

## N-Channel Trench Power MOSFET

### General Description

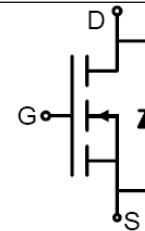
The JY3404X uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a load switch or in PWM applications.

### Features

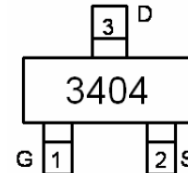
- $V_{DS} = 30V, I_D = 5.8A$   
 $R_{DS(ON)} < 30m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 42m\Omega @ V_{GS} = 4.5V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

### Application

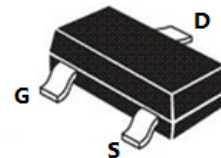
- PWM applications
- Load switch
- Power management



Schematic Diagram



Marking and pin Assignment



SOT-23-3L top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3404	JY3404X	SOT-23-3L	Ø180mm	8mm	3000 units

Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	30	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	$\pm 20$	V
$I_D$	Drain Current-Continuous	5.8	A
$I_{DM (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	30	A
$P_D$	Maximum Power Dissipation	1.5	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

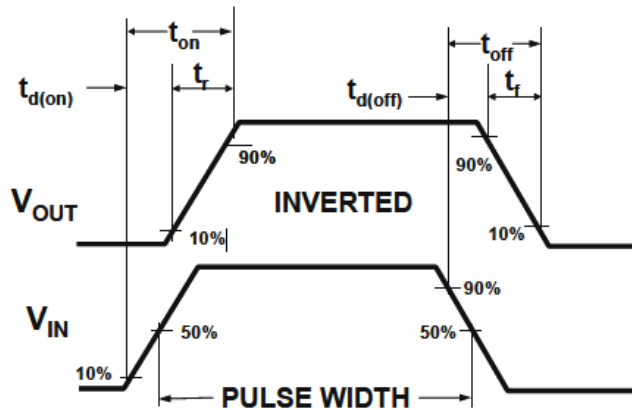
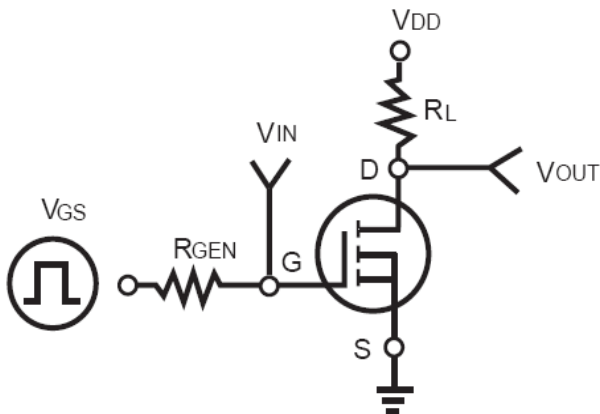
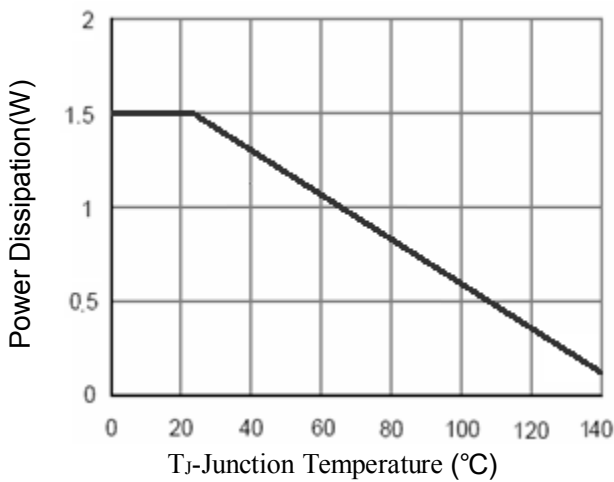
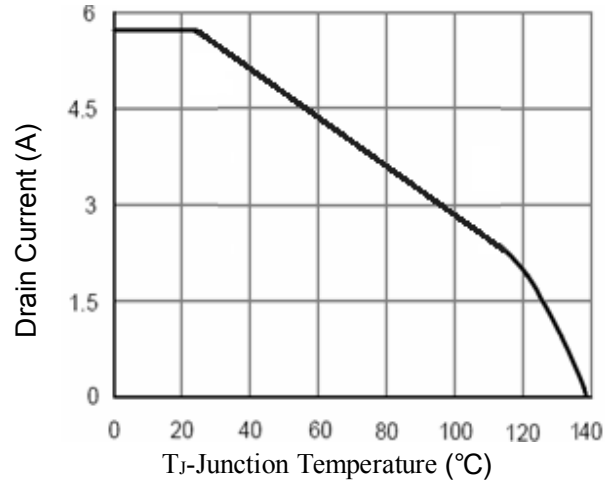
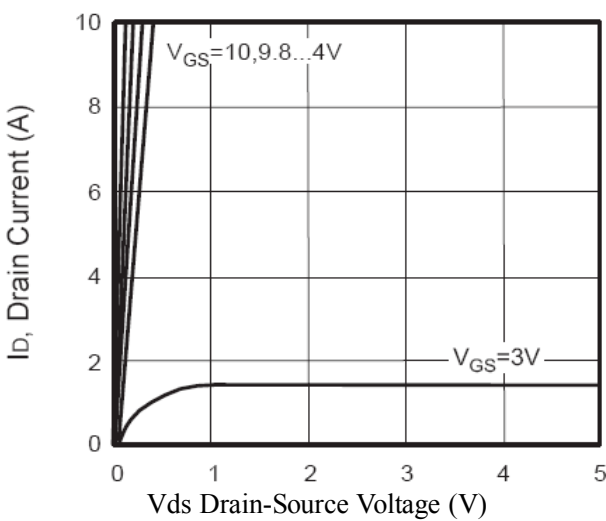
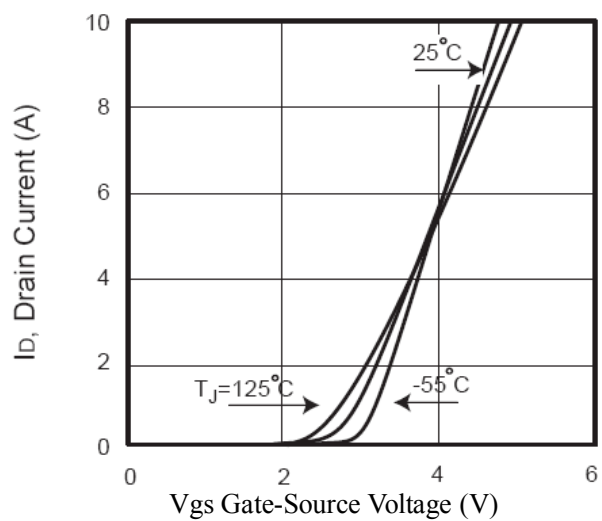
Table 2. Thermal Characteristic

