



SOT-23 Plastic-Encapsulate MOSFETS

MK3413

P-Channel 20-V(D-S) MOSFET

V(BR)DSS	RDS(on)MAX	ID
-20 V	80mΩ @ -4.5V	- 3A
	100mΩ @ -2.5V	
	130mΩ @ -1.8V	

FEATURE:

※ TrenchFET Power MOSFET

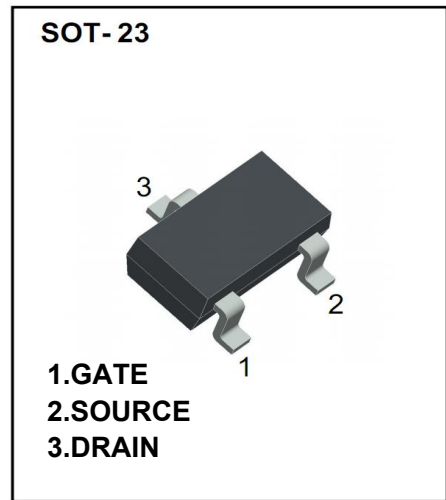
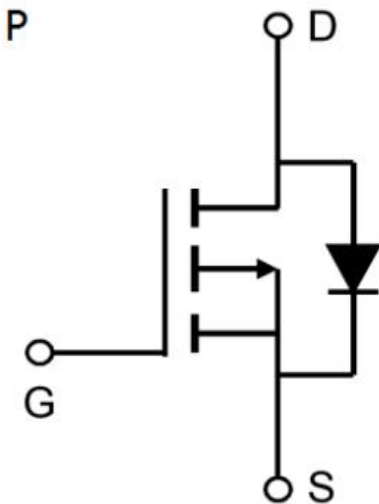
General Description :

The MK3413 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

MARKING:

A39T

Equivalent Circuit :



Maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	-20	V
Gate-Source Voltage	VGS	±8	
Continuous Drain Current	ID	-3	A
Pulsed Diode Curren	IDM	-15	
Continuous Source-Drain Current(Diode Conduction)	IS	-1.4	
Power Dissipation	PD	1.4	W
Thermal Resistance from Junction to Ambient (t≤10s)	RθJA	125	°C/W
Operating Junction	TJ	150	°C
Storage Temperature	TSTG	-55~+150	°C



MOSFET ELECTRICAL CHARACTERISTICS

Static Electrical Characteristics (Ta = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	V(BR)DSS	VGS = 0V, ID = -250μA	-20			V
Gate-source threshold voltage	VGS(th)	VDS = VGS, ID = -250μA	-0.4		-1.1	V
Gate-body leakage current	IGSS	VDS = 0V, VGS = ±8V			±100	nA
Zero gate voltage drain current	IDSS	VDS = -20V, VGS = 0V			-1	μA
Static Drain-Source On-Resistance	RDS(on)	VGS = -4.5V, ID = -3A		56	80	mΩ
		VGS = -2.5V, ID = -2.5A		70	100	mΩ
		VGS = -1.8V, ID = -1A		85	130	mΩ
Forward transconductance	gfs	VDS = -5V, ID = -3A		12		S
Diode forward voltage	VSD	IS = -1A, VGS = 0V		-0.8	-1	V
Maximum Body-Diode Continuous Current	IS				-1.4	A
Dynamic						
Input capacitance	Ciss	VDS = -10V, VGS = 0V, f = 1MHz		560		pF
Output capacitance	Coss			80		pF
Reverse transfer capacitance	Crss			70		pF
Total gate charge	Qg	VDS = -10V, VGS = -4.5V, ID = -3A		8.5		nC
Gate-source charge	Qgs			1.2		nC
Gate-drain charge	Qgd			2.1		nC
Gate resistance	Rg	f = 1MHz		15		Ω
Switching						
Turn-on delay time	td(on)	VDS = -10V RL = 2.7Ω, ID = -3A, VGS = -4.5V, Rg = 6Ω		7.2		ns
Rise time	tr			36		ns
Turn-off delay time	td(off)			53		ns
Fall time	tf			56		ns
Body Diode Reverse Recovery Time	Trr	IF = -3A, dI/dt = 100A/μs		37		ns
Body Diode Reverse Recovery Charge	Qrr	IF = -3A, dI/dt = 100A/μs		27		nC

