



## Description

The 1N60G uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 600V$   $I_D = 1A$

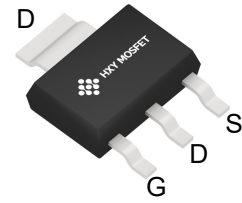
$R_{DS(ON)} < 12\Omega$  @  $V_{GS}=10V$

## Application

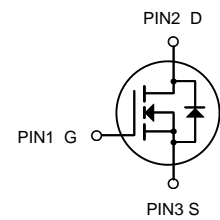
Battery protection

Load switch

Uninterruptible power supply



**SOT-223  
(SOT-223-4)**



N-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
1N60G	SOT-223(SOT-223-4)	HXY MOSFET	2500

## Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	600	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	1	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	4.8	A
$P_D@T_A=25^\circ C$	Total Power Dissipation <sup>4</sup>	1	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	62.5	$^\circ C/W$



**Electrical Characteristics** (  $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	600	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^{\circ}\text{C}, I_D=1\text{mA}$	---	0.057	---	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=0.6A$	---	9.5	12	$\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	4	---	6	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.68	---	$\text{mV}/^{\circ}\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=600V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	$\mu A$
		$V_{DS}=600V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=0.5A$	---	35	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.7	---	$\Omega$
$Q_g$	Total Gate Charge (4.5V)	$V_{DS}=520V, V_{GS}=10V, I_b=1A$	---	4	---	nC
$Q_{gs}$	Gate-Source Charge		---	0.9	---	
$Q_{gd}$	Gate-Drain Charge		---	2.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=325V, V_{GS}=10V, R_g=50\Omega, I_D=1A$	---	4	---	ns
$T_r$	Rise Time		---	24	---	
$T_{d(off)}$	Turn-Off Delay Time		---	6	---	
$T_f$	Fall Time		---	24	---	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	119	---	$\mu F$
$C_{oss}$	Output Capacitance		---	19	---	
$C_{rss}$	Reverse Transfer Capacitance		---	2	---	
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V, \text{Force Current}$	---	---	1	A
$I_{SM}$	Pulsed Source Current <sup>2,5</sup>		---	---	4.8	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1.4	V
$t_{rr}$	Reverse Recovery Time	$I_F=15A, di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	160	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	0.3	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=28A$
- 4.The power dissipation is limited by  $150^{\circ}\text{C}$  junction temperature 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation



