



## Description

The HXY7N04MI 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

$V_{DS} = 40V$   $I_D = 7A$

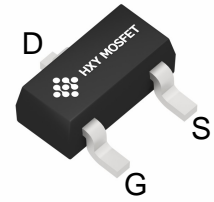
$R_{DS(ON)} < 24m\Omega @ V_{GS}=10V$

## Application

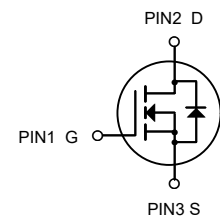
Battery protection

Load switch

Uninterruptible power supply



SOT-23-3L



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HXY7N04MI	SOT23-3L	40N05	3000

## Absolute Maximum Ratings ( $T_A=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-source voltage	30	V
$V_{GS}$	Gate-source voltage	$\pm 12$	V
$I_D$	Drain current-continuous <sup>a</sup> @ $T_j=125^{\circ}C$ -pulse $\sigma^b$	7.0	A
IDM		32.8	A
$I_S$	Drain-source Diode forward current	7	A
$P_D$	Maximum power dissipation	2.0	W
$T_j$	Operating junction Temperature range	-55—150	$^{\circ}C$
Rth JA	Thermal Resistance junction-to ambient	100	$^{\circ}C/W$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.5	2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note3</small>	V <sub>GS</sub> =10V, I <sub>D</sub> =8A	-	19	24	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	-	25	35	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1.0MHz	-	633	-	pF
C <sub>oss</sub>	Output Capacitance		-	67	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	58	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, I <sub>D</sub> =8A, V <sub>GS</sub> =10V	-	12	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	3.2	-	nC
Q <sub>gd</sub>	Gate-Drain(“Miller”) Charge		-	3.1	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = 20V, R <sub>L</sub> =2.5Ω V <sub>GS</sub> =10V,R <sub>REN</sub> =3Ω	-	4	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	3	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	15	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	2	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	7	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	32	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = 8A	-	-	1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition :  $T_J=25^{\circ}\text{C}, V_{DD}=20V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=7.2A$

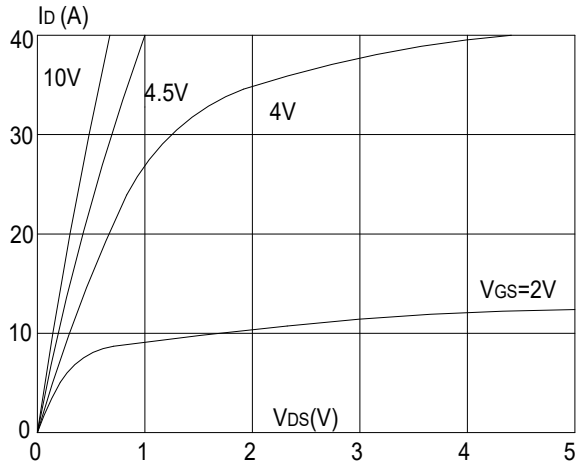
$T_J=25^{\circ}\text{C}, V_{DD}=-20V, V_G=-10V, L=0.5mH, R_g=25\Omega, I_{AS}=-8.4A$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$

