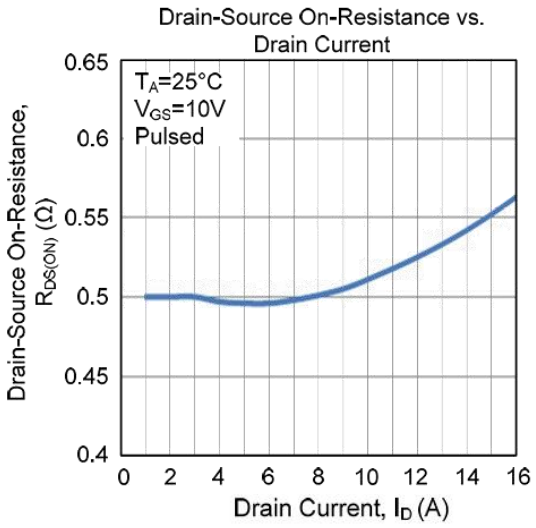


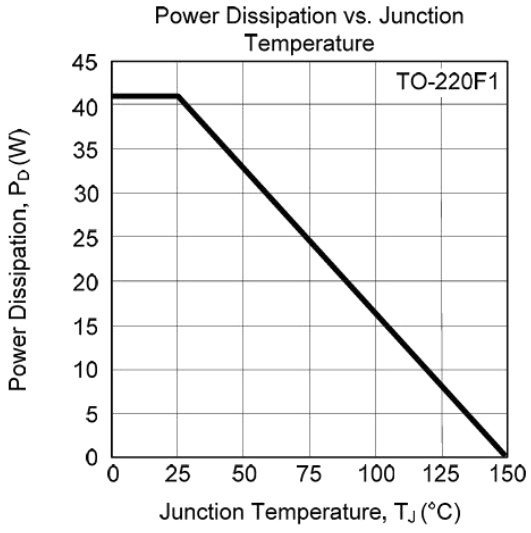
■ TYPICAL CHARACTERISTICS(Con.t)

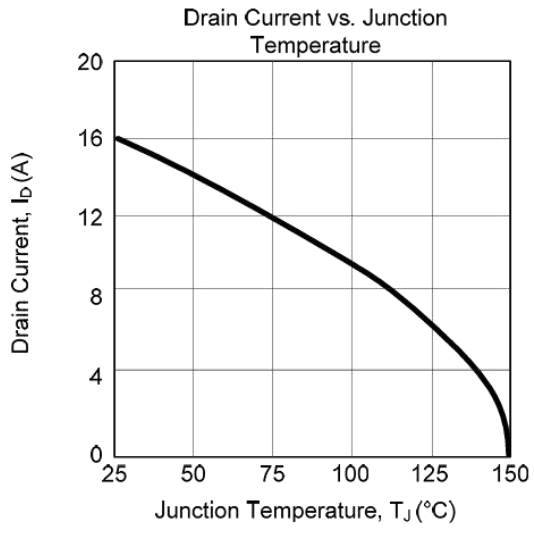




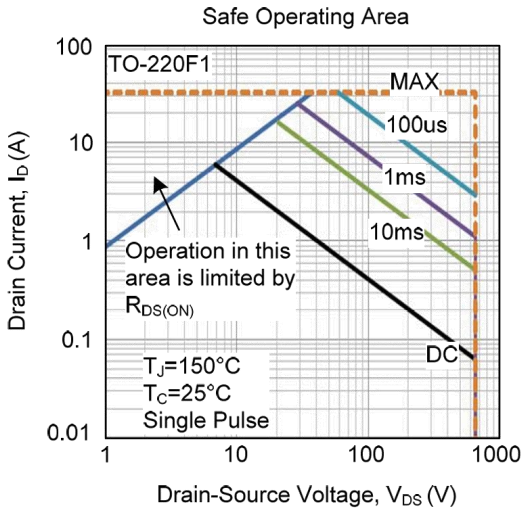




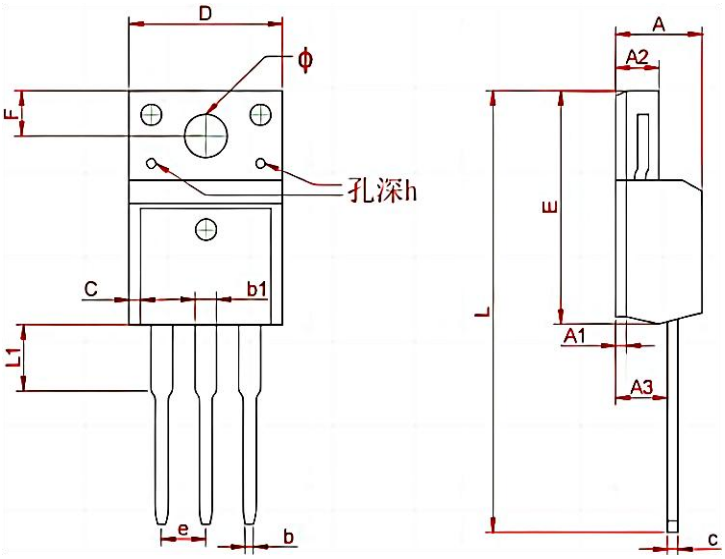




■ TYPICAL CHARACTERISTICS(Con.t)



■ 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 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