

30A, 60V N-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

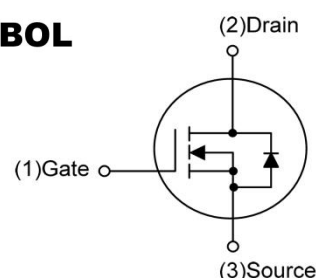
The 30N06 is a low voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and excellent avalanche characteristics. This power MOSFET is usually used at automotive applications in power supplies, high efficient DC to DC converters and battery operated products.



FEATURE

- * $R_{DS(ON)} = 30\text{ m}\Omega @ V_{GS} = 10\text{ V}, I_D = 15\text{ A}$
- * Ultra low gate charge (typical 20nC)
- * Low reverse transfer Capacitance (CR_{SS} = typical 80 pF)
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability

SYMBOL



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

SYMBOL	PARAMETER		VALUE	UNIT
V_{DS}	Drain-Source Voltage		60	V
V_{GS}	Gate Source Voltage		±20	V
I_D	Continuous Drain Current	T _C = 25°C	30	A
		T _C = 125°C	21.3	
I_{DM}	Pulsed Drain Current (Note 2)		120	A
E_{AS}	Avalanche Energy	Single Pulsed (Note 3)	300	mJ
E_{AR}		Repetitive (Note 2)	8	mJ
P_D	Maximum Power Dissipation	TO-220F	45	W
		TO-252	46	
T_J	Storage Temperature		150	°C
T_{STG}	Storage Temperature		-55~150	°C
T_{OPR}	Operation 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=0.66mH, I_{AS}=30A, V_{DD}=25V, R_G=20Ω, Starting T_J=25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	TO-220F	R θ JA	62.5	°C/W
	TO-252		110	
Junction-to-Case	TO-220F	R θ JC	2.7	°C/W
	TO-252		2.85	

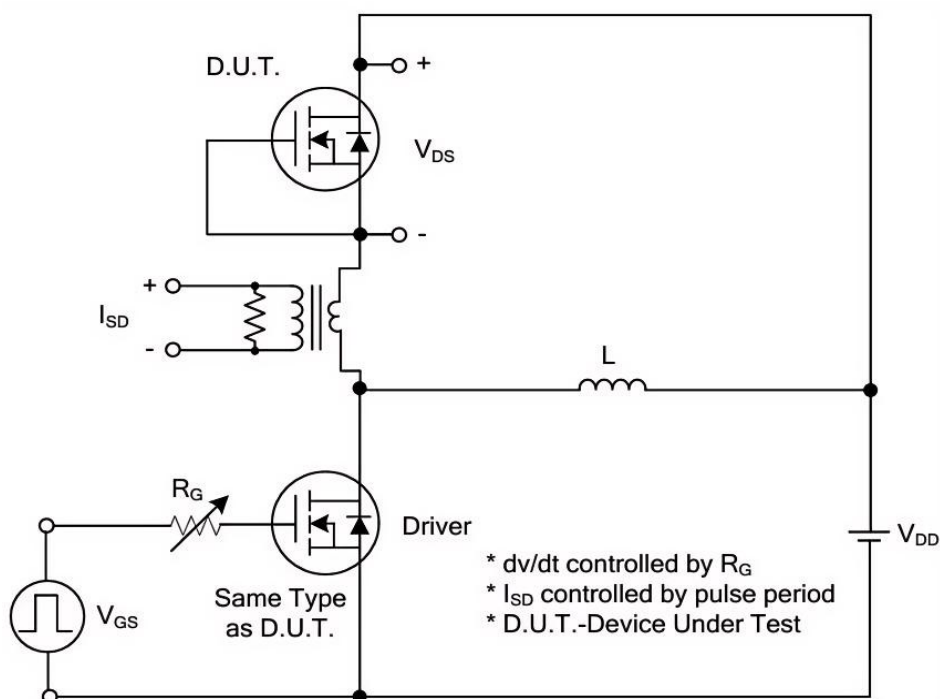
■ ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	v _{GS} =0V, I _D =250μA	60			V
Zero gate voltage drain current	I _{DSS}	v _{DS} =60V, V _{GS} =0V			10	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Breakdown Voltage Temperature Coefficient	ΔV _{(BR) DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.06		V/°C
ON CHARACTERISTICS						
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =15A		24	30	mΩ
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250μA	2.0		4.0	V
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V f=1.0MHz		800		pF
Output Capacitance	C _{OSS}			300		
Reverse Transfer Capacitance	C _{RSS}			50		
SWITCHING PARAMETERS						
Total gate charge	Q _g	V _{DS} =60V, V _{GS} =10V I _D =24A(Note 1, 2)		20	30	nC
Gate-source charge	Q _{gs}			6		
Gate-drain charge	Q _{gd}			9		
Turn-On Delay Time	td(on)	V _{DD} =30V, I _D = 24A V _{GS} =10V(Note 1, 2)		52		nS
Turn-On Rise time	tr			96		
Turn-Off Delay Time	td(off)			124		
Turn-Off Fall time	tf			84		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Continuous drain-source diode forward current	I _S				30	A
Pulsed drain-source diode forward current	I _{SM}				120	A
Drain-source diode forward voltage	V _{SD}	I _F =30A, V _{GS} =0V			1.4	V

