



Description

The HM6304 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

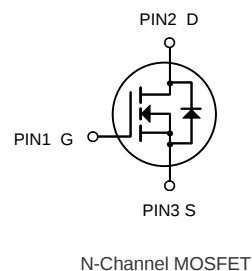
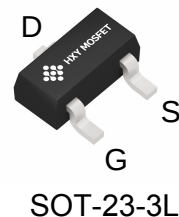
$V_{DS} = 30V, I_D = 5.8A$

$R_{DS(ON)} < 28m\Omega @ V_{GS}=10V$

$R_{DS(ON)} < 34m\Omega @ V_{GS}=4.5V$

Application

High power and current handing capability
Lead free product is acquired
Surface mount package
PWM applications
Load switch
Power management



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HM6304	SOT-23-3L	X0VX	3000PCS

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	± 12	V
I_D	Drain Current-Continuous	5.8	A
I_{DM}	Drain Current-Pulsed (Note 1)	30	A
P_D	Maximum Power Dissipation	1.4	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	89	$^{\circ}C/W$



Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.7	0.9	1.4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=2.5V, I_D=4A$	-	41	55	m Ω
		$V_{GS}=4.5V, I_D=5A$	-	23	34	m Ω
		$V_{GS}=10V, I_D=5.8A$	-	21	28	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5A$	10	-	-	S
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	825	-	PF
Output Capacitance	C_{oss}		-	100	-	PF
Reverse Transfer Capacitance	C_{rss}		-	78	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, R_L=2.7\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$	-	3.3	-	nS
Turn-on Rise Time	t_r		-	4.8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=5.8A,$ $V_{GS}=4.5V$	-	10	-	nC
Gate-Source Charge	Q_{gs}		-	1.6	-	nC
Gate-Drain Charge	Q_{gd}		-	3.1	-	nC
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=5.8A$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	5.8	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

