

Power MOSFET

20 V, 285 mA, P-Channel with ESD Protection, SOT-723

Features

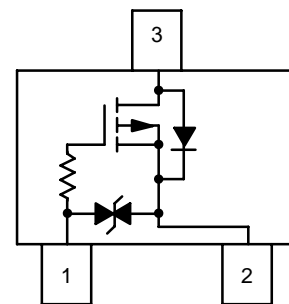
- Enables High Density PCB Manufacturing
- 44% Smaller Footprint than SC-89 and 38% Thinner than SC-89
- Low Voltage Drive Makes this Device Ideal for Portable Equipment
- Low Threshold Levels, $V_{GS(TH)} < 1.3$ V
- Low Profile (< 0.5 mm) Allows It to Fit Easily into Extremely Thin Environments such as Portable Electronics
- Operated at Standard Logic Level Gate Drive, Facilitating Future Migration to Lower Levels Using the Same Basic Topology
- These are Pb-Free Devices
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

Applications

- Interfacing, Switching
- High Speed Switching
- Cellular Phones, PDAs

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D Max
20 V	1.5Ω @ 4.5 V	285 mA
	2.4Ω @ 2.5 V	
	5.1Ω @ 1.8 V	
	6.8Ω @ 1.65 V	

Top View



1 – Gate
2 – Source
3 – Drain

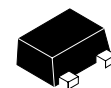
MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise stated)

Parameter		Symbol	Value	Unit	
Drain-to-Source Voltage		V_{DSS}	20	V	
Gate-to-Source Voltage		V_{GS}	±10	V	
Continuous Drain Current (Note 1)	Steady State	I_D	$T_A = 25^\circ\text{C}$	255	mA
			$T_A = 85^\circ\text{C}$	185	
	$t \leq 5$ s	$T_A = 25^\circ\text{C}$	285		
Power Dissipation (Note 1)	Steady State	P_D	$T_A = 25^\circ\text{C}$	440	mW
				$t \leq 5$ s	
Continuous Drain Current (Note 2)	Steady State	I_D	$T_A = 25^\circ\text{C}$	210	mA
			$T_A = 85^\circ\text{C}$	155	
			$T_A = 25^\circ\text{C}$	P_D	
Power Dissipation (Note 2)					
Pulsed Drain Current	$t_p = 10\mu\text{s}$	I_{DM}	400	mA	
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$	
Source Current (Body Diode) (Note 2)		I_S	286	mA	
Lead Temperature for Soldering Purposes (1/8" from case for 10 seconds)		T_L	260	$^\circ\text{C}$	

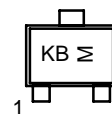
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces)
2. Surface-mounted on FR4 board using the minimum recommended pad size.

MARKING DIAGRAM



SOT-723



KB = Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping
FTK3043P	SOT-723*	8000 / Tape & Reel

*These packages are inherently Pb-Free.



FTK3043P

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Ambient – Steady State (Note 3)	$R_{\theta JA}$	280	°C/W
Junction-to-Ambient – $t = 5$ s (Note 3)	$R_{\theta JA}$	228	
Junction-to-Ambient – Steady State Minimum Pad (Note 4)	$R_{\theta JA}$	400	

- Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [1 oz] including traces)
- Surface-mounted on FR4 board using the minimum recommended pad size.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Test Condition	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 100\mu\text{A}$	$V_{(BR)DSS}$	20			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$I_D = 100\mu\text{A}$, Reference to 25°C	$V_{(BR)DSS}/T_J$		27		mV/°C
Zero Gate Voltage Drain Current	$V_{GS} = 0\text{ V}, V_{DS} = 16\text{ V}$	I_{DSS}			1	μA
					10	
Gate-to-Source Leakage Current	$V_{DS} = 0\text{ V}, V_{GS} = \pm 5\text{ V}$	I_{GSS}			1	μA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	0.4		1.3	V
Gate Threshold Temperature Coefficient		$V_{GS(TH)}/T_J$		-2.4		mV/°C
Drain-to-Source On Resistance	$V_{GS} = 4.5\text{ V}, I_D = 10\text{ mA}$	$R_{DS(ON)}$		1.5	3.4	Ω
	$V_{GS} = 4.5\text{ V}, I_D = 255\text{ mA}$			1.6	3.8	
	$V_{GS} = 2.5\text{ V}, I_D = 1\text{ mA}$			2.4	4.5	
	$V_{GS} = 1.8\text{ V}, I_D = 1\text{ mA}$			5.1	10	
	$V_{GS} = 1.65\text{ V}, I_D = 1\text{ mA}$			6.8	15	
Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 100\text{ mA}$	g_{FS}		0.275		S

