

N6006NZ

N-channel MOSFET
600V, 6A, 1.2Ω

R07DS1020EC0100

Rev.1.00

Feb 18, 2013

Description

The N6006NZ is N-channel MOS Field Effect Transistor designed for high current switching applications.

Features

- Low on-state resistance

$$R_{DS(on)} = 1.2\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 3.0 \text{ A)}$$

- Low input capacitance

$$C_{iss} = 1385\text{pF TYP. (} V_{DS} = 10\text{V, } V_{GS} = 0 \text{ V)}$$

- High current

$$I_{D(DC)} = \pm 6.0 \text{ A}$$

- RoHS Compliant

Ordering Information

Part No.	Lead Plating	Packing	Package
N6006NZ-S17-AY *1	Pure Sn (Tin)	Tube 50 p/tube	Isolated TO-220 1.95g TYP.

Note: *1. Pb-free (This product does not contain Pb in the external electrode.)

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$, all terminals are connected)

Item	Symbol	Ratings	Unit
Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	600	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	±30	V
Drain Current (DC)	$I_{D(DC)}$	±6.0	A
Drain Current (pulse) *1	$I_{D(pulse)}$	±24.0	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	35	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_{T2}	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	-55 to 150	°C
Single Avalanche Current *2	I_{AS}	6.0	A
Single Avalanche Energy *2	E_{AS}	24	mJ

Thermal Resistance

Channel to Case (Drain) Thermal Resistance $R_{th(ch-C)}$ 3.57 °C/W

Channel to Ambient Thermal Resistance $R_{th(ch-A)}$ 62.5 °C/W

Notes: *1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

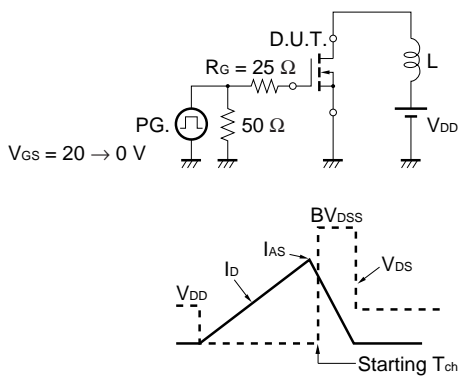
*2. Starting $T_{ch} = 25^\circ\text{C}$, $R_G = 25 \Omega$, $V_{DD} = 150 \text{ V}$, $V_{GS} = 20 \rightarrow 0 \text{ V}$, $L = 1\text{mH}$

Electrical Characteristics (T_A = 25°C, all terminals are connected)

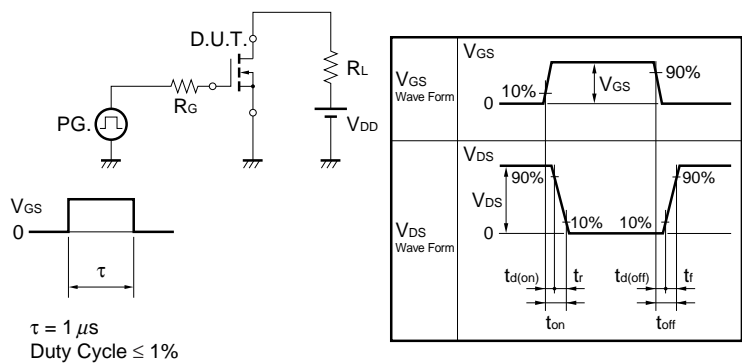
Item	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Zero Gate Voltage Drain Current	I _{DSS}			1	μA	V _{DS} = 600 V, V _{GS} = 0 V
Gate Leakage Current	I _{GSS}			±100	nA	V _{GS} = ± 30 V, V _{DS} = 0 V
Gate to Source Cut-off Voltage	V _{GS(off)}	2.0	3.0	4.0	V	V _{DS} = 10V, I _D = 1mA
Forward Transfer Admittance *1	y _{fs}	2.0	4.0		S	V _{DS} = 10 V, I _D = 3.0 A
Drain to Source On-state Resistance *1	R _{DS(on)}		1.0	1.2	Ω	V _{GS} = 10 V, I _D = 3.0 A
Input Capacitance	C _{iss}		1385		pF	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz
Output Capacitance	C _{oss}		480		pF	
Reverse Transfer Capacitance	C _{rss}		105		pF	
Turn-on Delay Time	t _{d(on)}		18		ns	V _{DD} = 150 V, I _D = 3.0 A, V _{GS} = 10 V, R _G = 10 Ω
Rise Time	t _r		8		ns	
Turn-off Delay Time	t _{d(off)}		47		ns	
Fall Time	t _f		7		ns	
Total Gate Charge	Q _G		29		nC	V _{DD} = 450 V, V _{GS} = 10 V, I _D = 6.0 A
Gate to Source Charge	Q _{GS}		7.4		nC	
Gate to Drain Charge	Q _{GD}		12		nC	
Body Diode Forward Voltage *1	V _{F(S-D)}		0.86	1.5	V	I _F = 6.0 A, V _{GS} = 0 V
Reverse Recovery Time	t _{rr}		274		ns	I _F = 6.0 A, V _{GS} = 0 V,
Reverse Recovery Charge	Q _{rr}		1080		nC	di/dt = 50 A/μs

