

## Surface Mount Dual N-Channel Enhancement Mode MOSFET

**(Pb)** Lead(Pb)-Free

### Features:

\*Super high dense cell design for low  $R_{DS(ON)}$

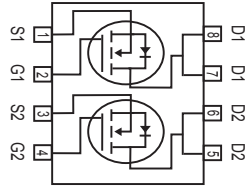
$$R_{DS(ON)} < 14m\Omega @ V_{GS} = 10V$$

$$R_{DS(ON)} < 20m\Omega @ V_{GS} = 4.5V$$

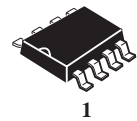
\*Simple Drive Requirement

\*Dual N MOSFET Package

\*SO-8 Package



**DRAIN CURRENT**  
**10 AMPERES**  
**DRAIN SOURCE VOLTAGE**  
**30 VOLTAGE**



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**SO-8**

## Maximum Ratings (TA=25°C Unless Otherwise Specified)

Rating	Symbol	Value	Unite
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>(1)</sup> ( $T_A = 25^\circ C$ ) ( $T_A = 70^\circ C$ )	$I_D$	10	A
		8	A
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	30	A
Power Dissipation <sup>(1)</sup> ( $T_A = 25^\circ C$ )	$P_D$	2	W
Maximax Junction-to-Ambient <sup>(1)</sup>	$R_{\theta JA}$	62.5	$^\circ C/W$
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ C$

## Device Marking

WTK4224=4224SS

## Electrical Characteristics(T<sub>j</sub> = 25°C Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =250uA
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	0.03	-	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	-	3.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA
Forward Transconductance	g <sub>fs</sub>	-	16	-	S	V <sub>DS</sub> =10V, I <sub>D</sub> =10A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	1	uA	V <sub>DS</sub> =30V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =70°C)		-	-	25	uA	V <sub>DS</sub> =24V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(ON)</sub>	-	-	14	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =10A
		-	-	20		V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	23	15	nC	I <sub>D</sub> =10A V <sub>DS</sub> =24V V <sub>GS</sub> =4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	6	-		
Gate-Drain ("Miller") Change	Q <sub>gd</sub>	-	14	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	12	-	ns	V <sub>DS</sub> =15V I <sub>D</sub> =1A V <sub>GS</sub> =10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =15Ω
Rise Time	T <sub>r</sub>	-	8	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	34	-		
Fall Time	T <sub>f</sub>	-	16	-		
Input Capacitance	C <sub>iss</sub>	-	1910	3070	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	400	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	280	-		
Gate Resistance	R <sub>g</sub>	-	0.9	-		

## Source-Drain Diode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	1.2	V	I <sub>S</sub> =1.7A, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C
Reverse Recovery Time <sup>2</sup>	T <sub>rr</sub>	-	30	-	ns	I <sub>S</sub> =10A, V <sub>GS</sub> =0V di/dt=100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	-	24	-	nC	

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 135°C/W when mounted on Min. copper pad.