CHARGES, CAPACITANCES AND GATE RESISTANCE

Input Capacitance	$V_{GS} = 0\text{ V}, f = 1\text{ MHz}, V_{DS} = 10\text{ V}$	C_{ISS}		11		pF
Output Capacitance		C_{OSS}		8.3		
Reverse Transfer Capacitance		C_{RSS}		2.7		

SWITCHING CHARACTERISTICS, $V_{GS} = 4.5\text{ V}$ (Note 4)

Turn-On Delay Time	$V_{GS} = 4.5\text{ V}, V_{DD} = 5\text{ V}, I_D = 10\text{ mA}, R_G = 6\Omega$	$t_{d(ON)}$		13		ns
Rise Time		t_r		15		
Turn-Off Delay Time		$t_{d(OFF)}$		94		
Fall Time		t_f		55		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	$V_{GS} = 0\text{ V}, I_S = 286\text{ mA}$	$T_J = 25^\circ\text{C}$	V_{SD}		0.83	1.2	V
		$T_J = 125^\circ\text{C}$			0.69		
Reverse Recovery Time	$V_{GS} = 0\text{ V}, V_{DD} = 20\text{ V}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}, I_S = 286\text{ mA}$	t_{RR}		9.1		ns	
Charge Time		t_a		7.1			
Discharge Time		t_b		2.0			
Reverse Recovery Charge		Q_{RR}		3.7			nC

- Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$
- Switching characteristics are independent of operating junction temperatures

