

### DESCRIPTION P-channel MOSFET

The FTK2333 uses advanced trench technology to provide excellent  $R_{DS(on)}$ , low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch applications.

### GENERAL FEATURES

$V_{(BR)DSS}$	$R_{DS(on)}$ MAX	$I_D$
- 12V	28mΩ@ -4.5V	- 6A
	32mΩ@ - 3.7V	
	40mΩ@- 2.5V	
	63mΩ@- 1.8V	
	150mΩ@- 1.5V	

- TrenchFET Power MOSFET
- Excellent  $R_{DS(on)}$  and Low Gate Charge

### Application

- Battery protection
- Load switch
- Power management

Schematic diagram

Marking and pin Assignment

SOT-23 top view

### PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
S33	FTK2333	SOT-23	Ø330mm	12mm	3000 units

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-12	V
Gate-Source Voltage	$V_{GS}$	±8	V
Continuous Drain Current	$I_D$	-6 <sup>a</sup>	A
Pulsed Drain Current (t=300μs)	$I_{DM}$	-20	A
Power Dissipation	$P_D$	0.35 <sup>b</sup>	W
		1.1 <sup>a</sup>	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	357 <sup>b</sup>	°C/W
		113 <sup>a</sup>	°C/W
Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-55~ +150	°C

- a. Device mounted on FR-4 substrate board, with minimum recommended pad layout, single side.  
b. Device mounted on no heat sink.

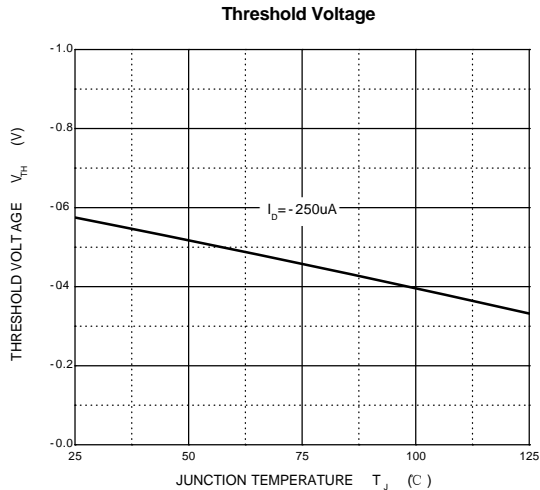
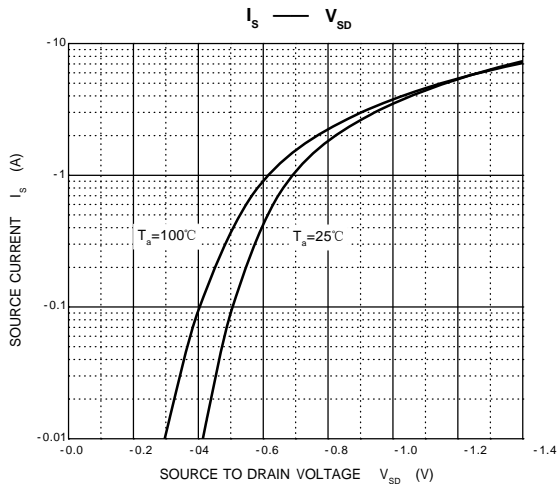
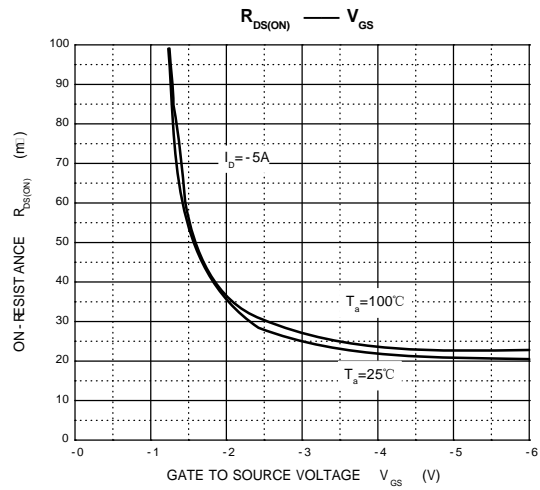
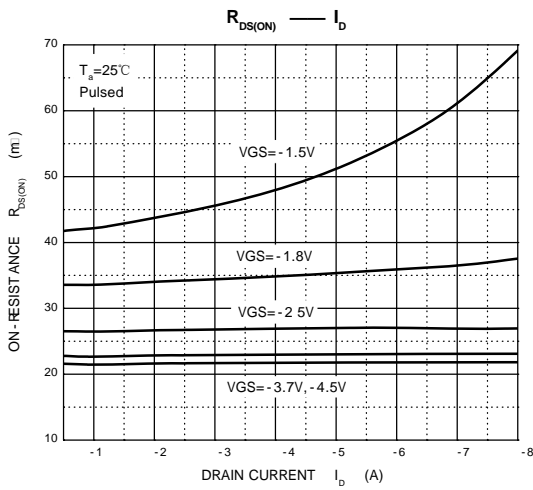
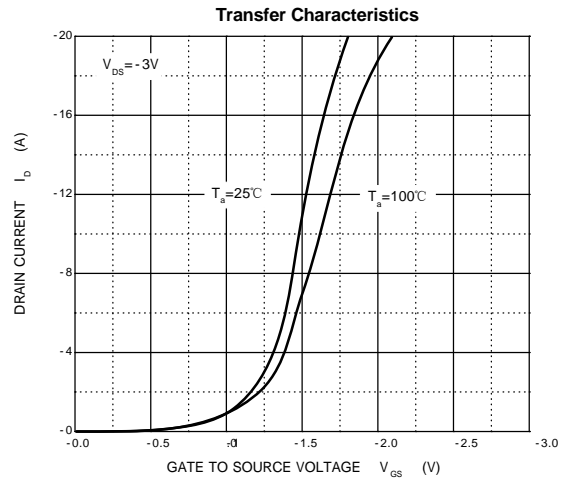
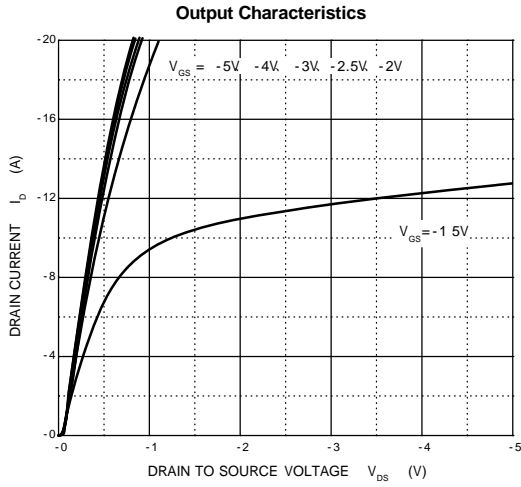
**Electrical characteristics ( $T_a=25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-12			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = -12V, V_{GS} = 0V$			-1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 8V, V_{DS} = 0V$			$\pm 0.1$	$\mu A$
Gate threshold voltage (note 1)	$V_{GS(h)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.4		-1	V
Drain-source on-resistance (note 1)	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -5A$			28	m $\Omega$
		$V_{GS} = -3.7V, I_D = -4.6A$			32	
		$V_{GS} = -2.5V, I_D = -4.3A$			40	
		$V_{GS} = -1.8V, I_D = -1A$			63	
		$V_{GS} = -1.5V, I_D = -0.5A$			150	
Forward tranconductance (note 1)	$g_{FS}$	$V_{DS} = -5V, I_D = -5A$		18		S
<b>Dynamic characteristics (note 2)</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -6V, V_{GS} = 0V, f = 1MHz$		1275		pF
Output Capacitance	$C_{oss}$			255		pF
Reverse Transfer Capacitance	$C_{rss}$			236		pF
Gate resistance	$R_g$	$f = 1MHz$	1.9		19	$\Omega$
Total Gate Charge	$Q_g$	$V_{DS} = -6V, V_{GS} = -4.5V, I_D = -5A$		14	21	nC
Gate-Source Charge	$Q_{gs}$			2.3		nC
Gate-Drain Charge	$Q_{gd}$			3.6		nC
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -6V, V_{GEN} = -4.5V, I_D = -4A$ $R_L = 6\Omega, R_{GEN} = 1\Omega$		26	40	ns
Turn-on rise time	$t_r$			24	40	ns
Turn-off delay time	$t_{d(off)}$			45	70	ns
Turn-off fall time	$t_f$			20	35	ns
<b>Source-Drain Diode characteristics</b>						
Diode forward current	$I_S$	$T_C = 25^\circ\text{C}$			-1.4	A
Diode pulsed forward current	$I_{SM}$				-20	A
Diode Forward voltage (note 1)	$V_{DS}$	$V_{GS} = 0V, I_S = -4A$			-1.2	V
Diode reverse recovery time (note 2)	$t_{rr}$	$I_F = -4A, di/dt = 100A/\mu s$		24	48	ns
Diode reverse recovery charge (note 2)	$Q_{rr}$			8	16	nC