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	85	°C/W

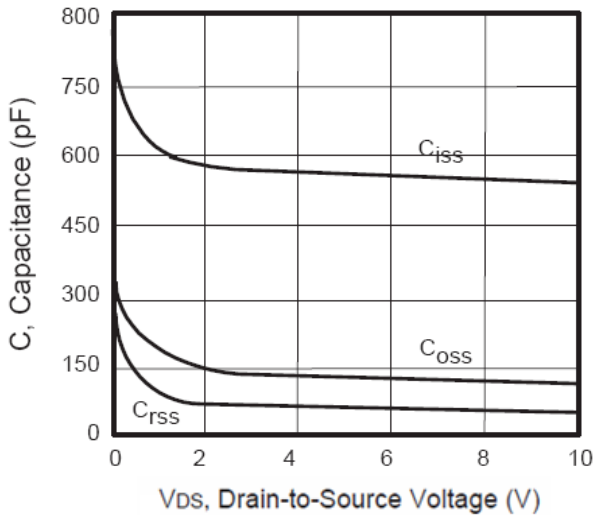
**Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	34		V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	1.6	2.4	V
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =5A	3	5.8		S
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =5.8A		21	30	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.9A		32	42	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz		560		pF
C <sub>oss</sub>	Output Capacitance			125		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			90		pF
<b>Switching Times</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V, I <sub>D</sub> =5.5A, R <sub>L</sub> =15Ω V <sub>GS</sub> =10V, R <sub>G</sub> =2.5Ω		10		nS
t <sub>r</sub>	Turn-on Rise Time			4		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			27		nS
t <sub>f</sub>	Turn-Off Fall Time			5		nS
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =3.6A, V <sub>GS</sub> =5V		7		nC
Q <sub>gs</sub>	Gate-Source Charge			1.5		nC
Q <sub>gd</sub>	Gate-Drain Charge			3		nC
<b>Source-Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source-Drain Current(Body Diode)				5.8	A
V <sub>SD</sub>	Forward on Voltage <sup>(Note 1)</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A		0.78	1	V