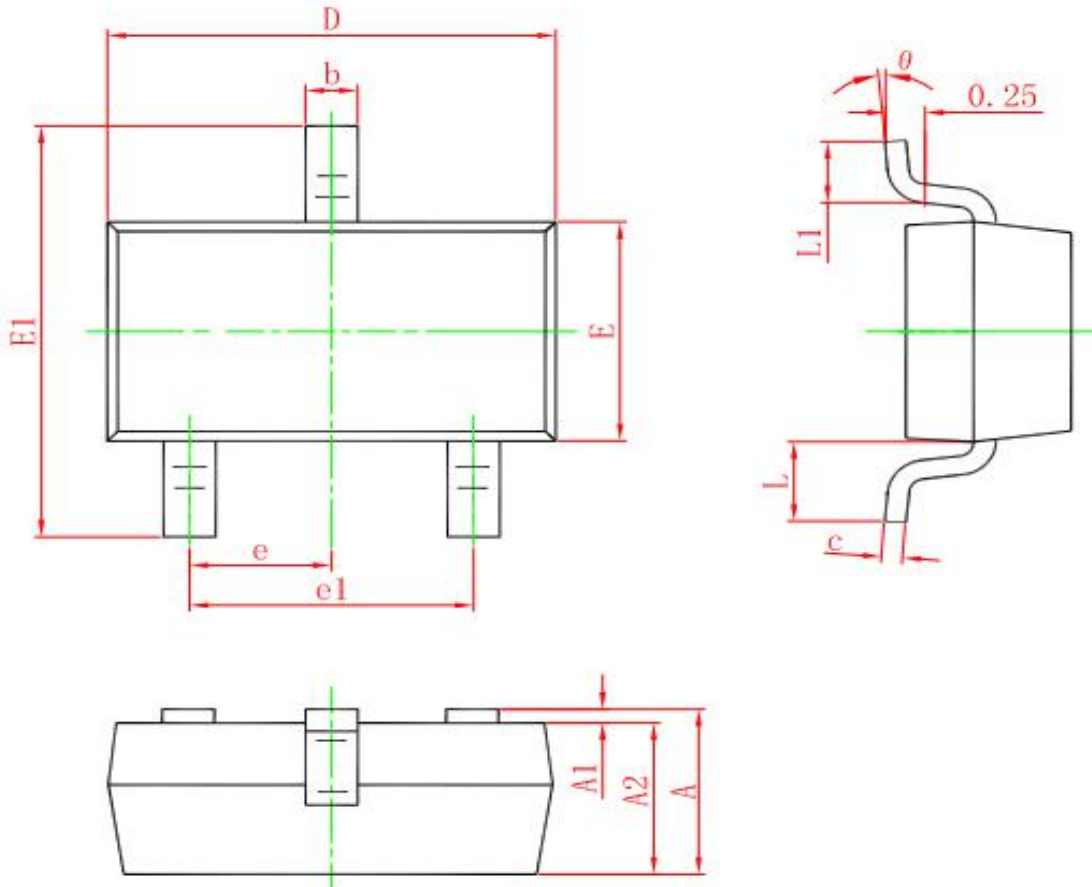
Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 10 sec.
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.



SOT-23 PACKAGE OUTLINE DIMENSIONS:

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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°	8°



Typical Electrical Thermal Characteristics:

