

### DESCRIPTION

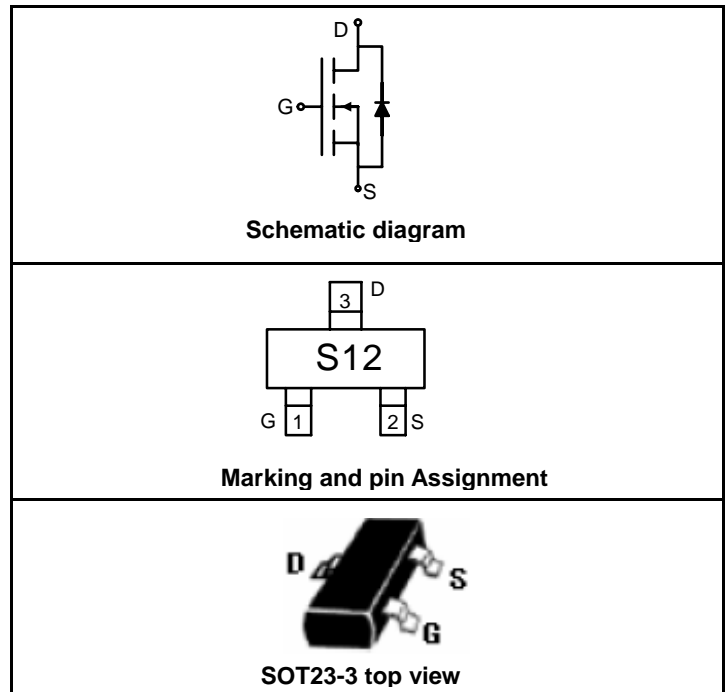
The FTK2312 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

### GENERAL FEATURES

- $V_{DS} = 20V, I_D = 4.5A$   
 $R_{DS(ON)} < 40m\Omega @ V_{GS}=2.5V$   
 $R_{DS(ON)} < 33m\Omega @ V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

### APPLICATION

- Battery protection
- Load switch
- Power management



### PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
S12	FTK2312	SOT23-3	Ø180mm	8 mm	3000 units

### ABSOLUTE MAXIMUM RATINGS (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	±8	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D$	4.5	A
	$I_{DM}$	13.5	A
Maximum Power Dissipation	$P_D$	1.25	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	°C/W
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### ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V, V_{DS}=0V$			±100	nA
<b>ON CHARACTERISTICS (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.65	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=2.5V, I_D=4.5A$		33	40	mΩ
		$V_{GS}=4.5V, I_D=5A$		27	33	mΩ
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=5A$		10		S

DYNAMIC CHARACTERISTICS (Note4)					
Input Capacitance	$C_{iss}$	$V_{DS}=8V, V_{GS}=0V,$ $F=1.0MHz$	500		PF
Output Capacitance	$C_{oss}$		300		PF
Reverse Transfer Capacitance	$C_{rss}$		140		PF
SWITCHING CHARACTERISTICS (Note 4)					
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=1A$ $V_{GS}=4.5V, R_{GEN}=6\Omega$	20	40	nS
Turn-on Rise Time	$t_r$		18	40	nS
Turn-Off Delay Time	$t_{d(off)}$		60	108	nS
Turn-Off Fall Time	$t_f$		28	56	nS
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=5A, V_{GS}=4.5V$	10	15	nC
Gate-Source Charge	$Q_{gs}$		2.3		nC
Gate-Drain Charge	$Q_{gd}$		2.9		nC
DRAIN-SOURCE DIODE CHARACTERISTICS					
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1A$		1.2	V
Diode Forward Current (Note 2)	$I_S$			1	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 testing

### TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

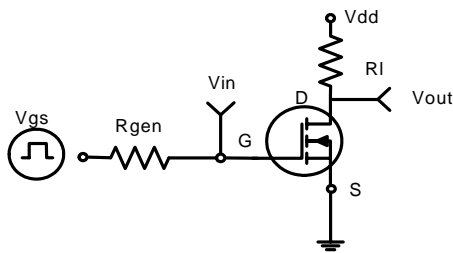


Figure 1: Switching Test Circuit

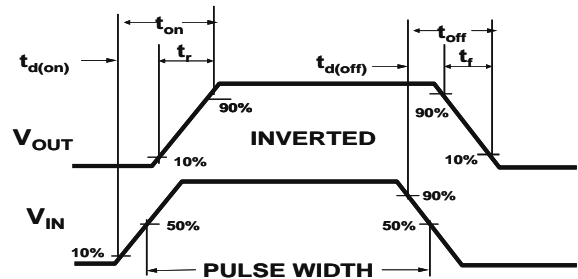


Figure 2: S witching Waveforms

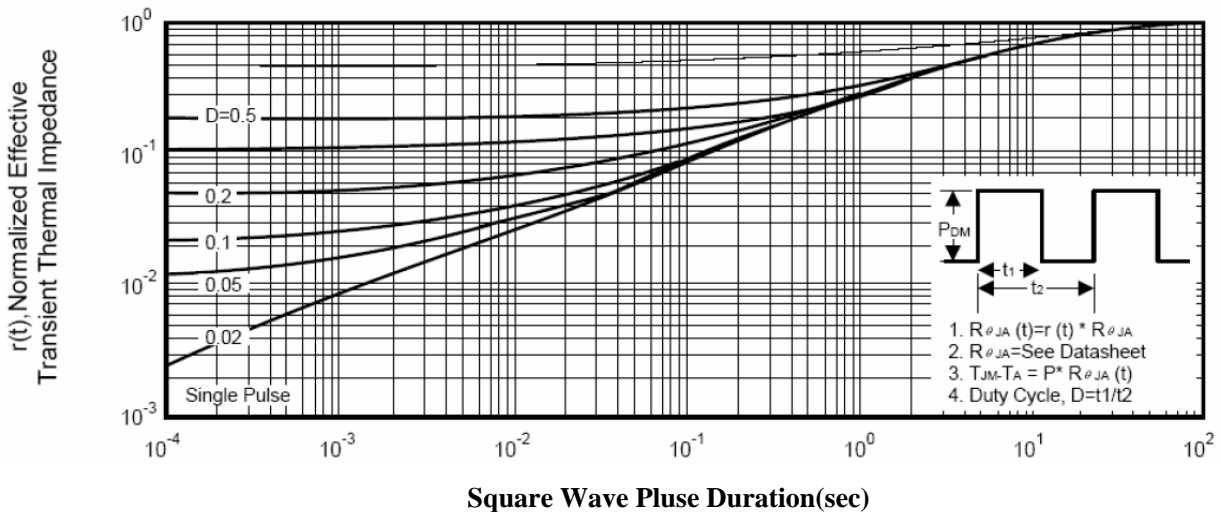
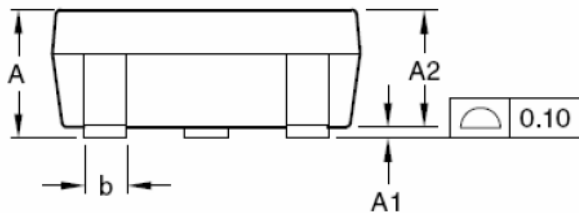
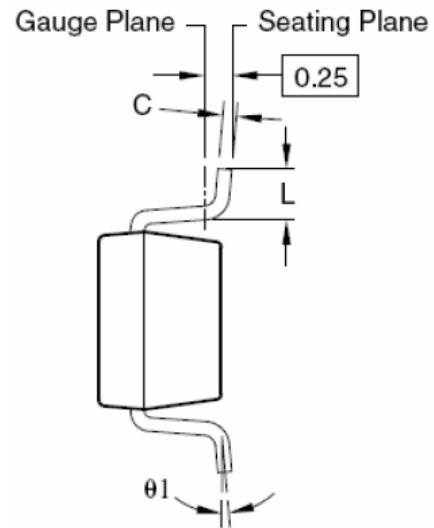
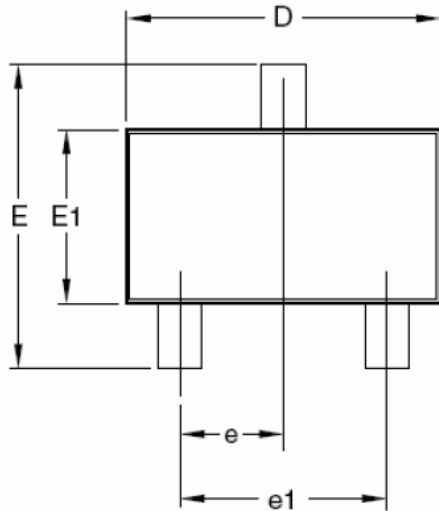


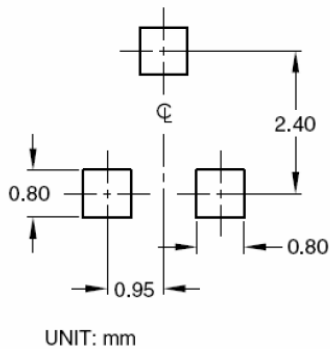
Figure 3: Normalized Maximum Transient Thermal Impedance

## SOT23-3 PACKAGE INFORMATION

Dimensions in Millimeters (UNIT:mm)



RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	0.90	—	1.25
A1	0.00	—	0.13
A2	0.70	1.00	1.15
b	0.30	0.40	0.50
C	0.08	0.13	0.20
D	2.80	2.90	3.10
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	—	0.60
θ1	0°	5°	8°

Dimensions in inches

Symbols	Min.	Nom.	Max.
A	0.035	—	0.049
A1	0.000	—	0.005
A2	0.028	0.039	0.045
b	0.012	0.016	0.020
C	0.003	0.005	0.008
D	0.110	0.114	0.122
E	0.102	0.110	0.118
E1	0.055	0.063	0.071
e	0.037 BSC		
e1	0.075 BSC		
L	0.012	—	0.024
θ1	0°	5°	8°

NOTES:

1. All dimensions are in millimeters.
2. Tolerance  $\pm 0.10\text{mm}$  (4mil) unless otherwise specified.
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.