TYPICAL PERFORMANCE CURVES

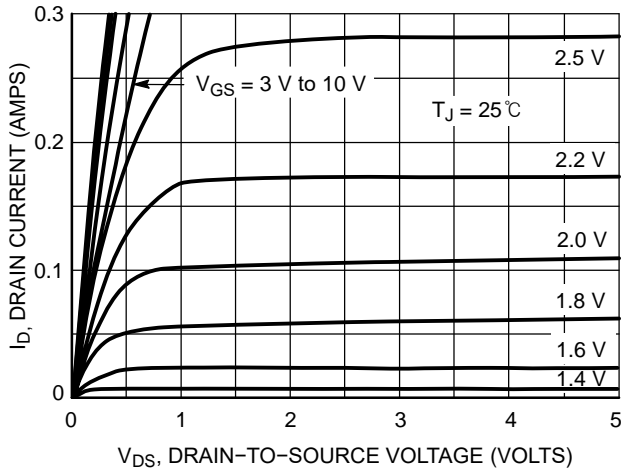


Figure 1. On-Region Characteristics

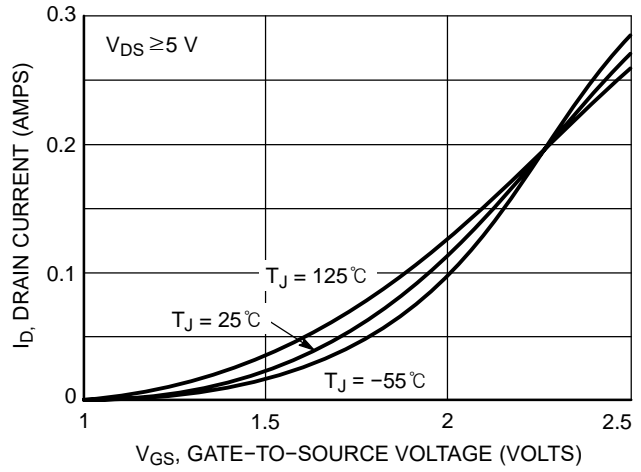


Figure 2. Transfer Characteristics

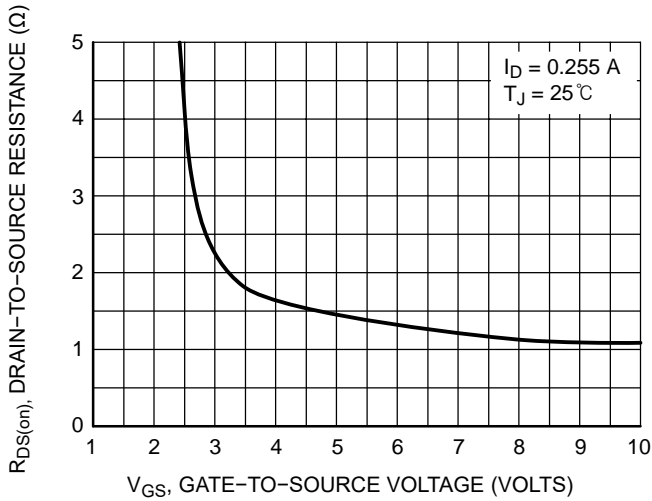


Figure 3. On-Resistance vs. Gate-to-Source Voltage

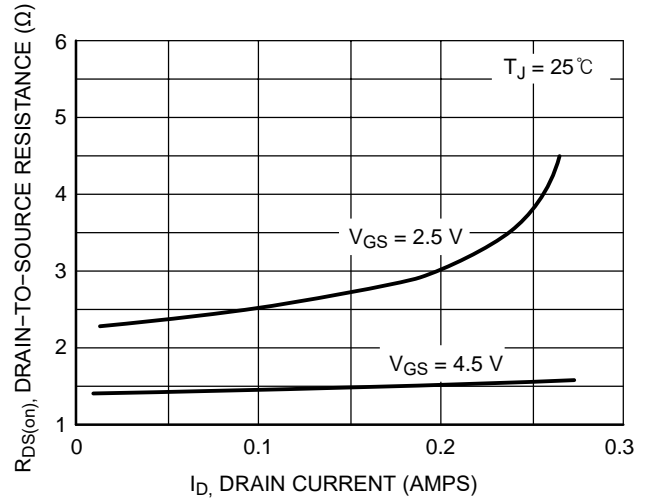


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

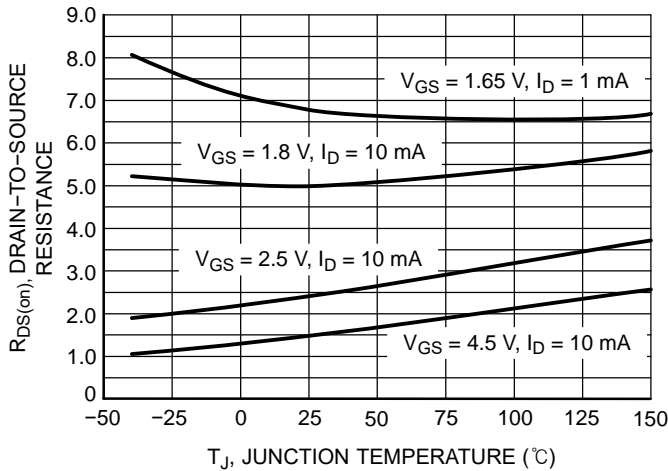


Figure 5. On-Resistance Variation with Temperature

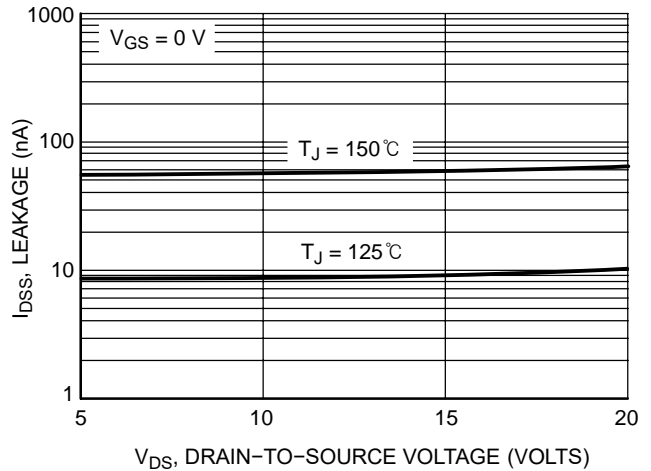
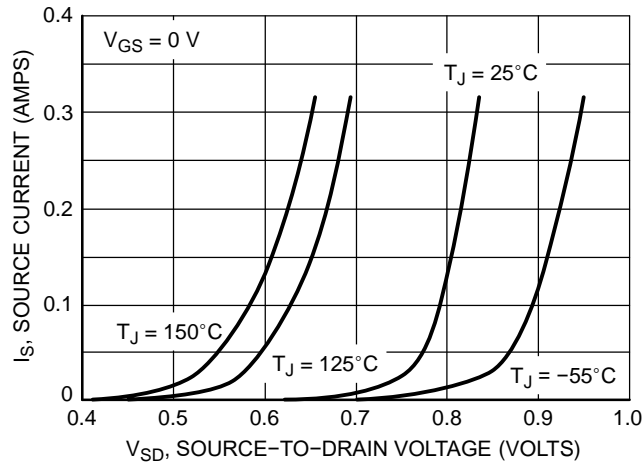
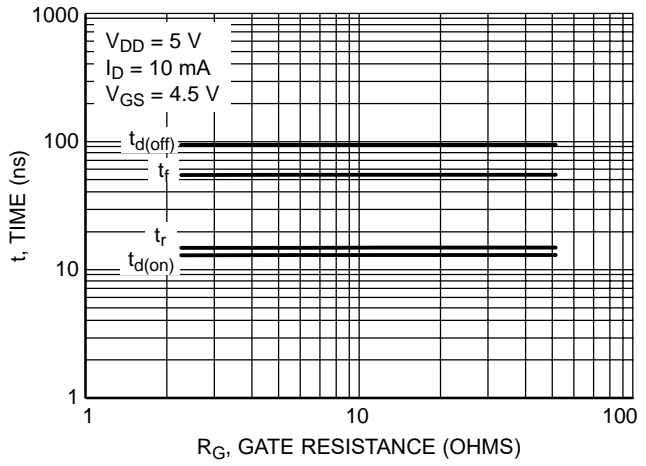