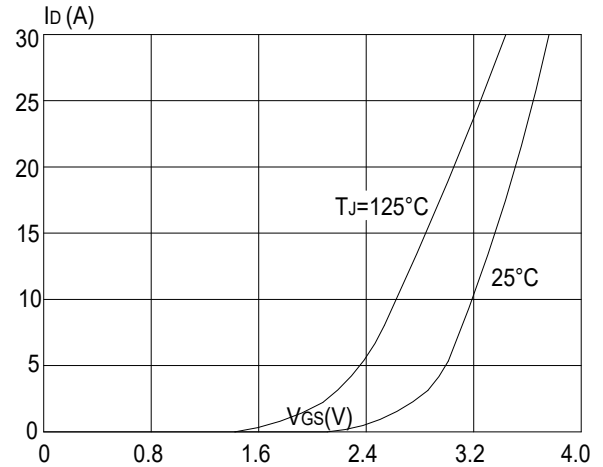


## Typical Performance Characteristics-N

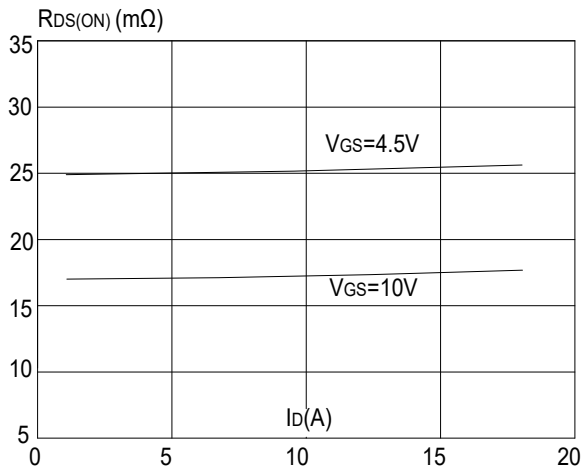
**Figure1: Output Characteristics**



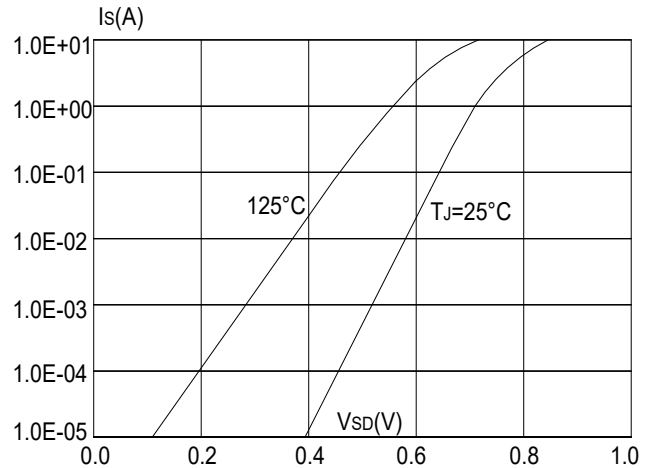
**Figure 2: Typical Transfer Characteristics**



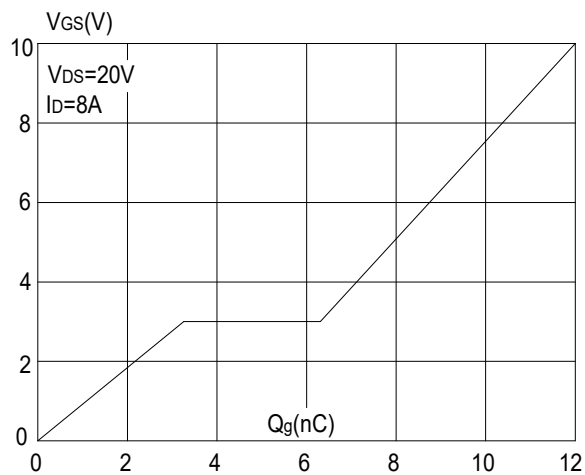
**Figure 3: On-resistance vs. Drain Current**



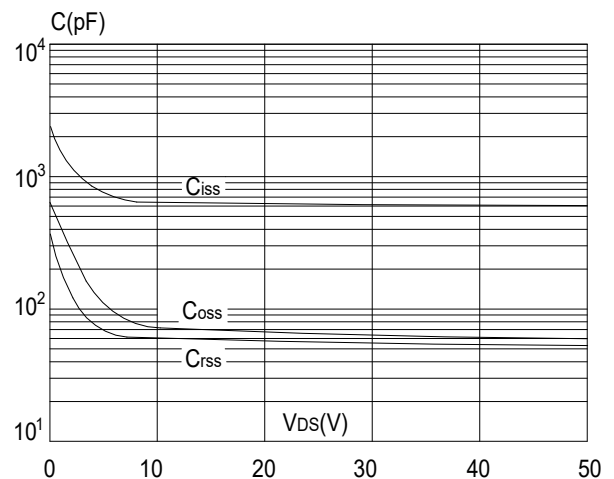
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