### Typical Characteristics

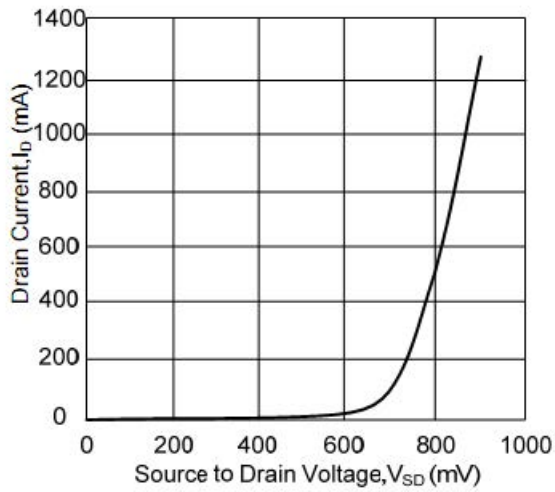


Fig1. Drain Current vs. Source to Drain Voltage

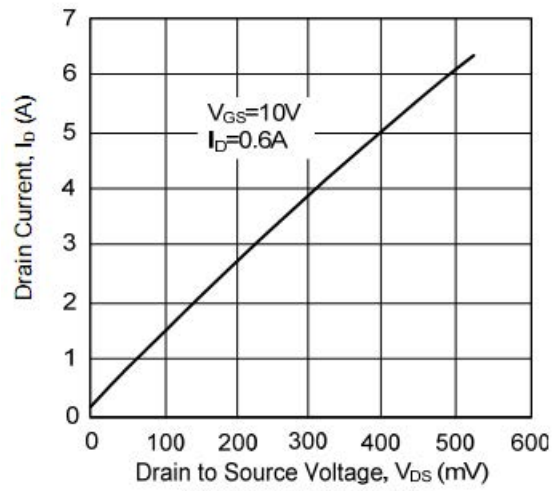


Fig2. Resistance Characteristics

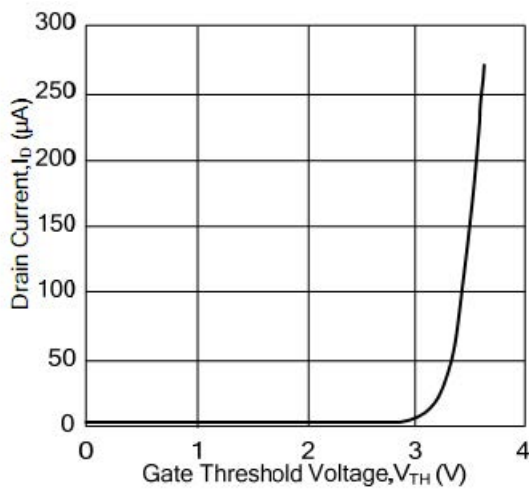


Fig3. Drain Current vs. Gate Threshold Voltage

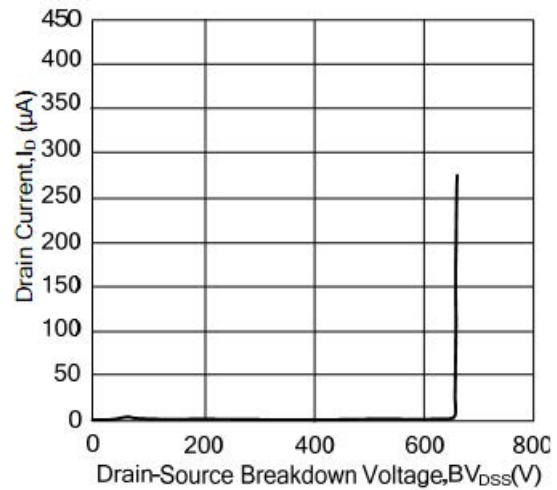
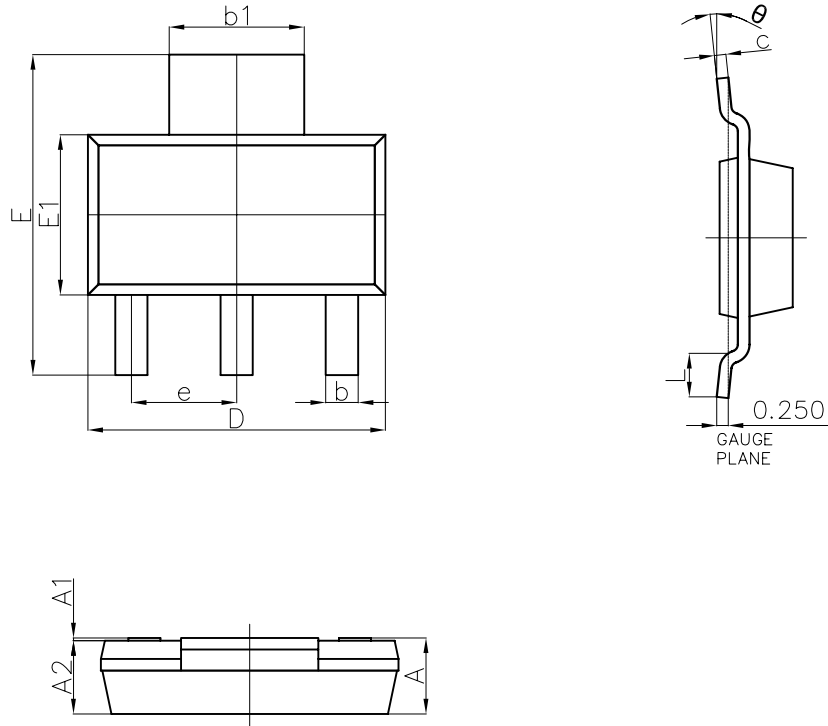


Fig4. Drain Current vs. Drain-Source Breakdown Voltage



**SOT-223 (SOT-223-4) Package Outline Dimensions**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.800	—	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	—	0.030	—
theta	0°	10°	0°	10°



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