Note: *1. Pulsed

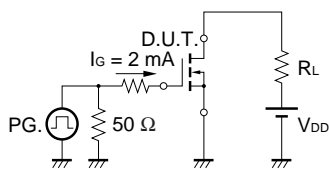
TEST CIRCUIT 1 AVALANCHE CAPABILITY



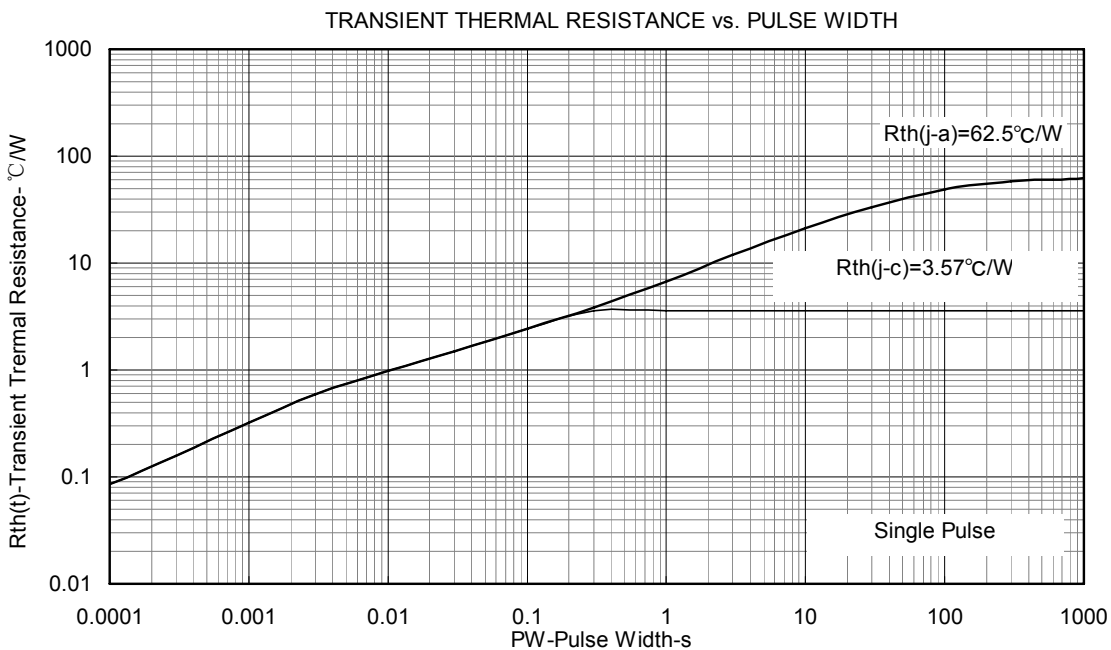