## Characteristics Curve

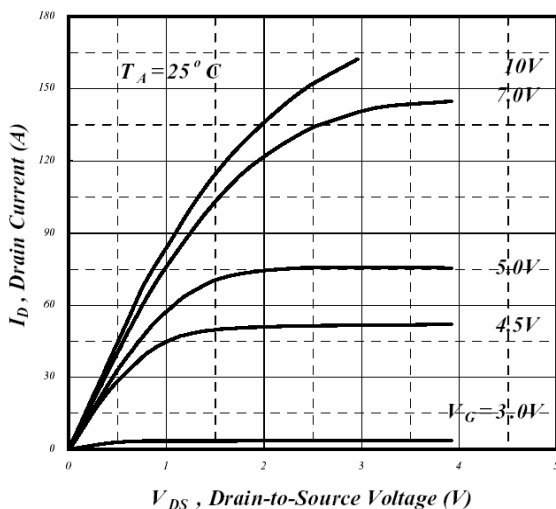


Fig 1. Typical Output Characteristics

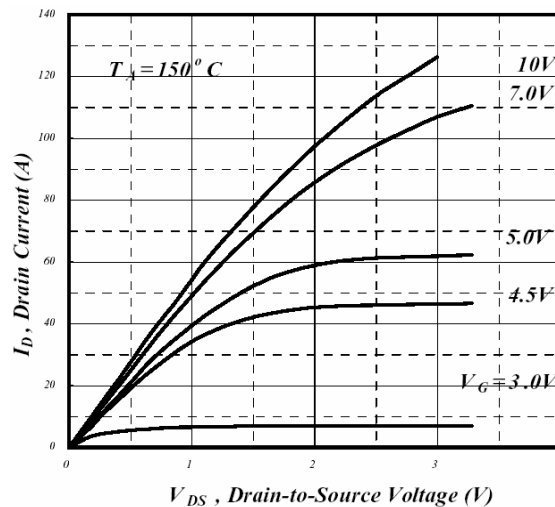


Fig 2. Typical Output Characteristics

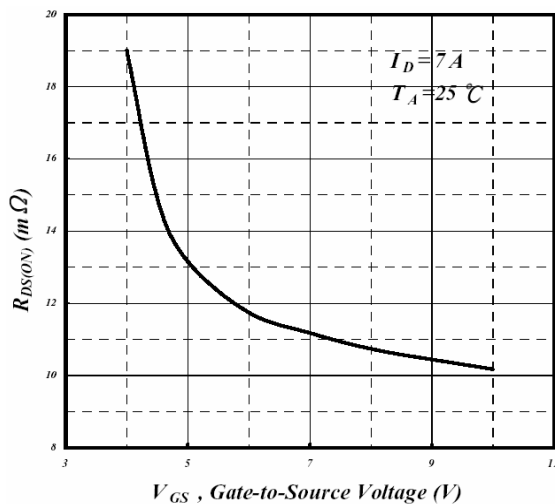


Fig 3. On-Resistance v.s. Gate Voltage

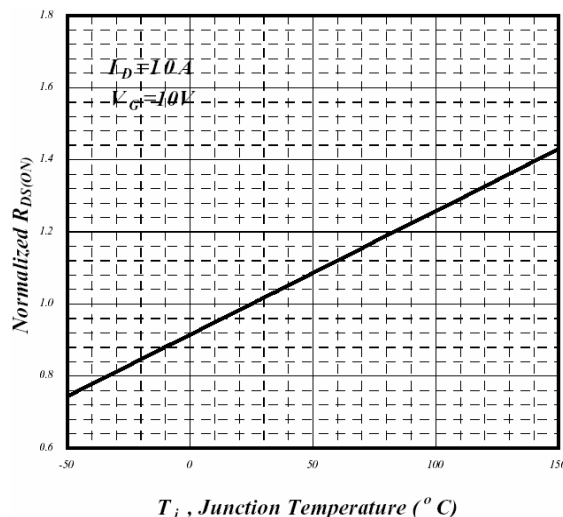