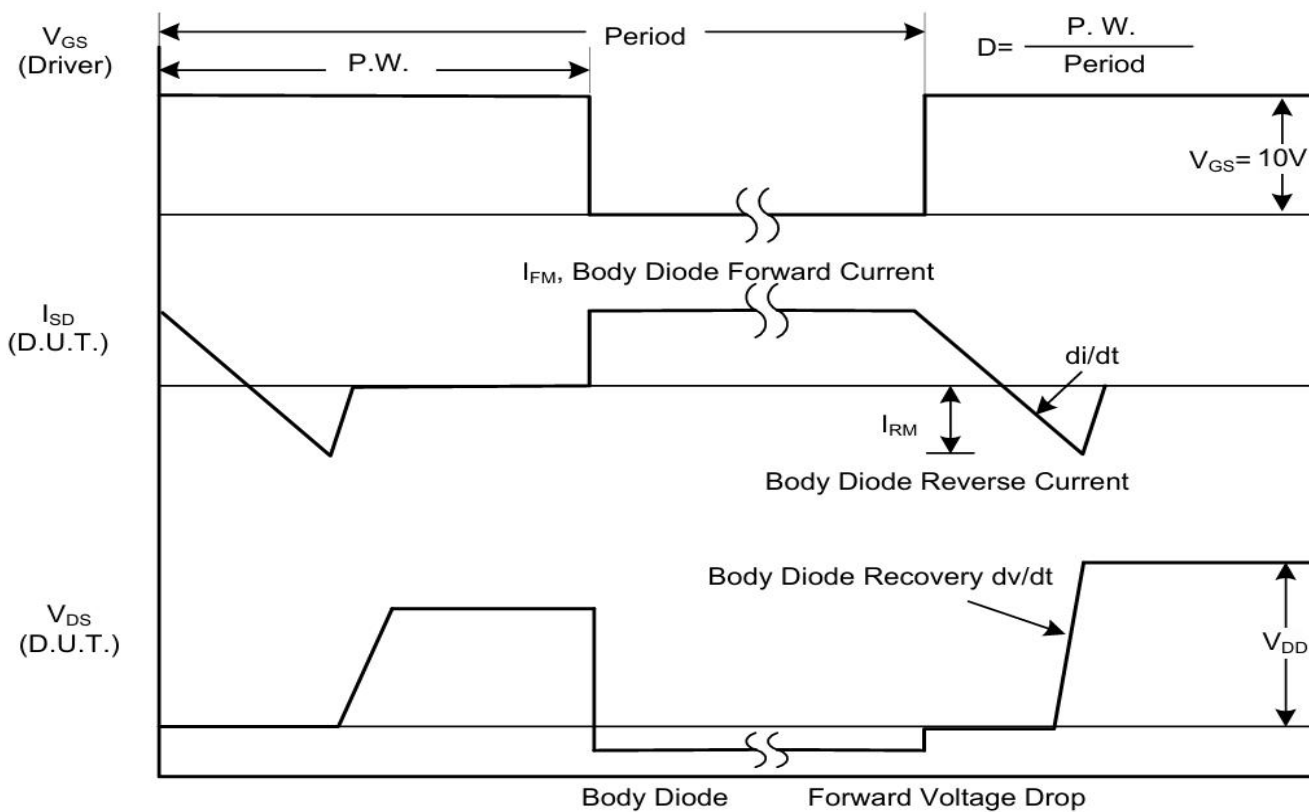
Notes:

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

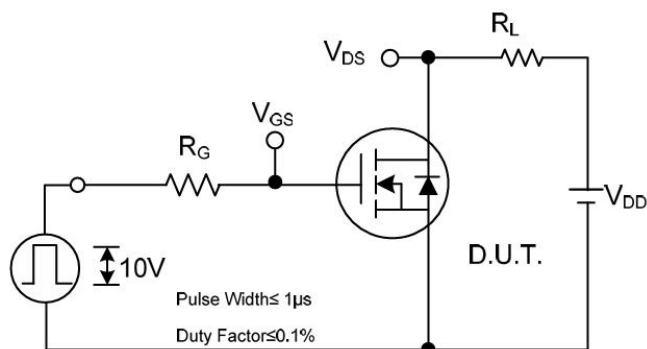


Peak Diode Recovery dv/dt Waveforms

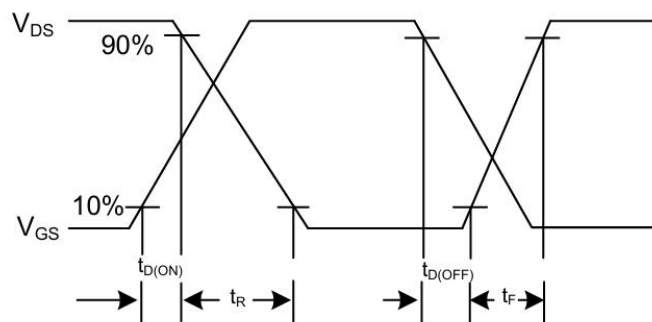
30N06

N-CHANNEL POWER MOSFET

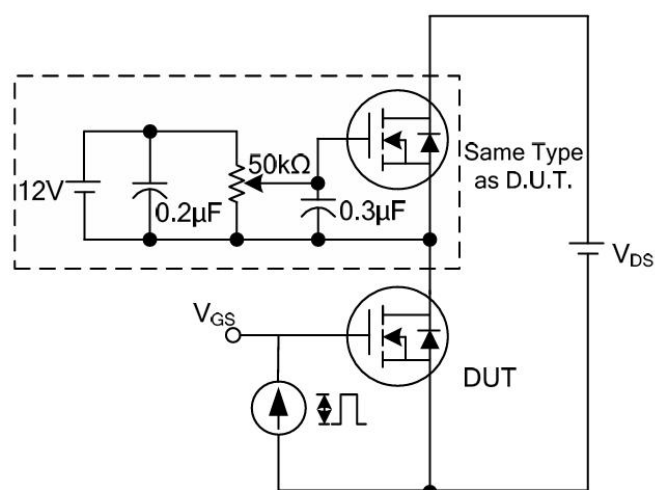
■ TEST CIRCUITS AND WAVEFORMS(Con.t)