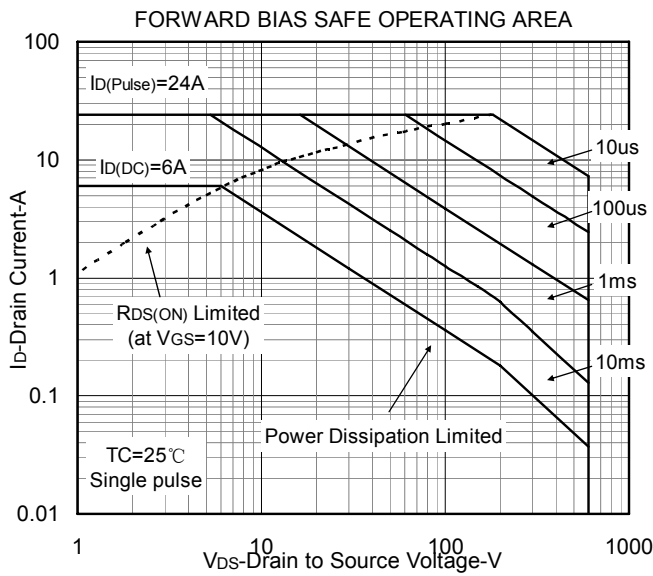
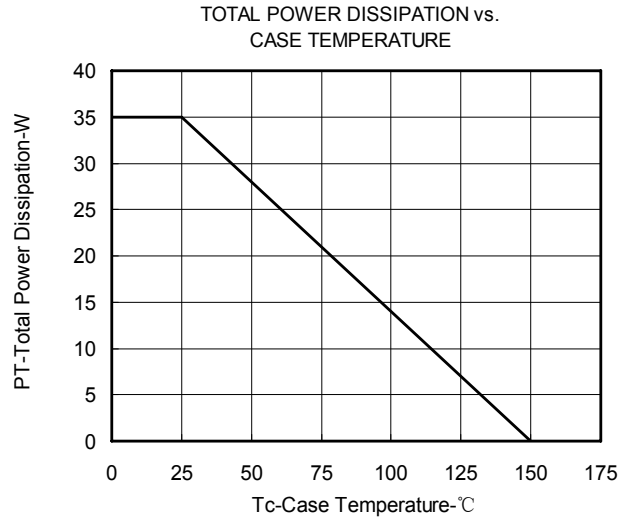
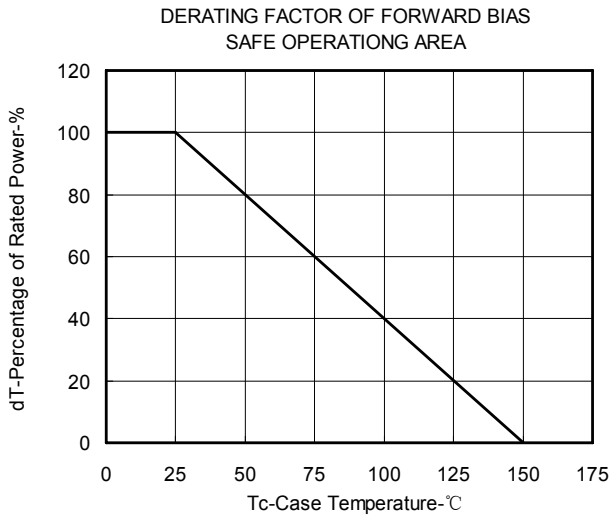
TEST CIRCUIT 2 SWITCHING TIME