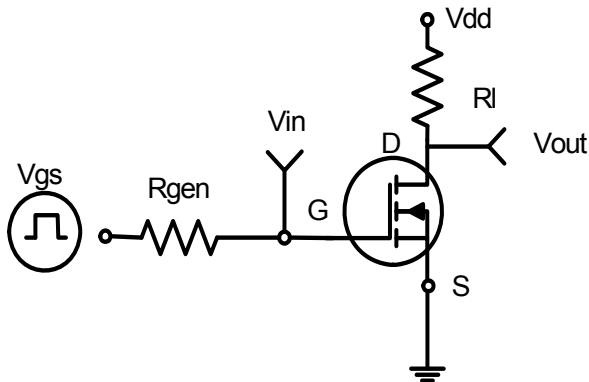


Figure 1: Switching Test Circuit

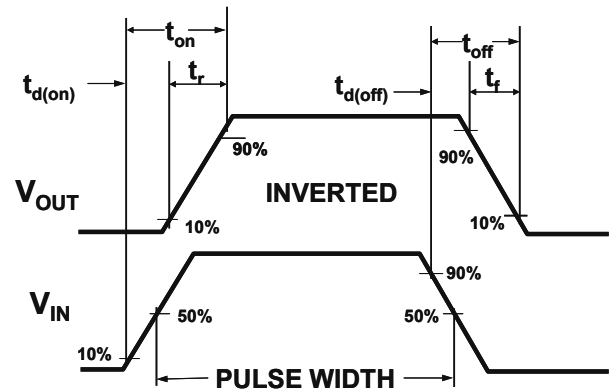


Figure 2: Switching Waveforms

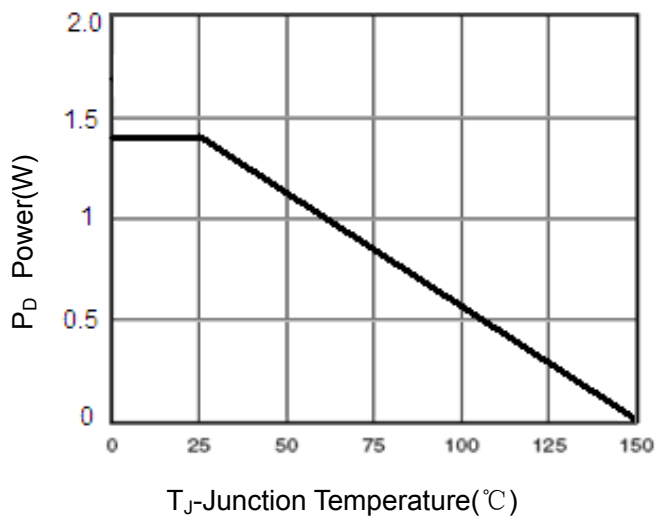


Figure 3 Power Dissipation

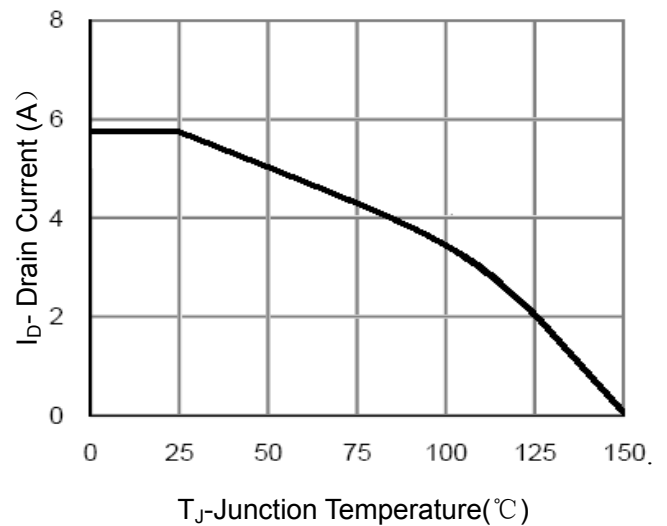


Figure 4 Drain Current

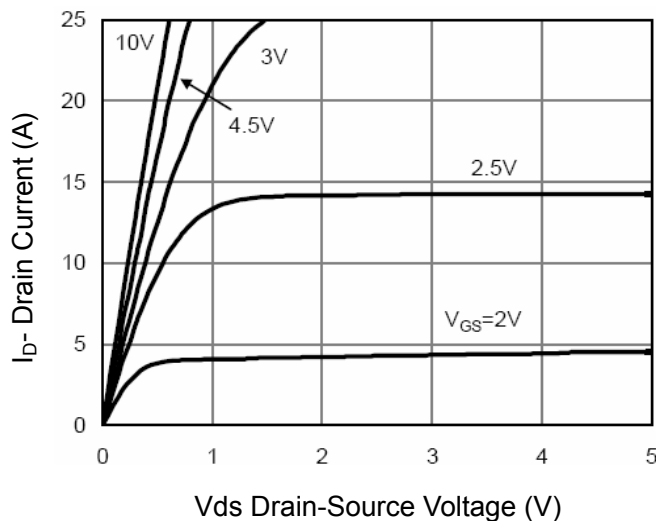