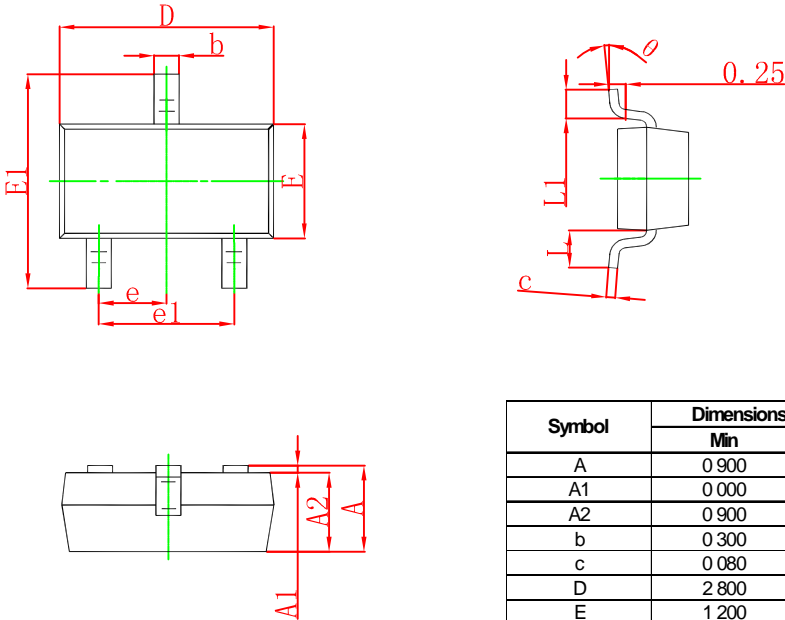
- Notes :**
1. Pulse test; pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  2. Guaranteed by design, not subject to production testing.



# Typical Characteristics

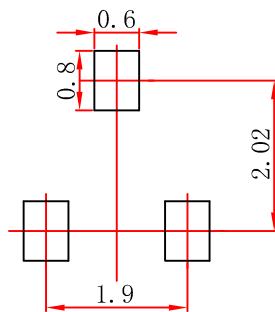


## SOT- 23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

## SOT- 23 Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance:  $\pm 0.05\text{mm}$ .
  3. The pad layout is for reference purposes only.