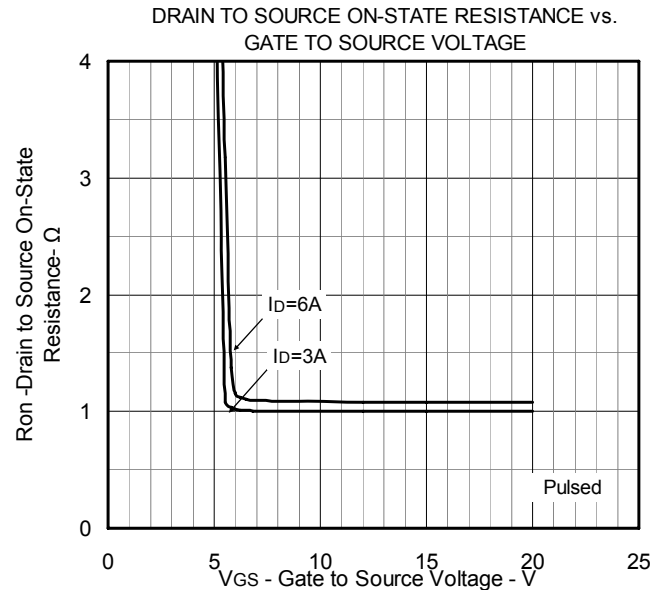
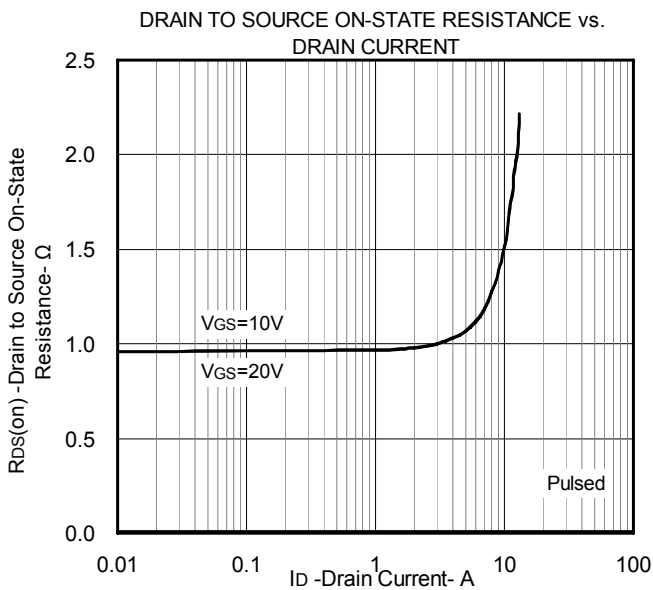
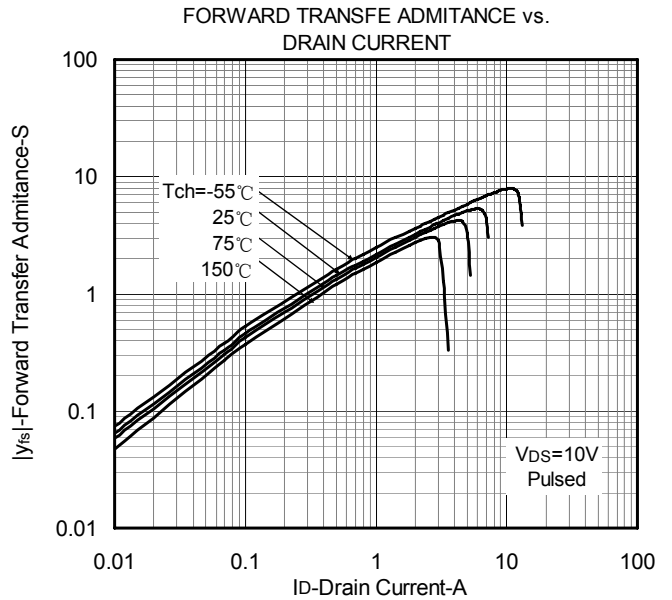