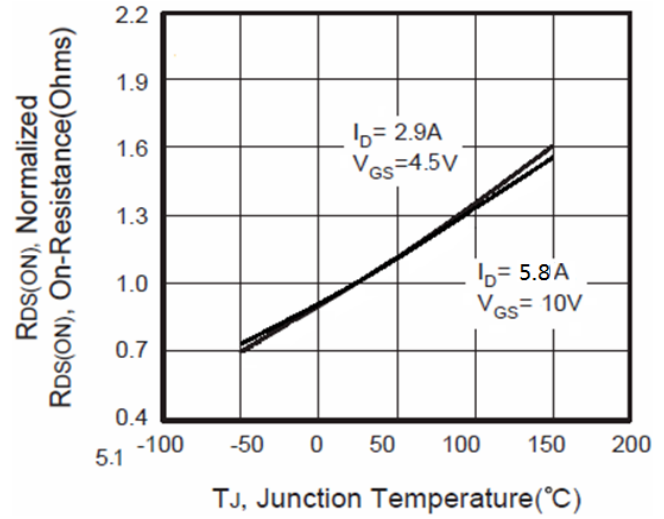
Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

**Switch Time Test Circuit and Switching Waveforms:**

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)**
**Figure1. Power Dissipation**

**Figure2. Drain Current**

**Figure3. Output Characteristics**

**Figure4. Transfer Characteristics**


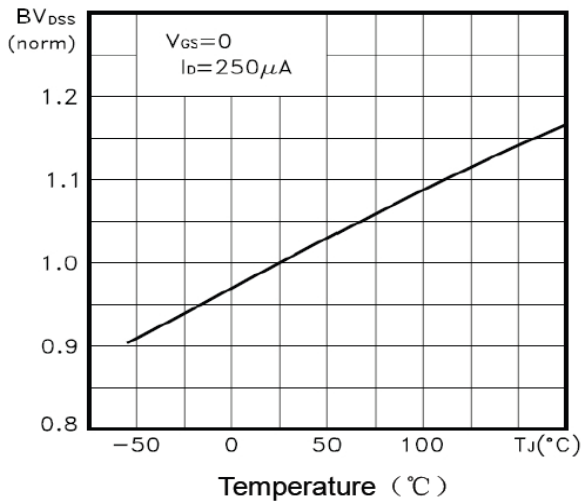
**Figure5. Capacitance**



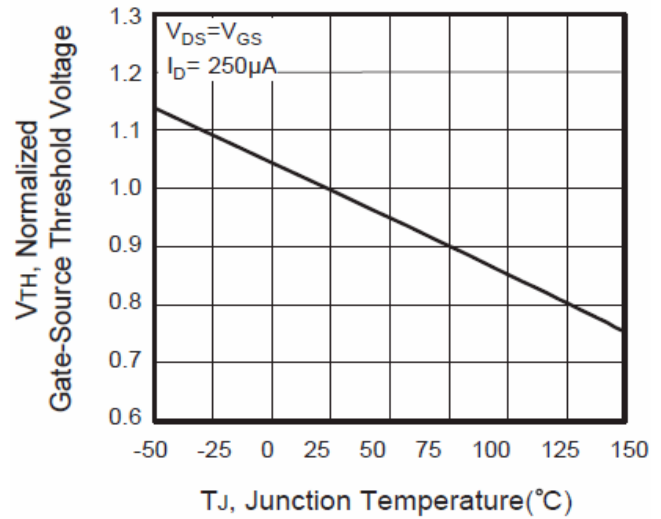
**Figure6.  $R_{DS(ON)}$  vs Junction Temperature**



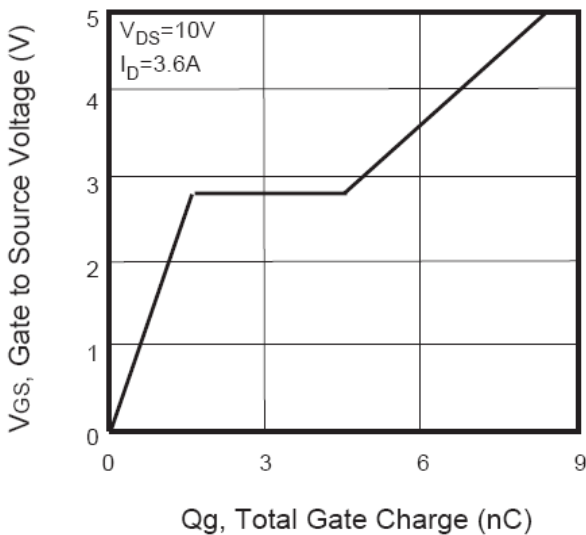
**Figure7. Max  $BV_{DSS}$  vs Junction Temperature**



