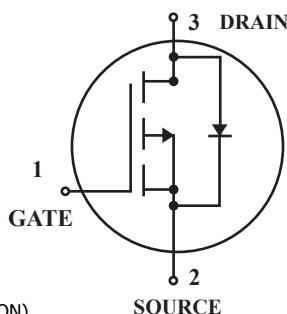


P-Channel Enhancement Mode Power MOSFET

(Pb) Lead(Pb)-Free



DRAIN CURRENT

-4.3 AMPERES

DRAIN SOURCE VOLTAGE

-12 VOLTAGE

Features:

*Super High Dense Cell Design For Low $R_{DS(ON)}$

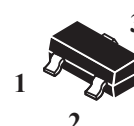
$R_{DS(ON)} < 50m\Omega @ V_{GS} = -4.5V$

*Rugged and Reliable

*Simple Drive Requirement

*Fast Switching

*SOT-23 Package



SOT-23

Applications

*Power Management in Notebook Computer

*Portable Equipment

*Battery Powered System

Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Specified)

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-12	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current ³ , ($T_A = 25^\circ C$) ($T_A = 70^\circ C$)	I_D	-4.3	A
		-3.4	
Pulsed Drain Current ¹	I_{DM}	-12	
Total Power Dissipation ($T_A = 25^\circ C$)	P_D	1.38	W
Maximum Thermal Resistace Junction-ambient ³	$R_{\theta JA}$	90	$^\circ C/W$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55~+150	$^\circ C$

Device Marking

WTC6401=6401

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

Characteristic	Symbol	Min	Typ	Max	Unit
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Static

Drain-Source Breakdown Voltage $V_{GS}=0, I_D=-250\mu\text{A}$	BV_{DSS}	-12	-	-	V
Gate-Source Threshold Voltage $V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	$V_{GS(Th)}$	-	-	-1.0	
Gate-Source Leakage current $V_{GS} = \pm 8\text{V}$	I_{GSS}	-	-	± 100	nA
Drain-Source Leakage Current($T_j=25^\circ\text{C}$) $V_{DS}=-16\text{V}, V_{GS}=0$	I_{DSS}	-	-	-1	μA
Drain-Source Leakage Current($T_j=70^\circ\text{C}$) $V_{DS}=-12\text{V}, V_{GS}=0$		-	-	-25	
Drain-Source On-Resistance ² $V_{GS}=-4.5\text{V}, I_D=-4.3\text{A}$ $V_{GS}=-2.5\text{V}, I_D=-2.5\text{A}$ $V_{GS}=-1.8\text{V}, I_D=-2.0\text{A}$	$R_{DS(on)}$	- - -	- - -	50 85 125	$\text{m}\Omega$
Forward Transconductance $V_{DS}=-5.0, I_D=-4.0\text{A}$	g_{fs}	-	12	-	S

Dynamic

Input Capacitance $V_{GS}=0\text{V}, V_{DS}=-15\text{V}, f=1.0\text{MHz}$	C_{iss}	-	985	1580	pF
Output Capacitance $V_{GS}=0\text{V}, V_{DS}=-15\text{V}, f=1.0\text{MHz}$	C_{oss}	-	180	-	
Reverse Transfer Capacitance $V_{GS}=0\text{V}, V_{DS}=-15\text{V}, f=1.0\text{MHz}$	C_{rss}	-	160	-	

Switching

Turn-on Delay Time ² $V_{DS}=-10V, V_{GS}=-10V, I_D=-1A, R_D=10\Omega, R_G=3.3\Omega$	$t_d(on)$	-	8	-	ns
Rise Time $V_{DS}=-10V, V_{GS}=-10V, I_D=-1A, R_D=10\Omega, R_G=3.3\Omega$	t_r	-	11	-	
Turn-off Delay Time $V_{DS}=-10V, V_{GS}=-10V, I_D=-1A, R_D=10\Omega, R_G=3.3\Omega$	$t_d(off)$	-	54	-	
Fall Time $V_{DS}=-10V, V_{GS}=-10V, I_D=-1A, R_D=10\Omega, R_G=3.3\Omega$	t_f	-	36	-	
Total Gate Charge ² $V_{DS}=-12V, V_{GS}=-4.5V, I_D=-4.0A$	Q_g	-	15	24	nC
Gate-Source Charge $V_{DS}=-12V, V_{GS}=-4.5V, I_D=-4.0A$	Q_{gs}	-	1.3	-	
Gate-Source Change $V_{DS}=-12V, V_{GS}=-4.5V, I_D=-4.0A$	Q_{gd}	-	4	-	

Source-Drain Diode Characteristics

Forward On Voltage ² $V_{GS}=0V, I_S=-1.2A$	V_{SD}	-	-	1.2	V
Reverse Recovery Time ² $V_{GS}=0V, I_S=-4.0A, di/dt=100A/\mu s$	T_{rr}	-	39	-	ns
Reverse Recovery Charge $V_{GS}=0V, I_S=-4.0A, di/dt=100A/\mu s$	Q_{rr}	-	26	-	nC

Note: 1. Pulse width limited by max, junction temperature.

2. pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

3. Surface mounted on 1 in² copper pad of FR4 board; 270°C/W when mounted on min, copper pad.

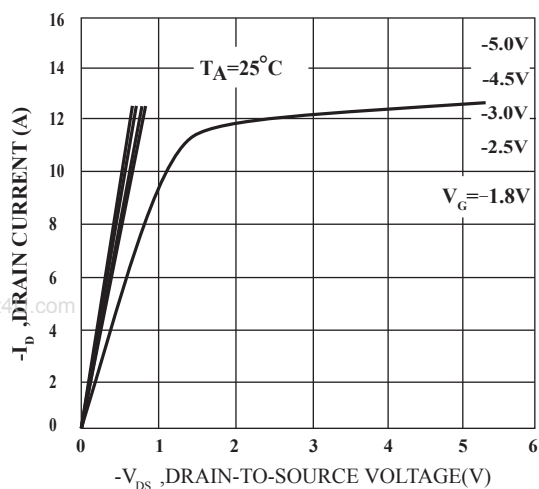


FIG.1 Typical Output Characteristics

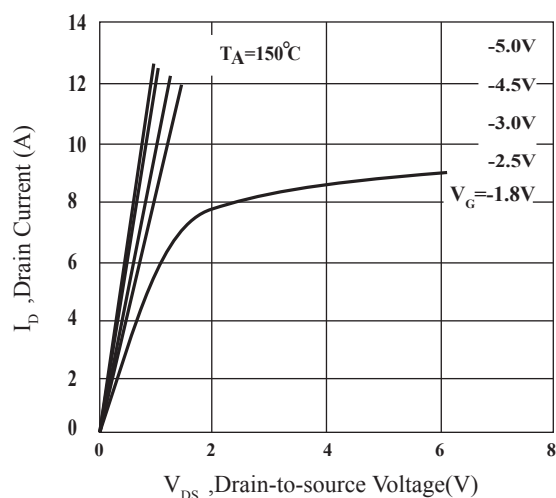


Fig.2 Typical Output Characteristics

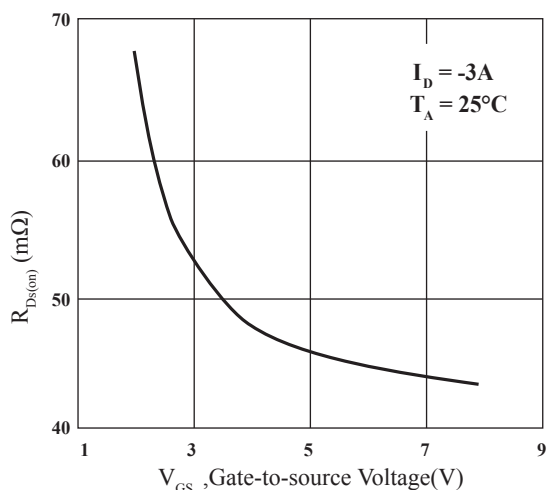