Figure 5 Output Characteristics

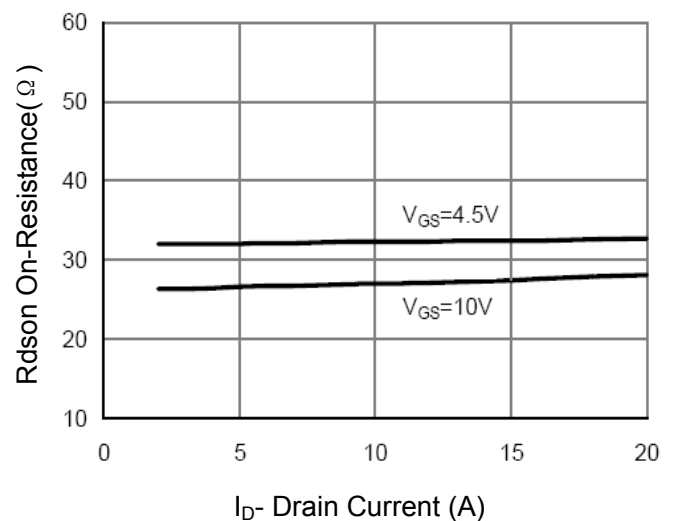


Figure 6 Drain-Source On-Resistance

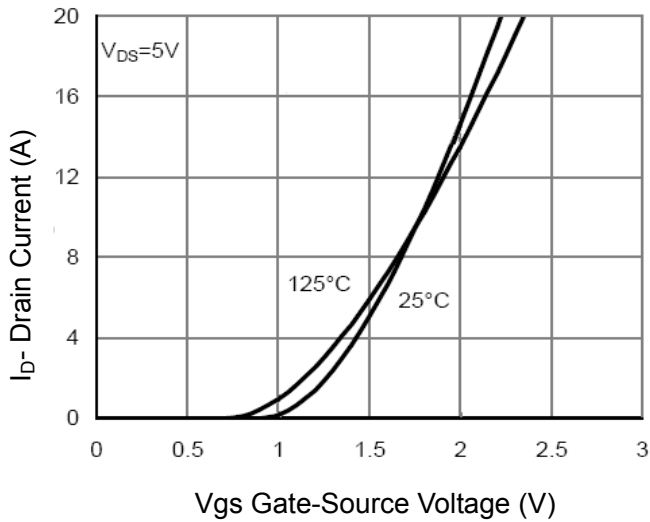


Figure 7 Transfer Characteristics

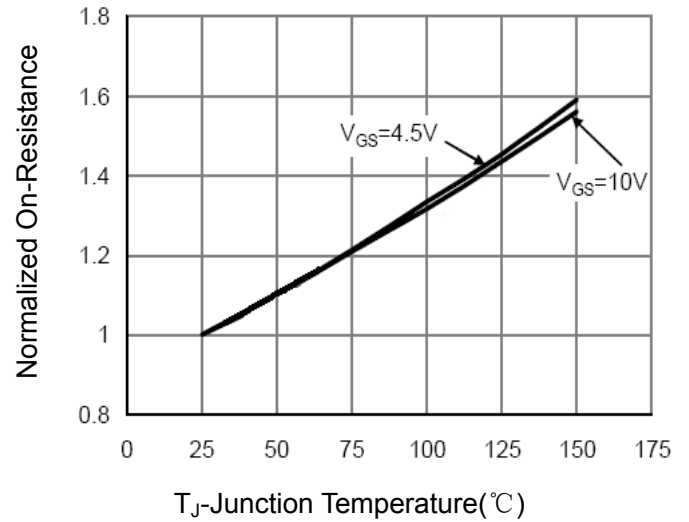


Figure 8 Drain-Source On-Resistance

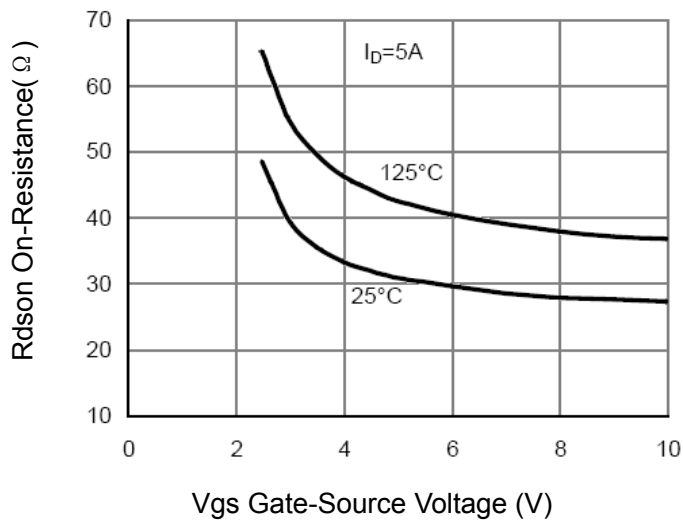