Fig 4. Normalized On-Resistance v.s. Junction Temperature

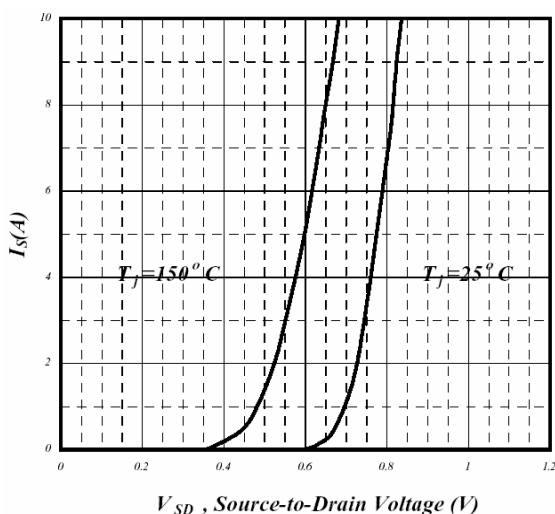


Fig 5. Forward Characteristics of Reverse Diode

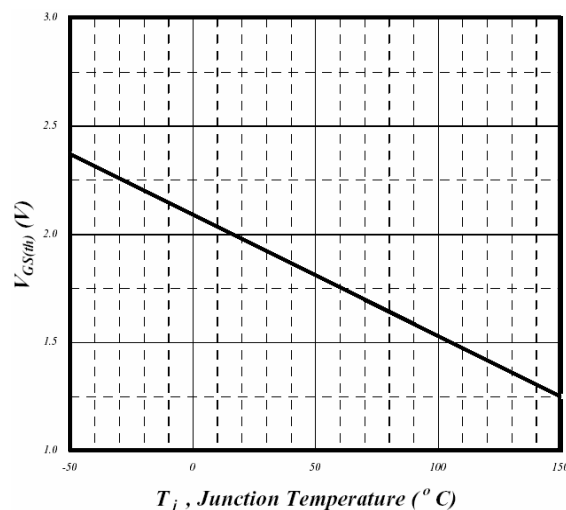
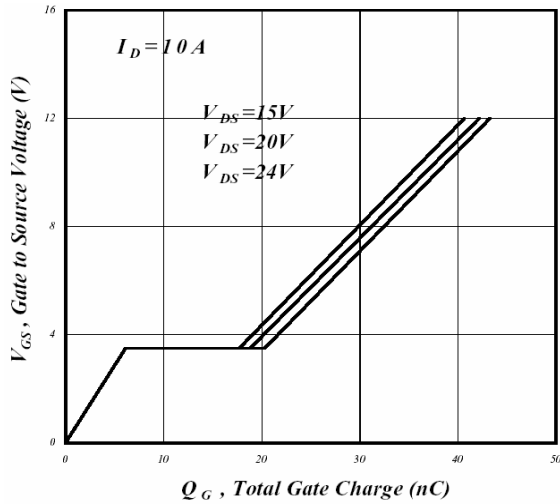
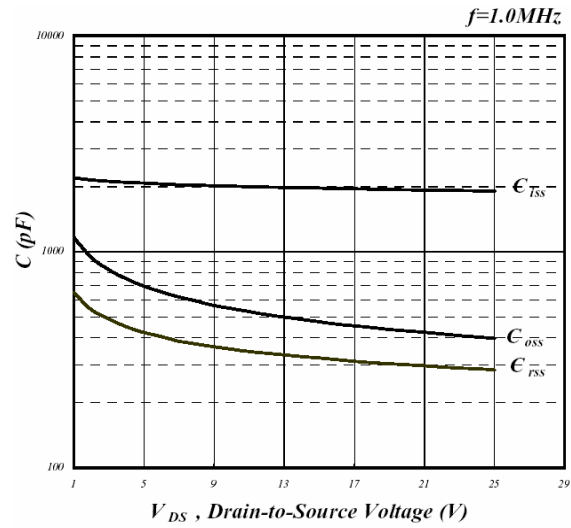


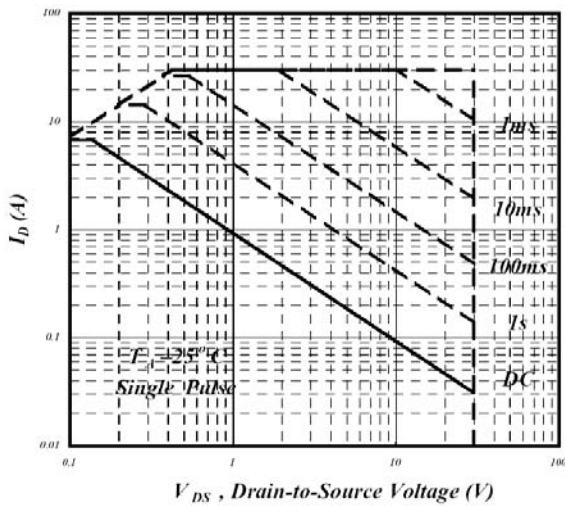
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