Fig.3 On-Resistance v.s. Gate Voltage

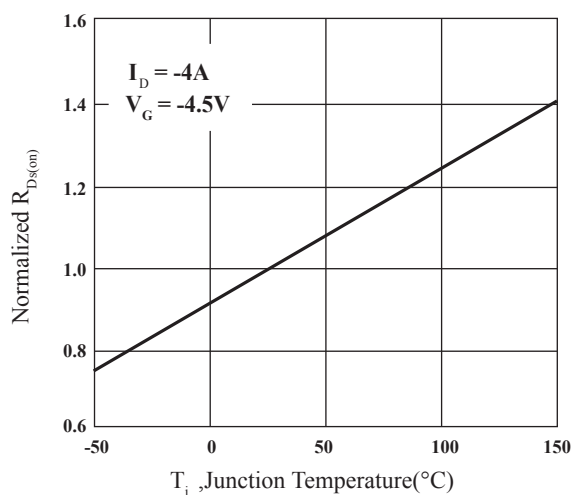


Fig.4 Normalized OnResistance

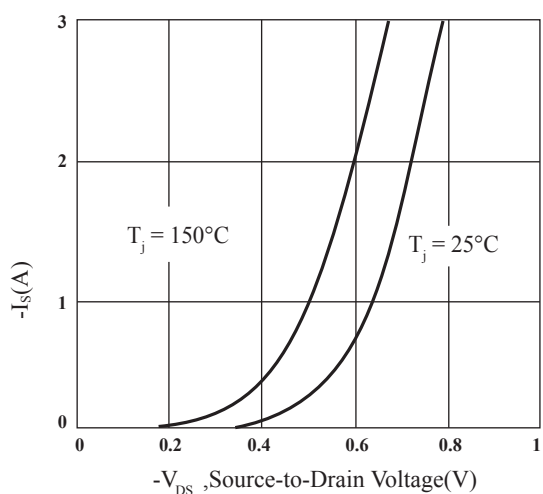


Fig.5 Forward Characteristics of Reverse Diode

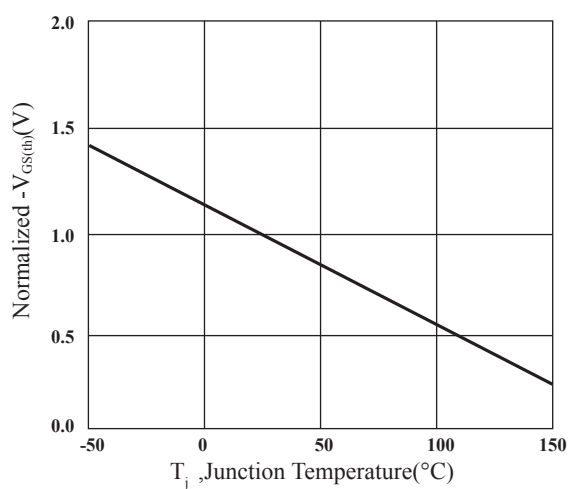
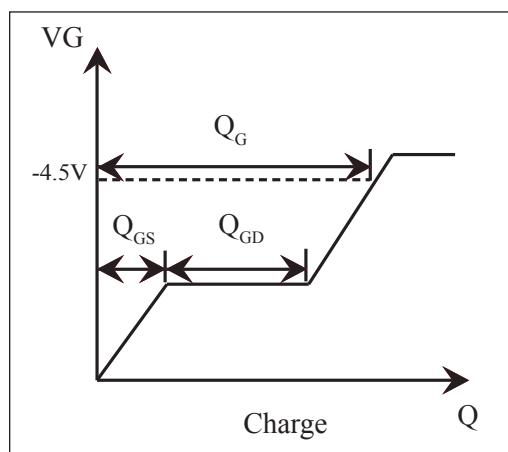
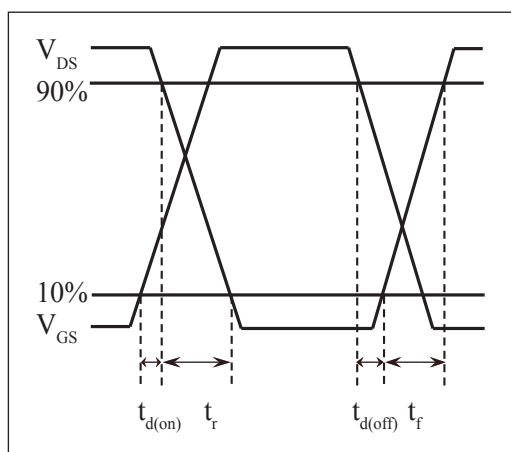
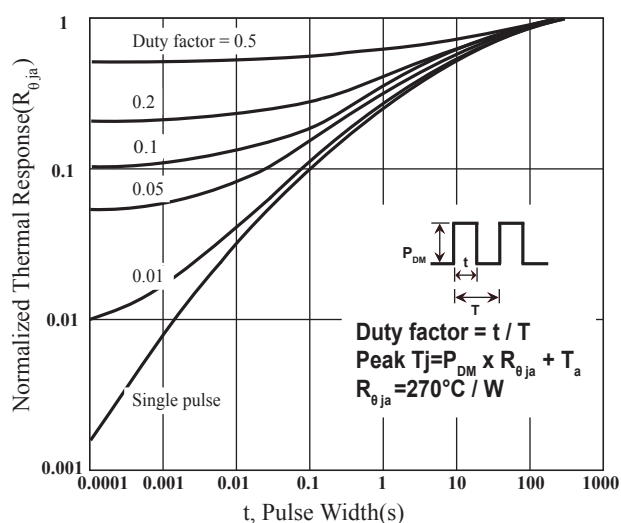
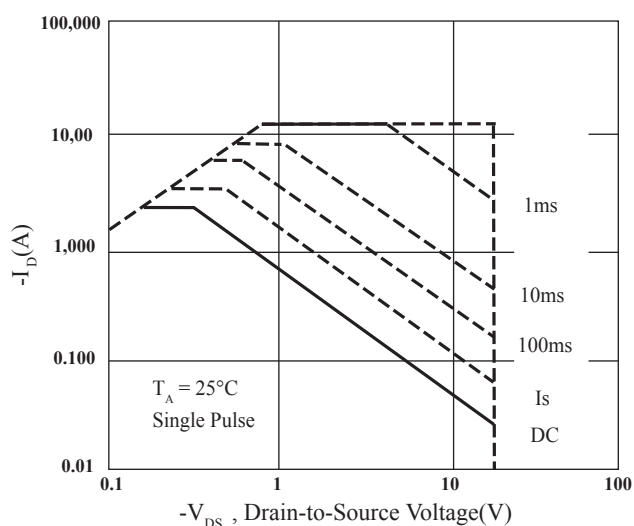