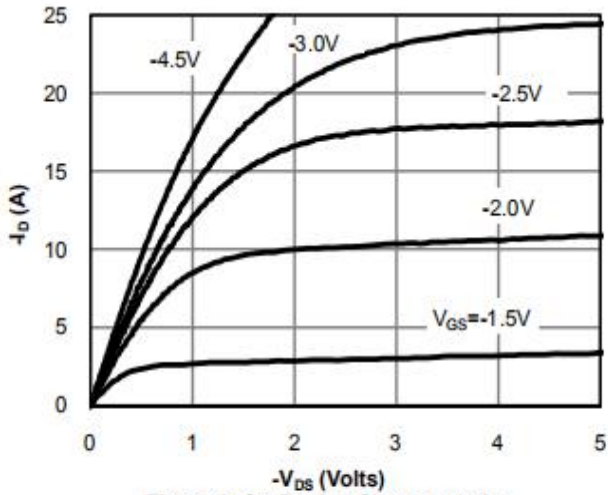


Figure 1: On-Region Characteristics

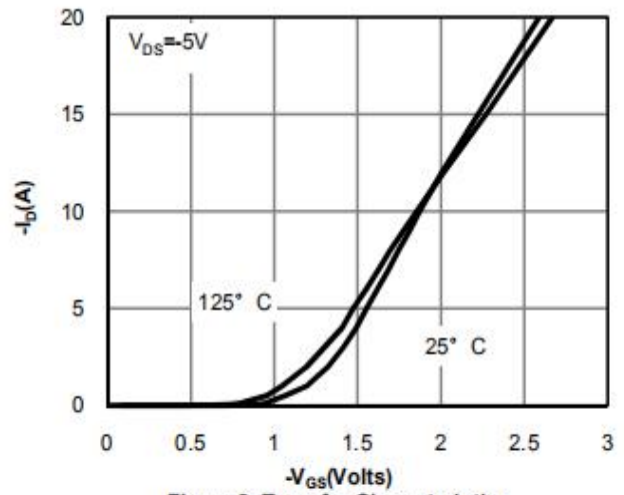


Figure 2: Transfer Characteristics

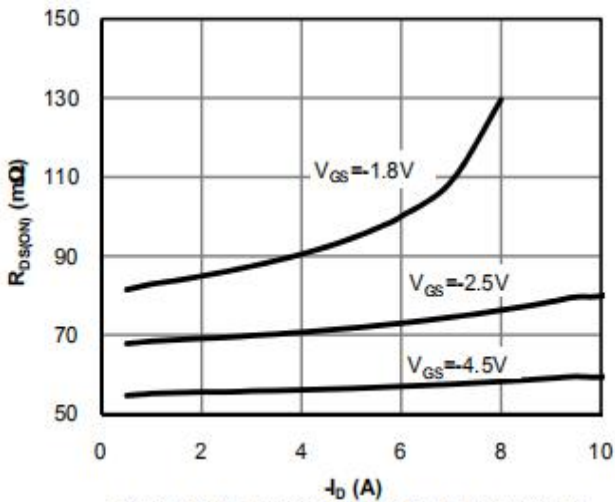


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

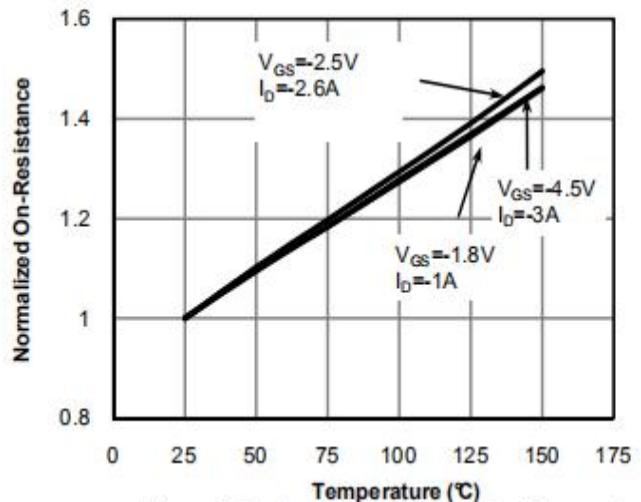


Figure 4: On-Resistance vs. Junction Temperature

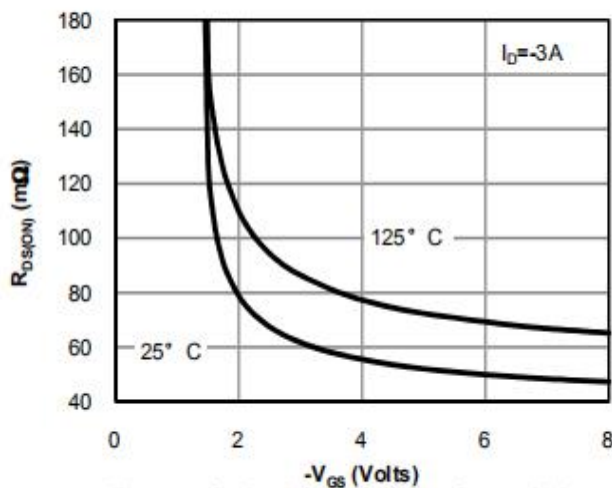


Figure 5: On-Resistance vs. Gate-Source Voltage

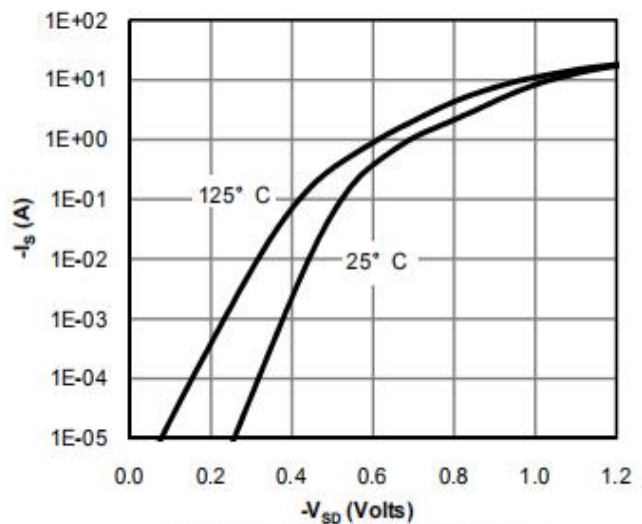


Figure 6: Body-Diode Characteristics



Typical Electrical Thermal Characteristics:

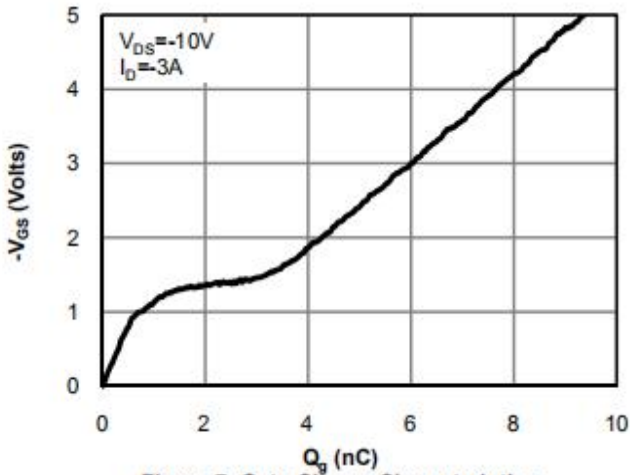


Figure 7: Gate-Charge Characteristics

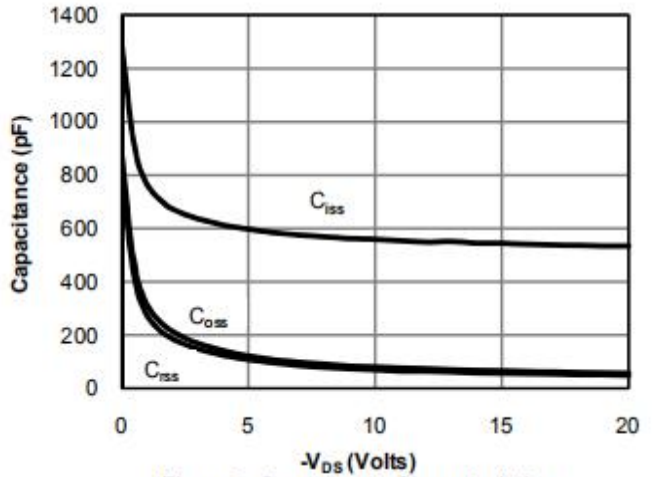


Figure 8: Capacitance Characteristics

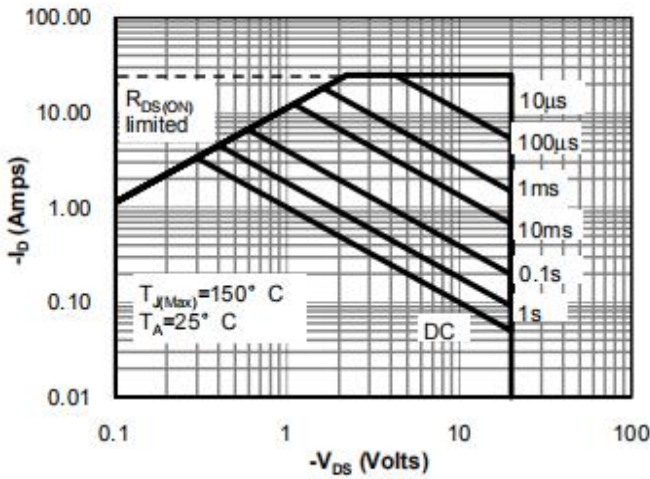