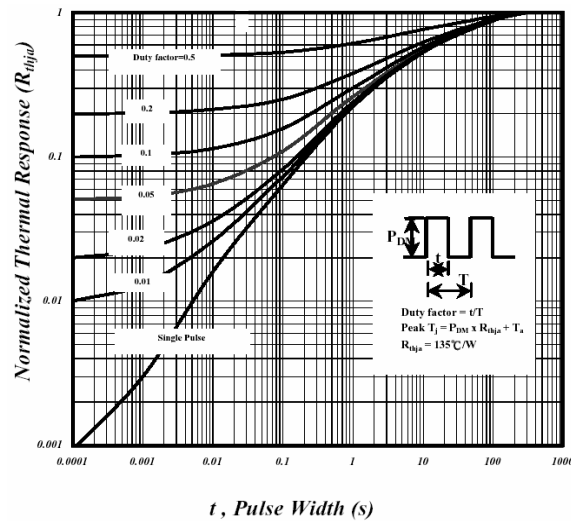
**Fig 7. Gate Charge Characteristics**



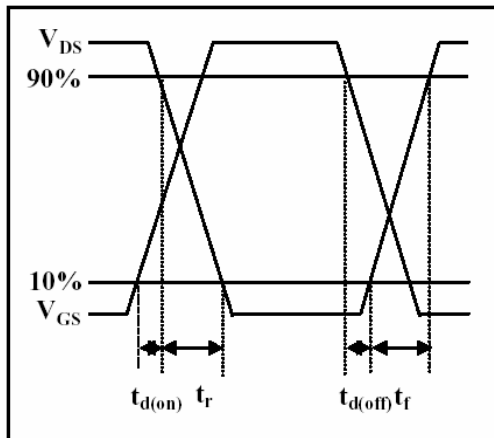
**Fig 8. Typical Capacitance Characteristics**



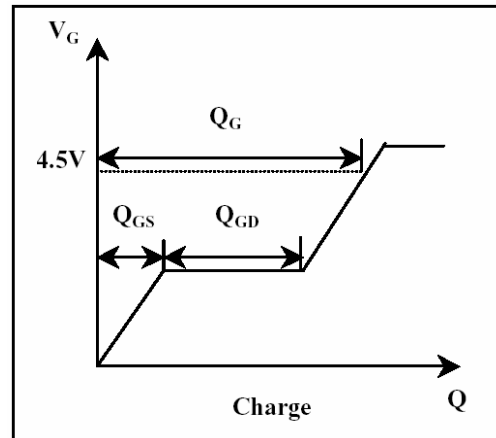
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



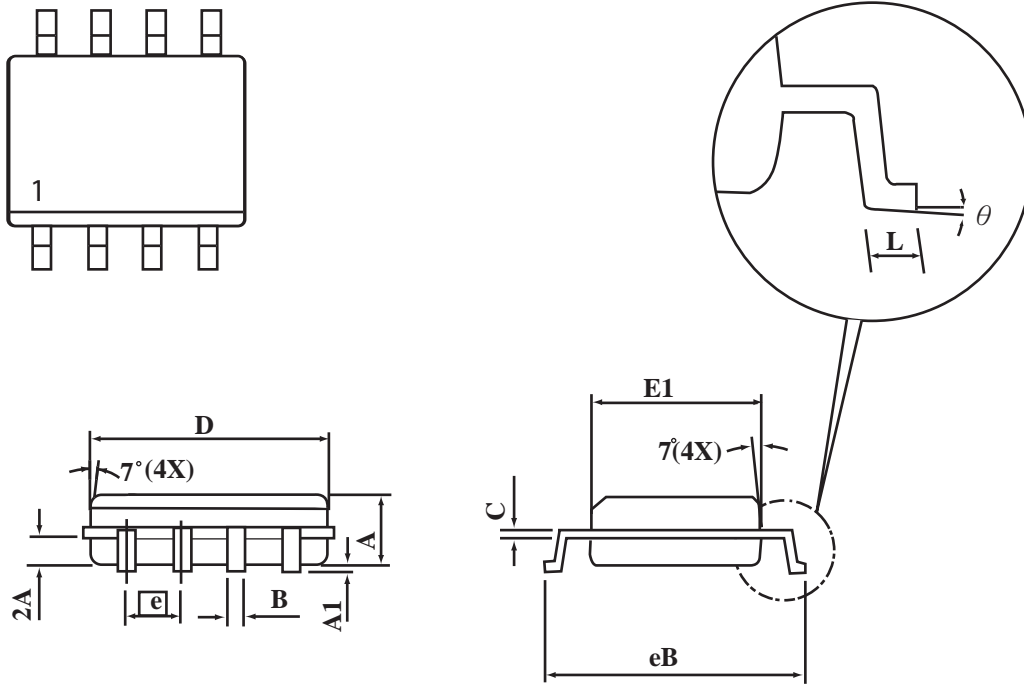
**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

SO-8 Package Outline Dimensions

Unit:mm



SYMBOLS	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.20
B	0.35	0.45
C	0.18	0.23
D	4.69	4.98
E1	3.56	4.06
eB	5.70	6.30
e	1.27 BSC	
L	0.60	0.80
θ	0°	8°