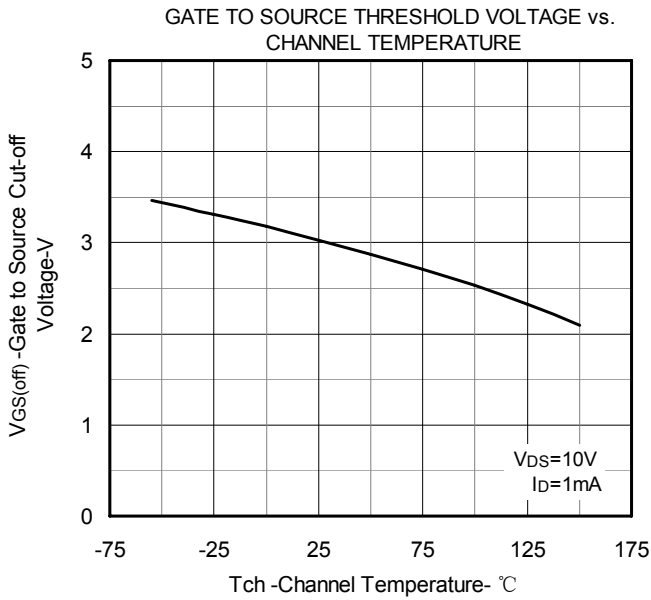
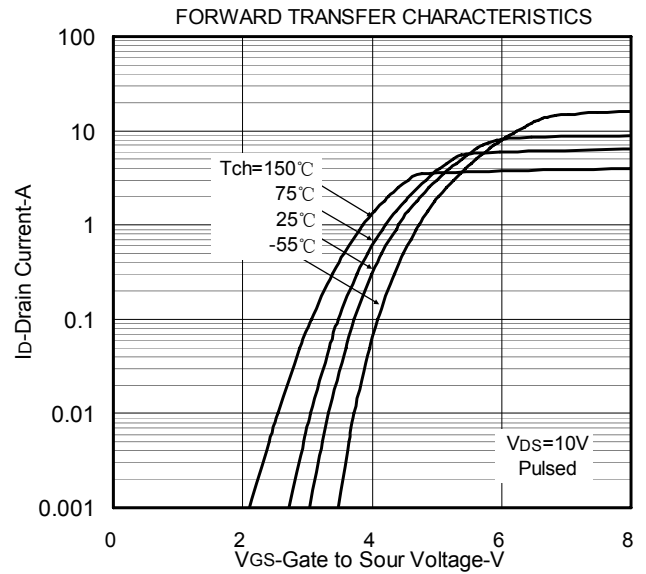
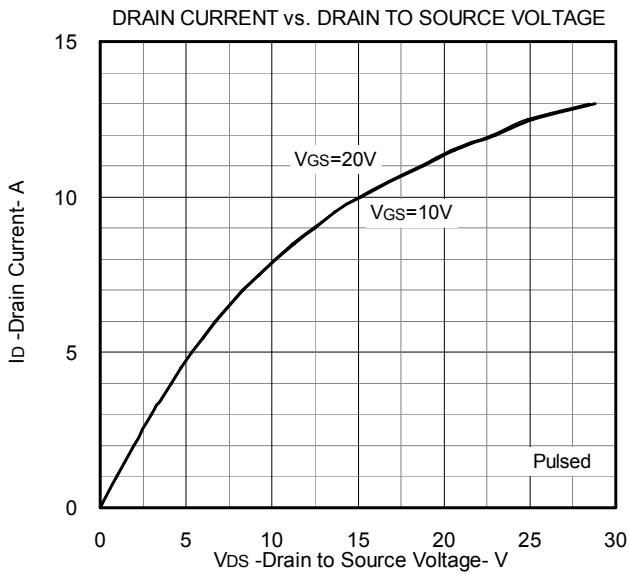