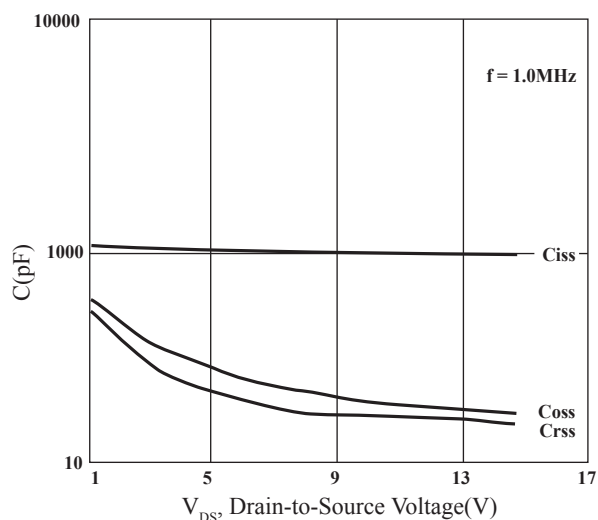
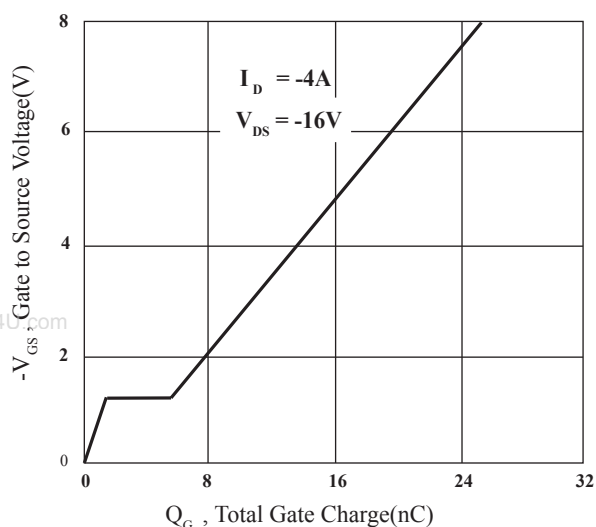
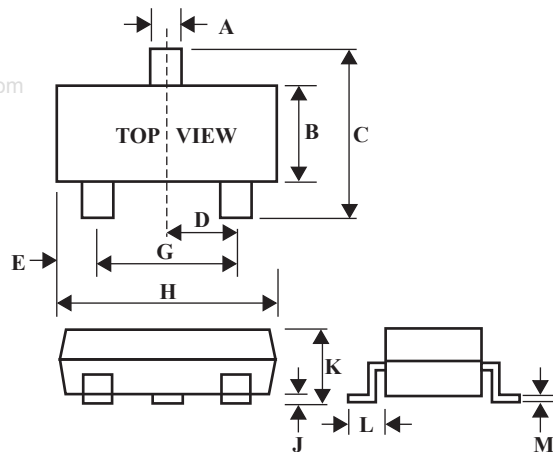


Fig.6 Gate Threshold Voltage v.s. Junction Temperature



SOT-23 Outline Dimension



SOT-23		
Dim	Min	Max
A	0.35	0.51
B	1.19	1.40
C	2.10	3.00
D	0.85	1.05
E	0.46	1.00
G	1.70	2.10
H	2.70	3.10
J	0.01	0.13
K	0.89	1.10
L	0.30	0.61
M	0.076	0.25