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

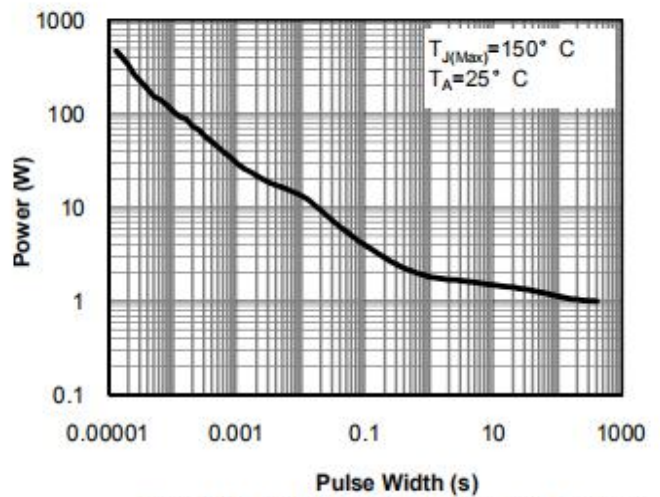


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

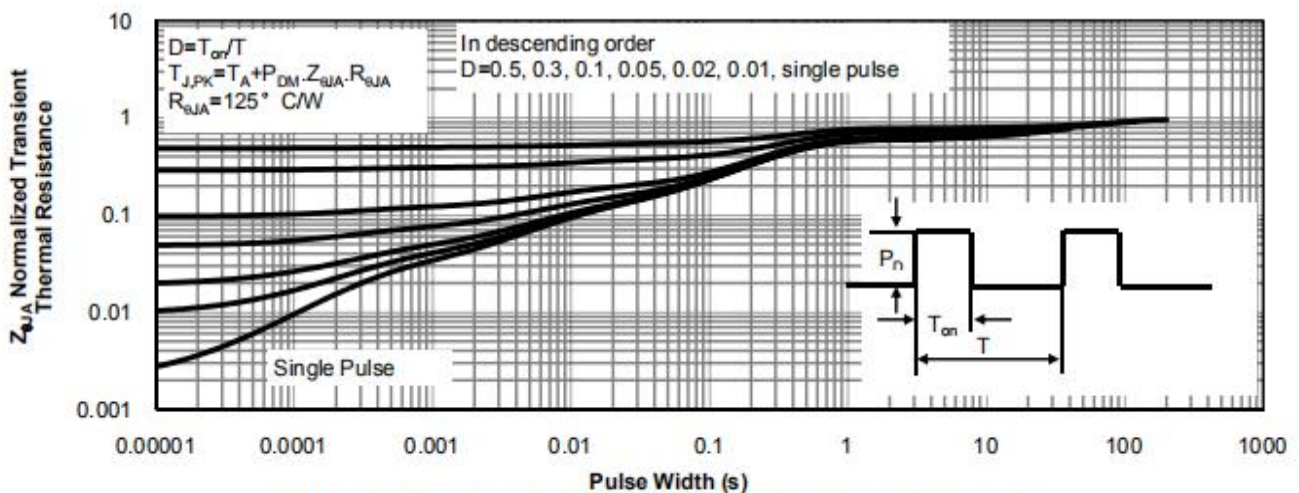


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)