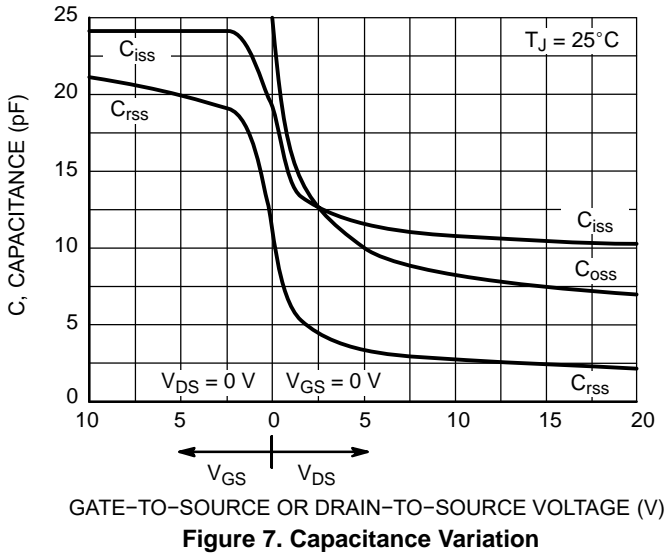


Figure 6. Drain-to-Source Leakage Current vs. Voltage



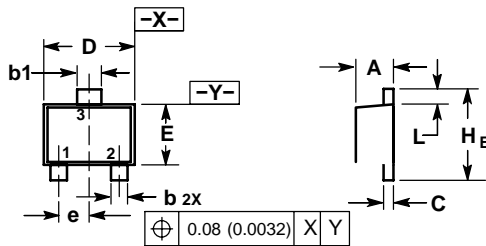
FTK3043P

TYPICAL PERFORMANCE CURVES



PACKAGE DIMENSIONS

SOT-723



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILL METERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
b	0.15	0.21	0.27	0.0059	0.0083	0.0106
b1	0.25	0.31	0.37	0.010	0.012	0.015
C	0.07	0.12	0.17	0.0028	0.0047	0.0067
D	1.15	1.20	1.25	0.045	0.047	0.049
E	0.75	0.80	0.85	0.03	0.032	0.034
e	0.40 BSC			0.016 BSC		
H _E	1.15	1.20	1.25	0.045	0.047	0.049
L	0.15	0.20	0.25	0.0059	0.0079	0.0098

SOLDERING FOOTPRINT*