Figure 9 $R_{DS(on)}$ vs V_{GS}

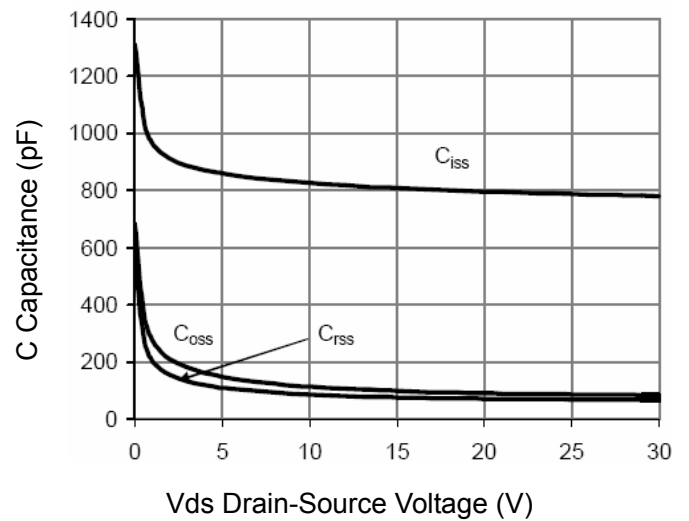


Figure 10 Capacitance vs V_{DS}

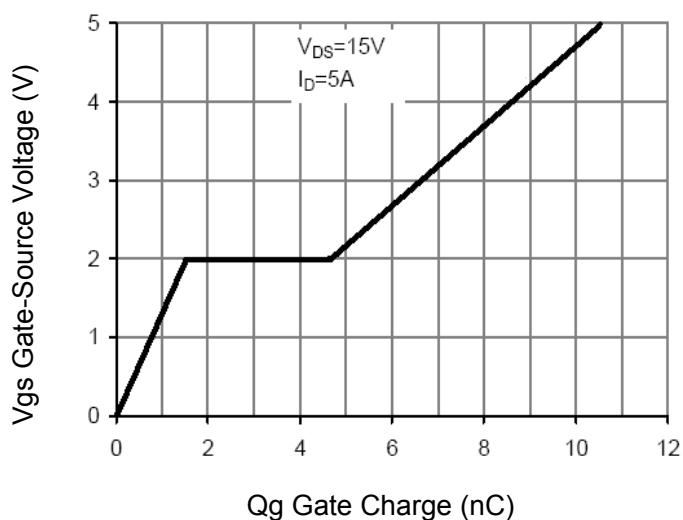


Figure 11 Gate Charge

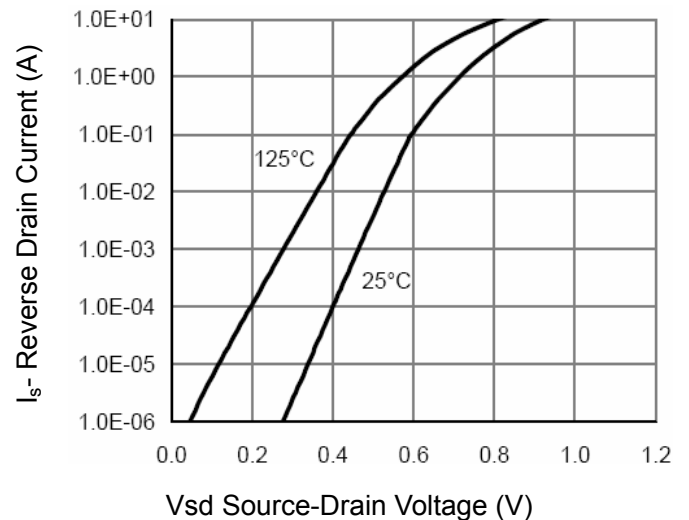


Figure 12 Source-Drain Diode Forward

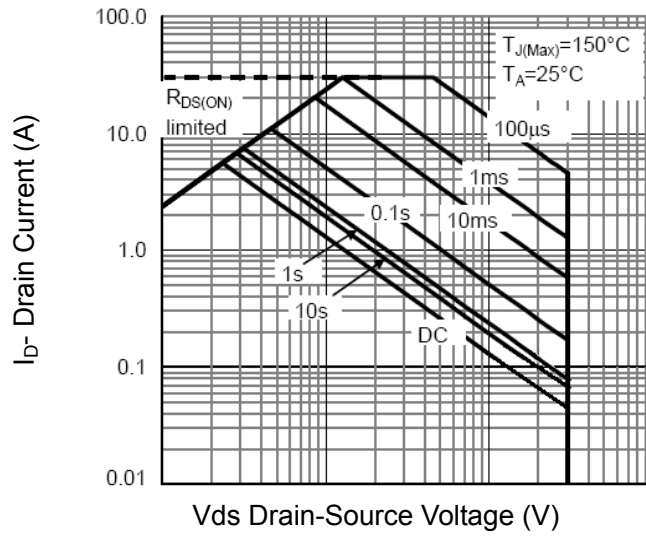


Figure 13 Safe Operation Area