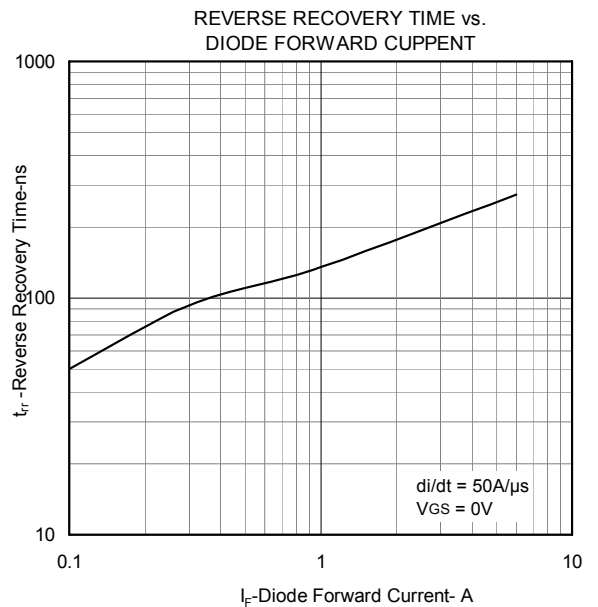
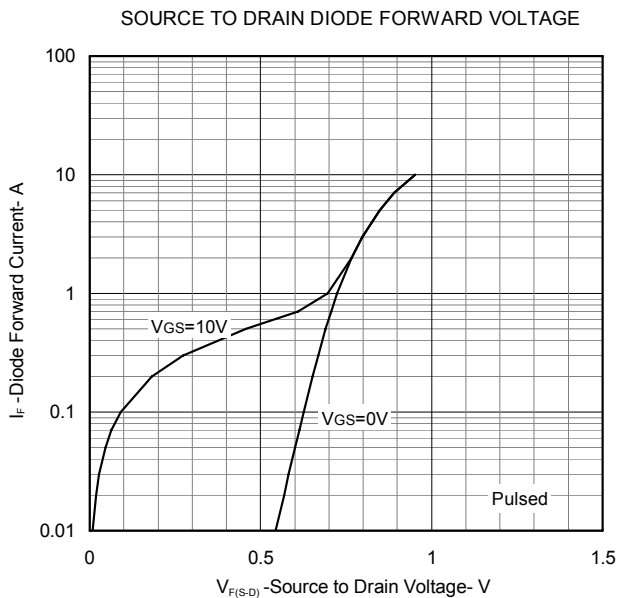
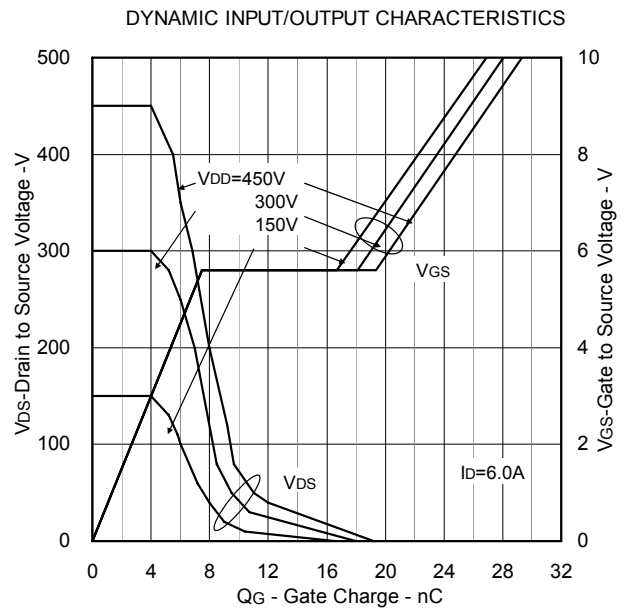