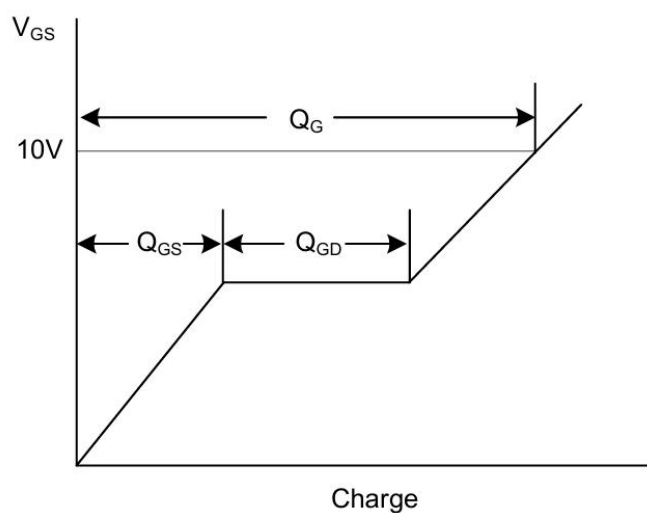
Switching Test Circuit



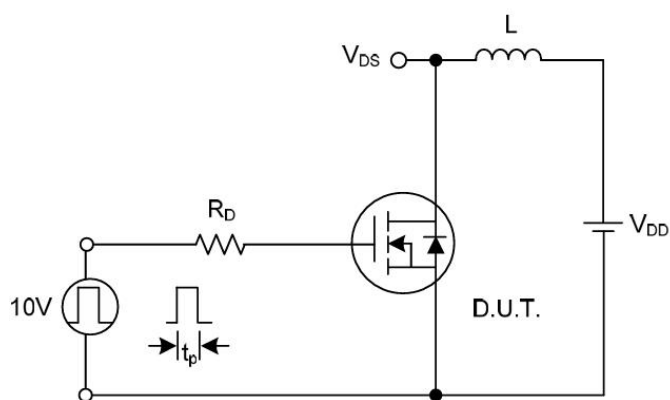
Switching Waveforms



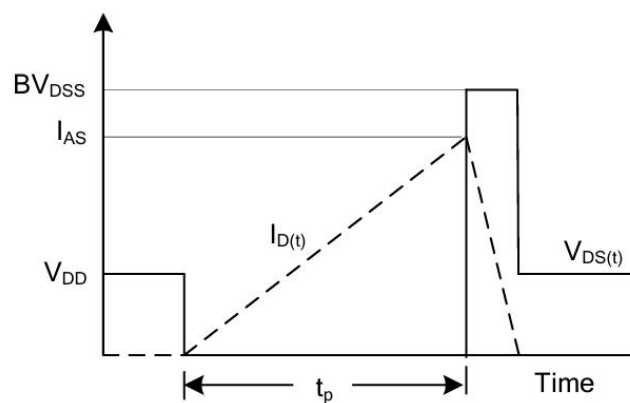
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit

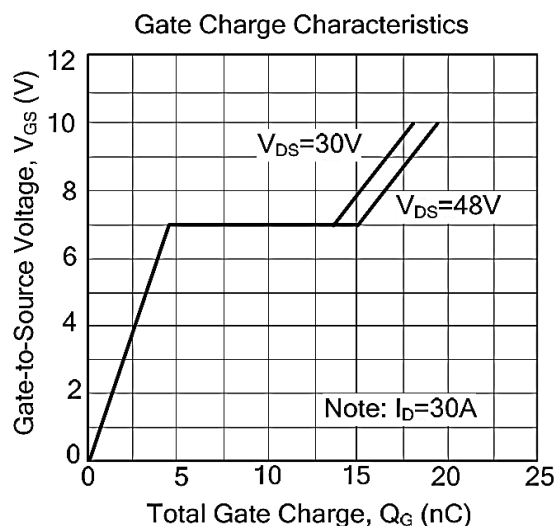
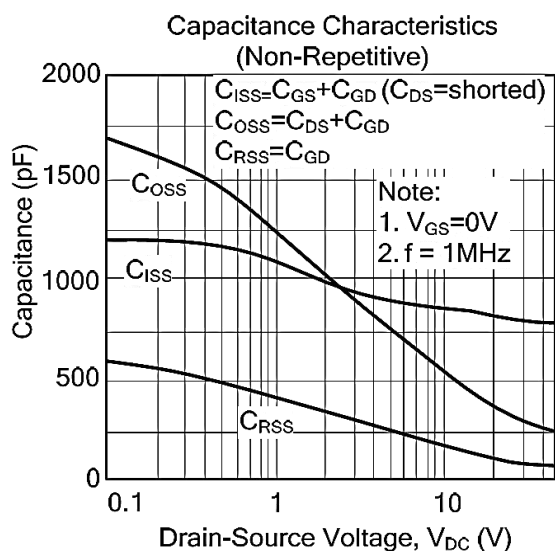
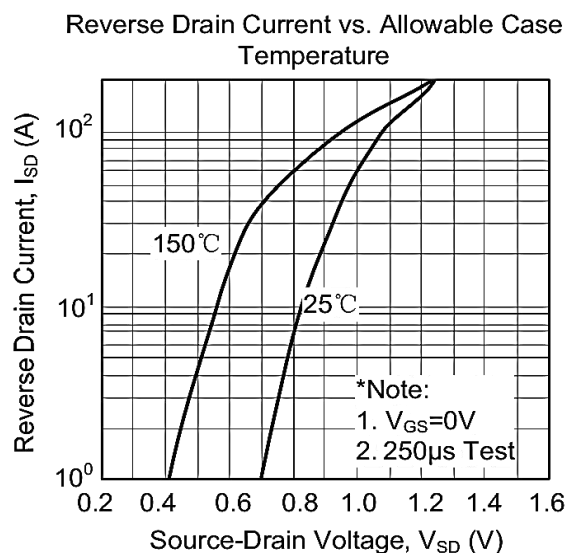
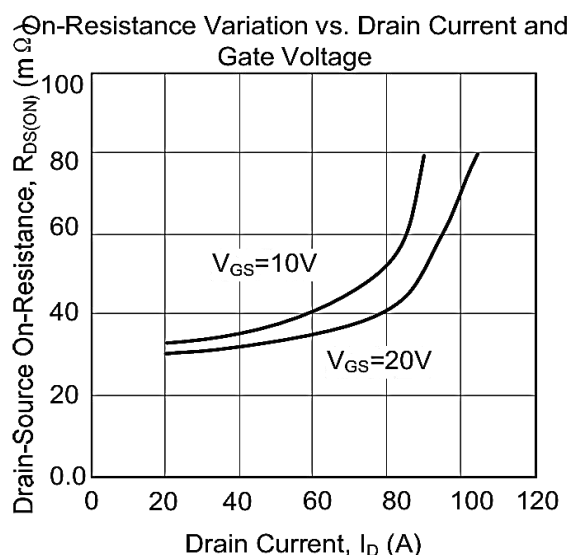
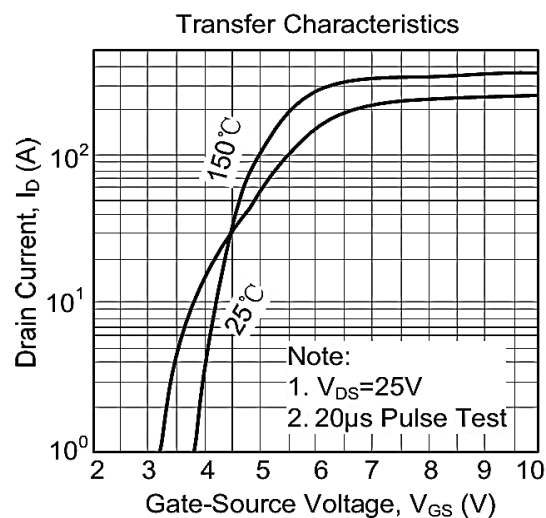
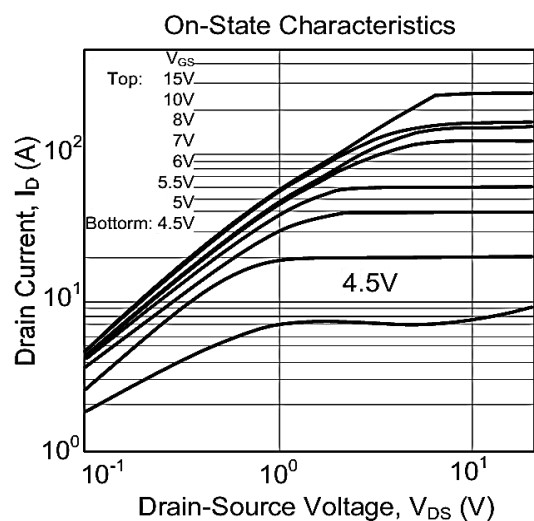