**Figure8.  $V_{GS(th)}$  vs Junction Temperature**



**Figure9. Gate Charge Waveforms**



**Figure10. Maximum Safe Operating Area**

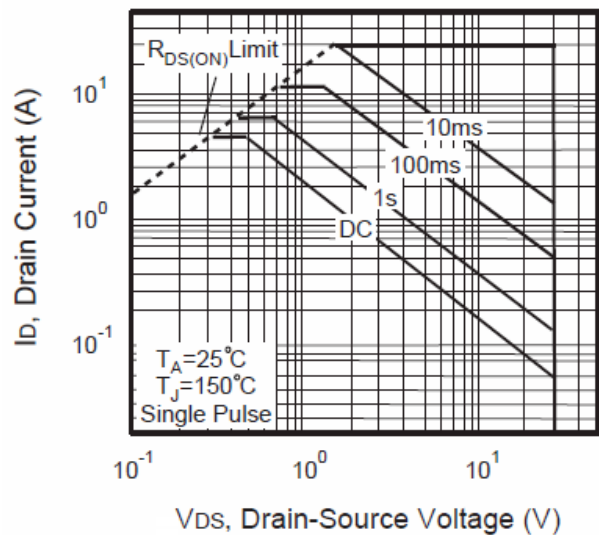
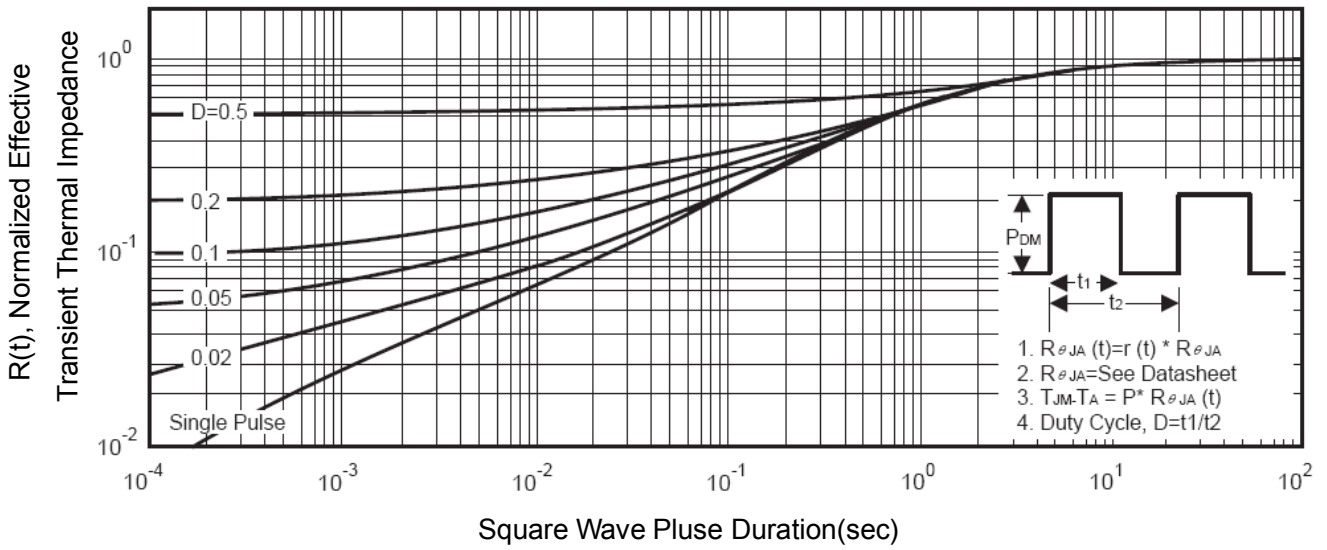
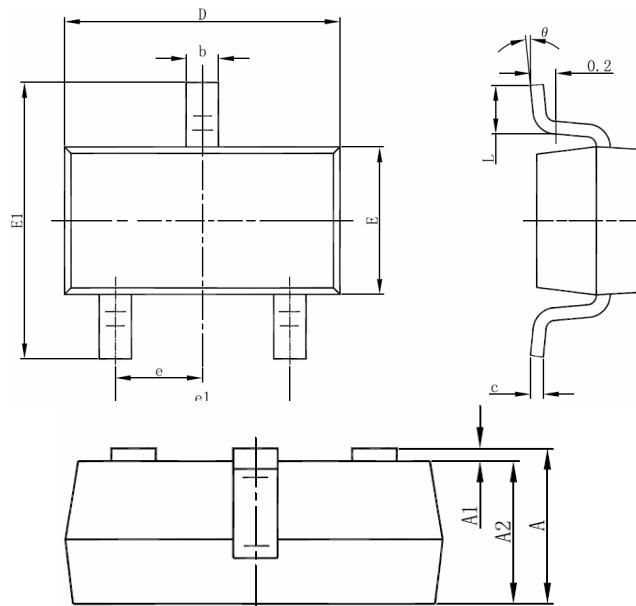


Figure11. Normalized Maximum Transient Thermal Impedance



### SOT-23-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

**Carrier Dimensions**

PKG TYPE	W	P	E	F	D	D1	Po	Po10	P2
SOT-23	8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00
Tolerance	+0.3/-0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.05

A0	B0	K0	T
3.15	2.77	1.22	0.20
±0.1	±0.1	±0.1	±0.02