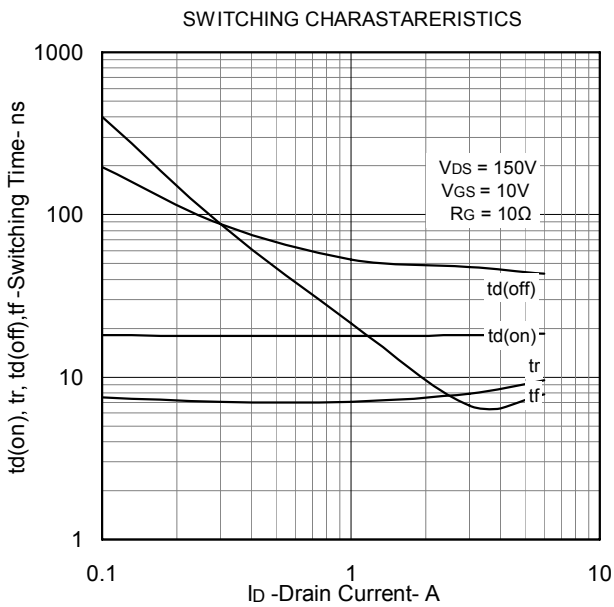
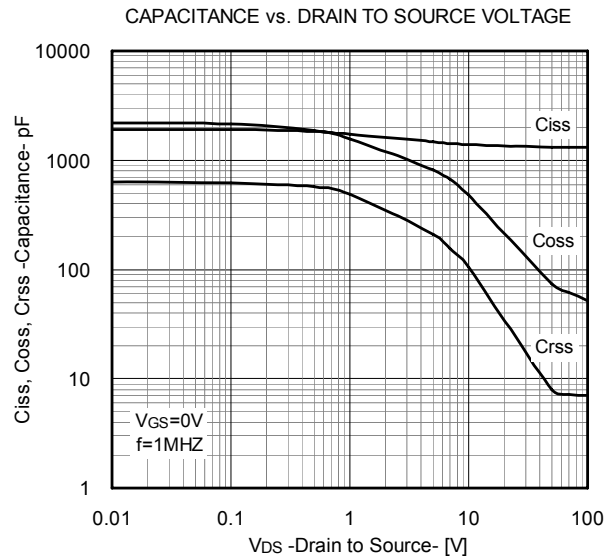
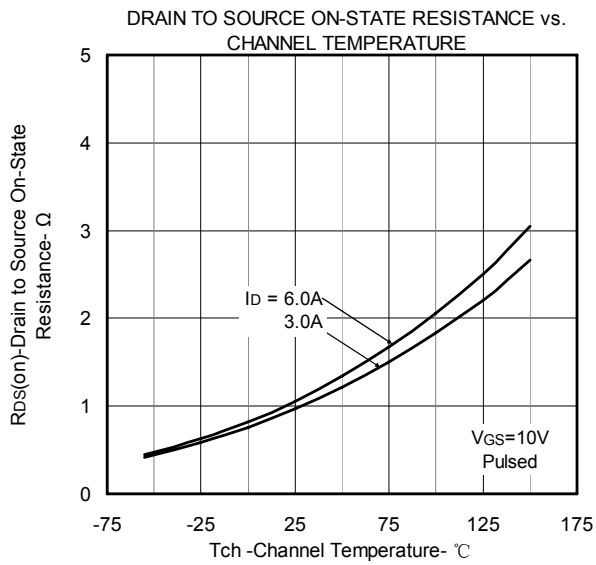
TEST CIRCUIT 3 GATE CHARGE