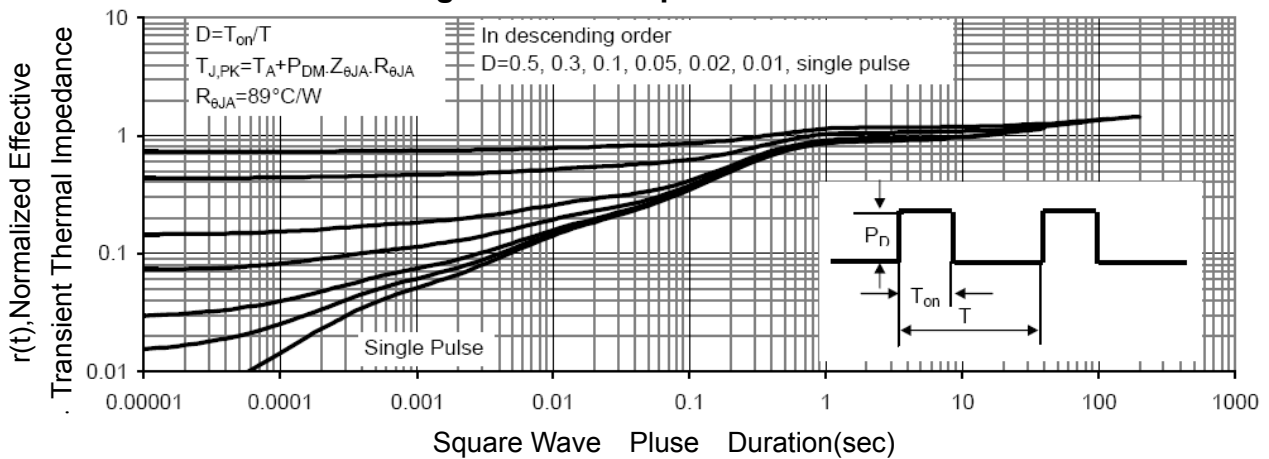
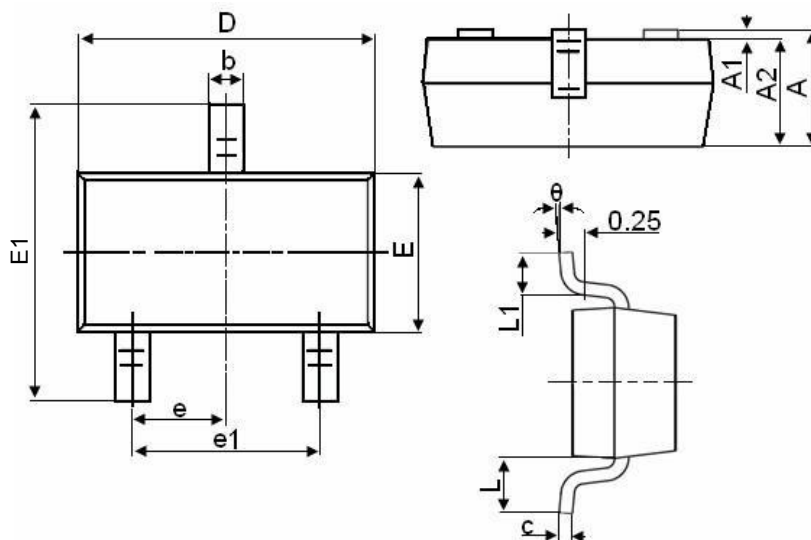


Figure 14 Normalized Maximum Transient Thermal Impedance



SOT-23-3L Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.650	2.950
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.600
θ	0°	8°



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