

# FMMT413

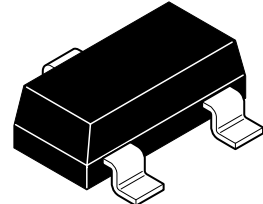
## SOT23 NPN silicon planar avalanche transistor

### Summary

$V_{(BR)CES} = 150V$ ,  $V_{(BR)CEO} = 50V$ ,  $I_{USB} = 25A$

### Description

The FMMT413 is a NPN silicon planar bipolar transistor optimized for avalanche mode operation. Tight process control and low inductance packaging combine to produce high current pulses with fast edges, ideal for laser diode driving.

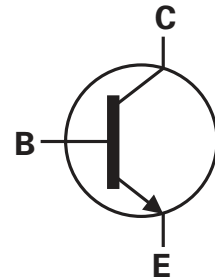


### Features

- Avalanche mode operation
- 50A peak avalanche current
- Low inductance packaging

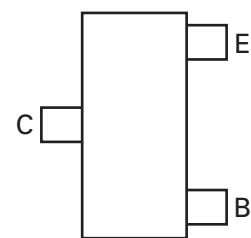
### Applications

- Laser LED drivers
- Fast edge generation
- High speed pulse generators



### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
FMMT413TD	7	8	500
FMMT413TA	7	8	3,000



Pinout - top view

### Device marking

413

# FMMT413

## Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	$BV_{CBO}$	150	V
Collector-emitter voltage	$BV_{CEO}$	50	V
Emitter-base voltage	$BV_{EBO}$	6	V
Peak pulse current (25ns Pulse Width)	$I_{CM}$	50	A
Continuous collector current	$I_C$	100	mA
Power dissipation at $T_{amb} = 25^{\circ}C$ Linear derating factor	$P_D$	330	mW
Operating and storage temperature range	$T_j, T_{stg}$	-55 to +150	$^{\circ}C$

## Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient	$R_{\theta JA}$	378	$^{\circ}C/W$

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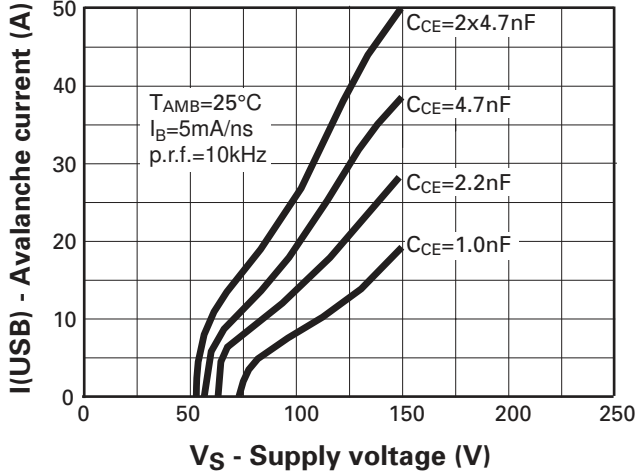
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	150			V	
Collector-emitter breakdown voltage	$BV_{CES}$	150			V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CEO}$	50			V	$I_C = 10\text{mA}$
Emitter-base breakdown voltage	$BV_{EBO}$	6			V	$I_E = 100\mu\text{A}$
Collector cut-off current	$I_{CBO}$			100	nA	$V_{CB} = 120\text{V}$
Emitter cut-off current	$I_{EBO}$			100	nA	$V_{EB} = 4\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$			150	mV	$I_C = 10\text{mA}$ , $I_B = 1\text{mA}$
Base-emitter saturation voltage	$V_{BE(sat)}$			800	mV	$I_C = 10\text{mA}$ , $I_B = 1\text{mA}$
Current in second breakdown (pulsed)	$I_{USB}$	22			A	$V_C=110\text{V}$ , $C_{CE}=4.7\text{nF}^{(*)}$
		25			A	$V_C=130\text{V}$ , $C_{CE}=4.7\text{nF}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	50				$I_C = 10\text{mA}$ , $V_{CE} = 10\text{V}$
Collector-emitter inductance	$L_{ce}$		2.5		nH	Standard SOT23 leads
Transition frequency	$f_T$		150		MHz	$I_C = 10\text{mA}$ , $V_{CE} = 5\text{V}$ , $f = 20\text{MHz}$
Output capacitance	$C_{OBO}$		2		pF	$V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$

### NOTES:

(\*) Measured with a circuit possessing an approximate loop inductance of 12nH.

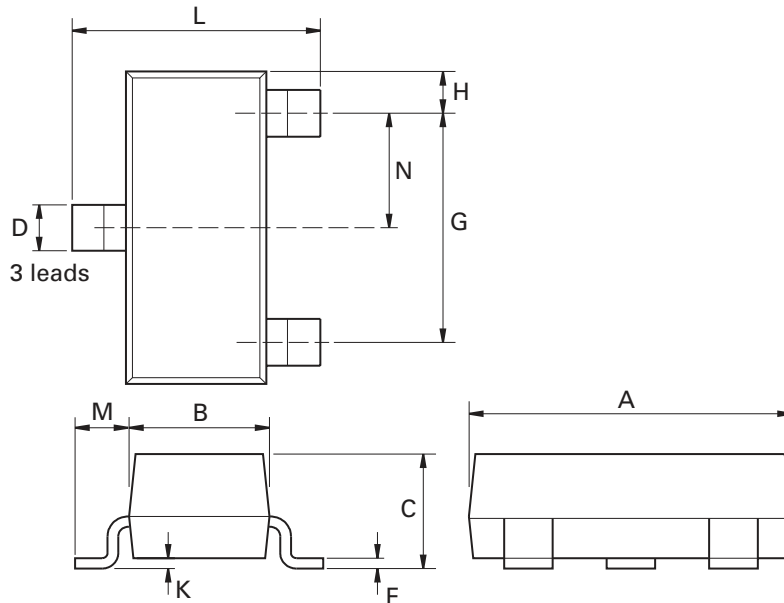
Typical characteristics



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## Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	2.67	3.05	0.105	0.120	H	0.33	0.51	0.013	0.020
B	1.20	1.40	0.047	0.055	K	0.01	0.10	0.0004	0.004
C	-	1.10	-	0.043	L	2.10	2.50	0.083	0.0985
D	0.37	0.53	0.015	0.021	M	0.45	0.64	0.018	0.025
F	0.085	0.15	0.0034	0.0059	N	0.95 NOM		0.0375 NOM	
G	1.90 NOM		0.075 NOM		-	-	-	-	-

**Note:** Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom
Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

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