Typical Characteristics (T_A = 25°C)

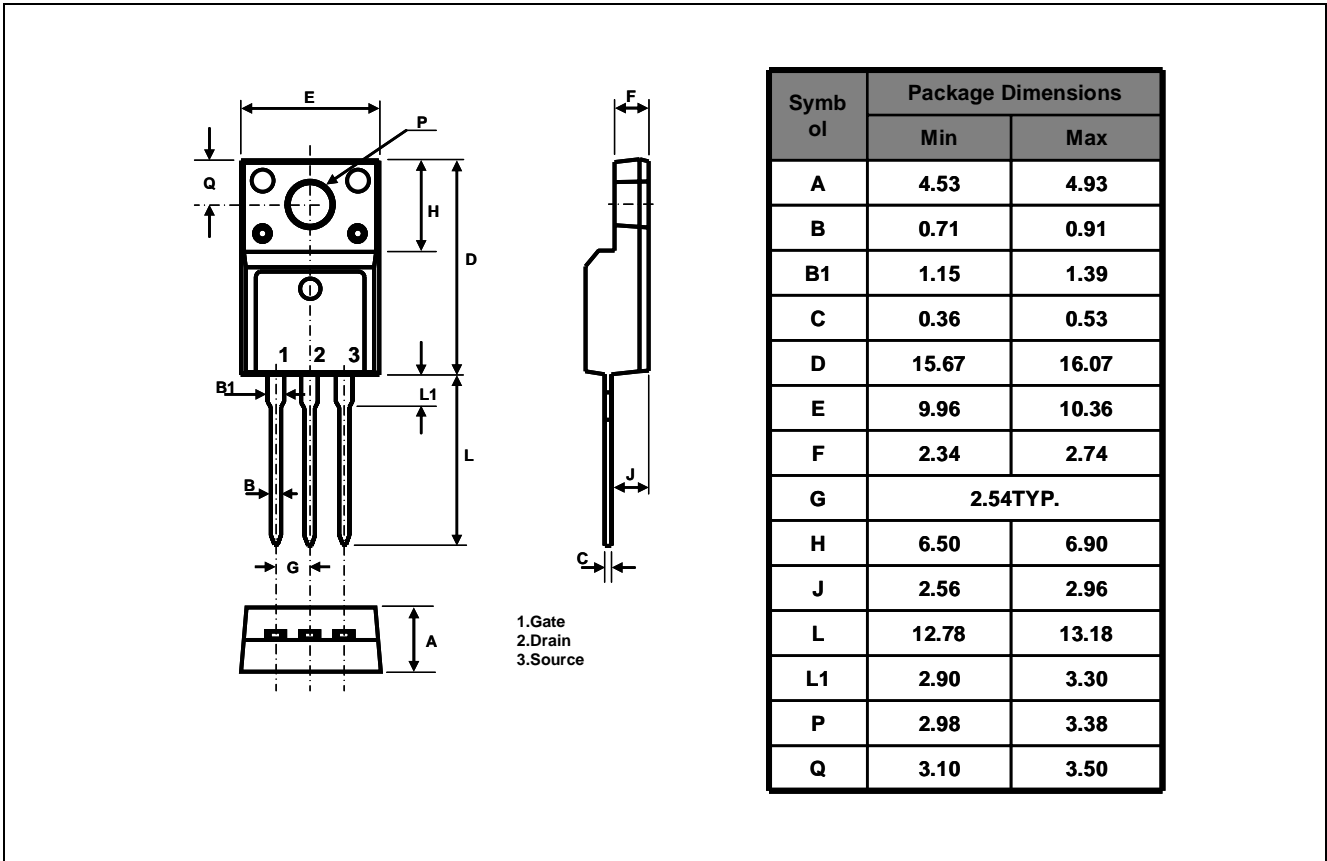




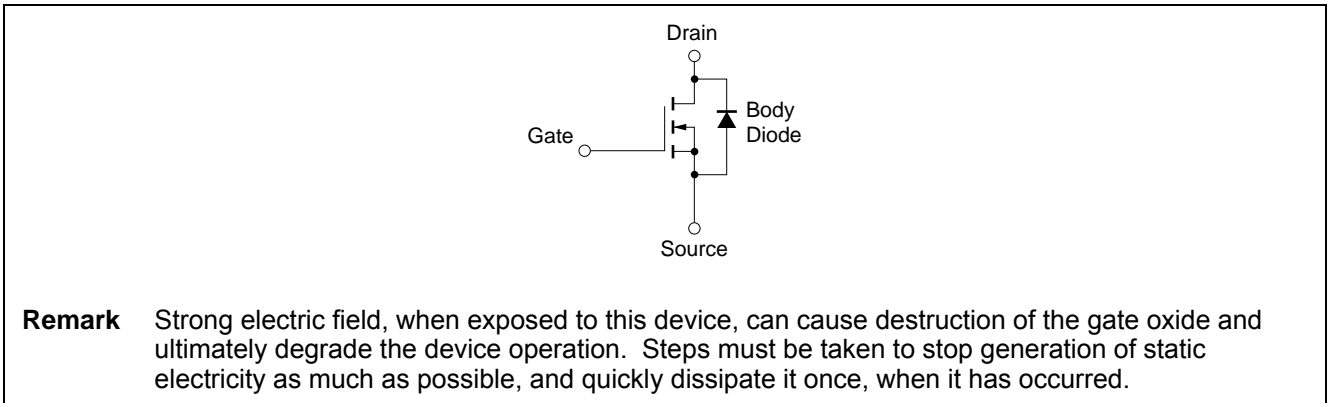


Package Drawing (Unit: mm)

Isolated TO-220



Equivalent Circuit



Revision History	N6006NZ Data Sheet
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Rev.	Date	Description	
		Page	Summary
1.00	Feb 18, 2013	-	First Edition Issued

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