Unclamped Inductive Switching Waveforms

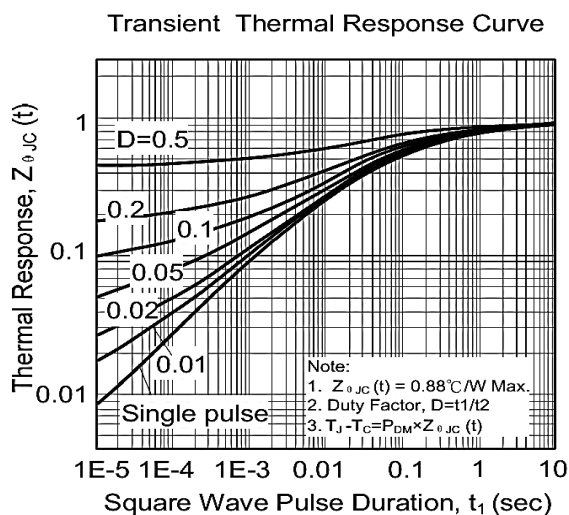
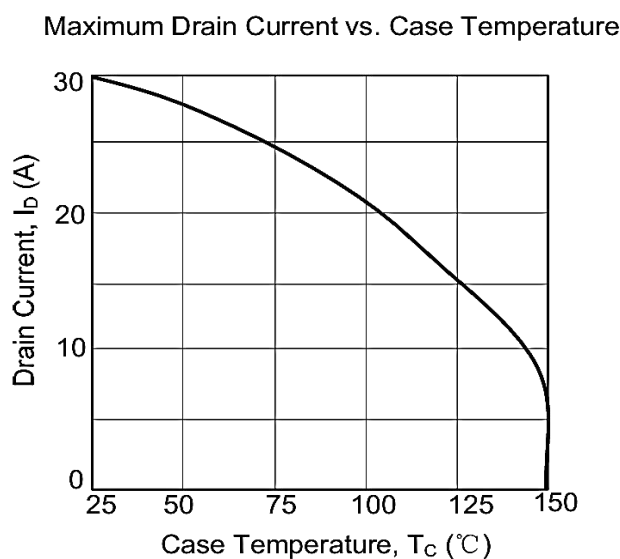
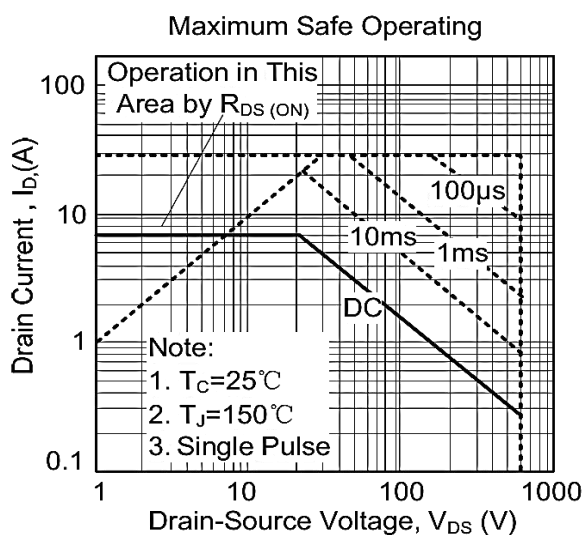
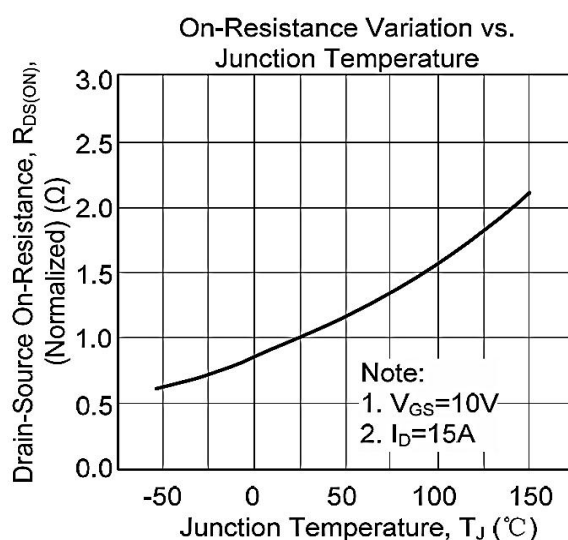
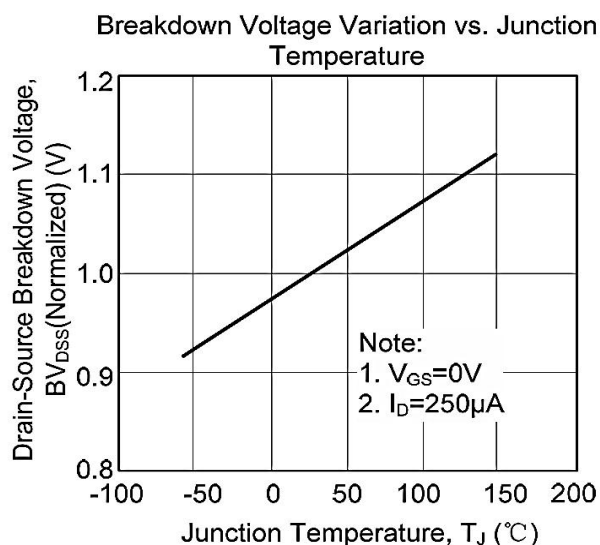
30N06