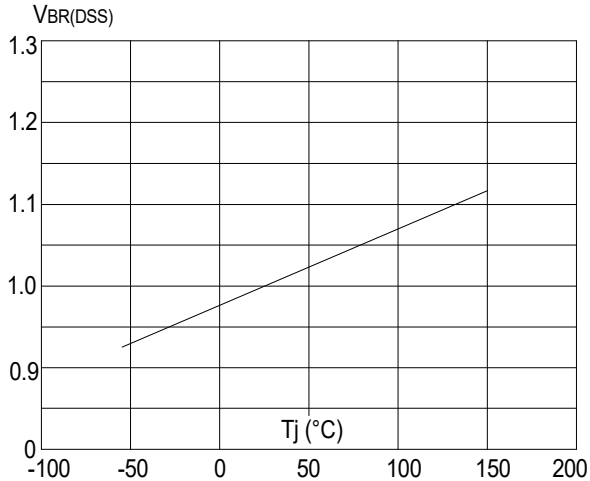


**Figure 6: Capacitance Characteristics**

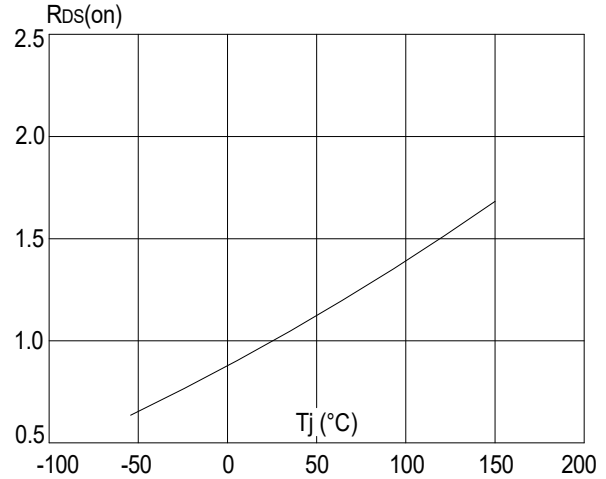




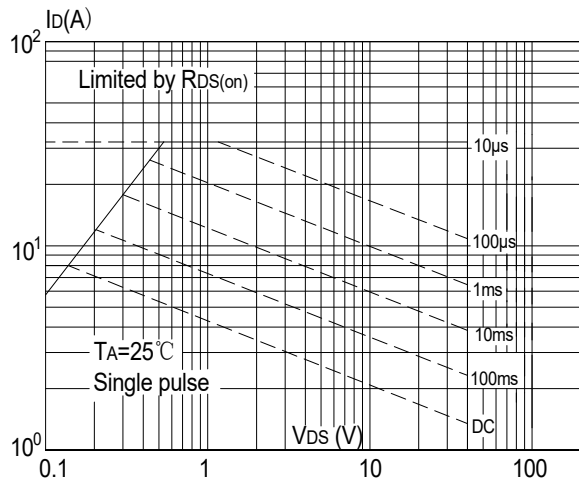
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



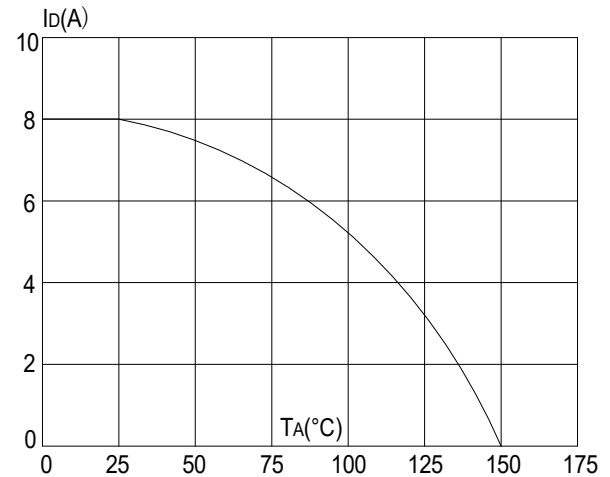
**Figure 8:** Normalized on Resistance vs. Junction Temperature



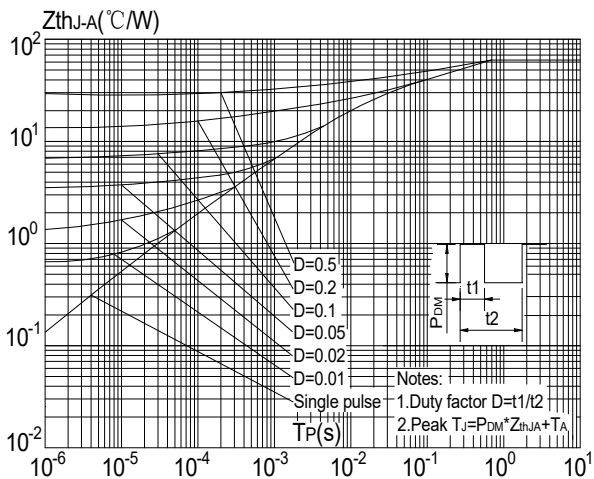
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

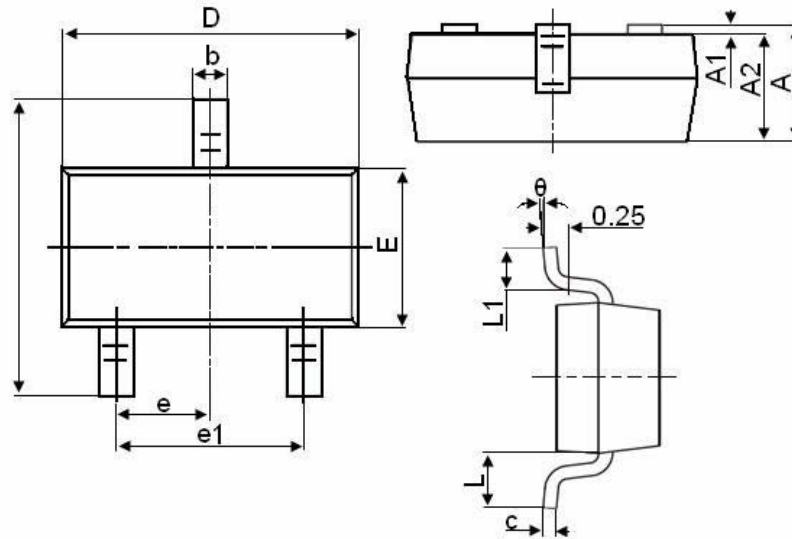


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





## SOT-23-3L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°



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