N-CHANNEL POWER MOSFET

TYPICAL CHARACTERISTICS



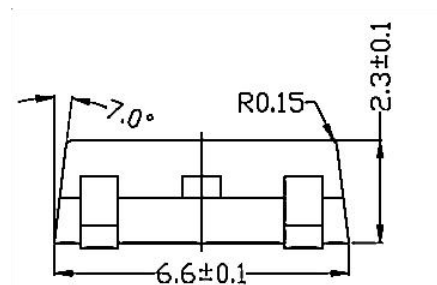
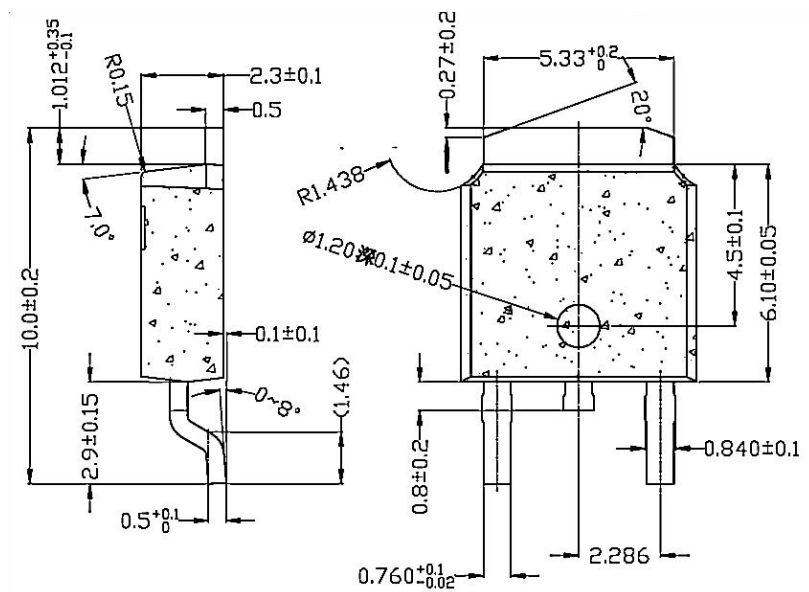
■ TYPICAL CHARACTERISTICS(Con.t)



30N06

N-CHANNEL POWER MOSFET

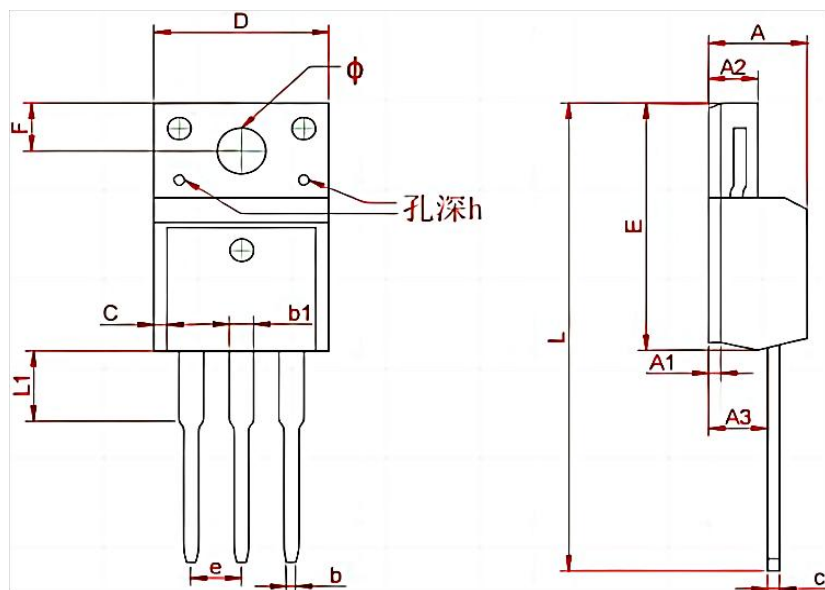
TO - 252 PACKAGE OUTLINE DIMENSIONS



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

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