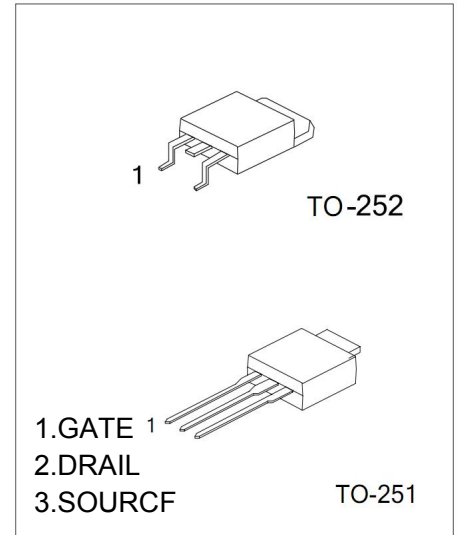




MKD413A P-Channel 40-V(D-S) Power MOSFET

V(BR)DSS	RDS(on)MAX	ID
-40 V	45mΩ@ 10 V	-12A
	60mΩ@ 4.5 V	

Equivalent Circuit:



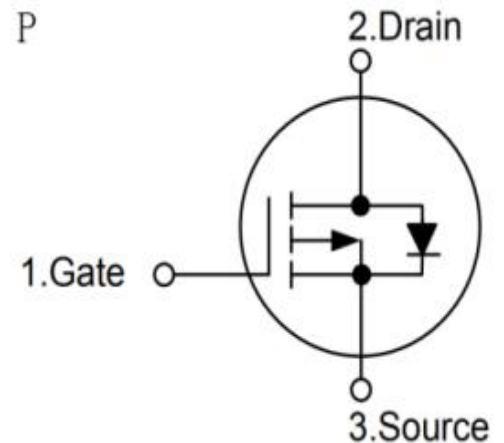
General Description:

The MKD413A uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. With the excellent thermal resistance of the DPAK package, this device is well suited for high current load applications.

FEATURE:

- ※ Low capacitance
- ※ Low gate charge
- ※ Fast switching capability
- ※ Avalanche energy specified

SYMBOL:



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	-40	V
Gate-Source Voltage	VGS	±20	
Continuous Drain Current	ID	-12	A
Pulsed Diode Curren	IDM	-30	
Power Dissipation	PD	50	W
Thermal Resistance from Junction to Ambient (t≤10s)	RθJA	65	°C/W
Repetitive avalanche energy L=0.1mH	EAR	20	mJ
Avalanche Current	I AR	22	A
Operating Junction	TJ	175	°C
Storage Temperature	TSTG	-55~+175	



MOSFET ELECTRICAL CHARACTERISTICS

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

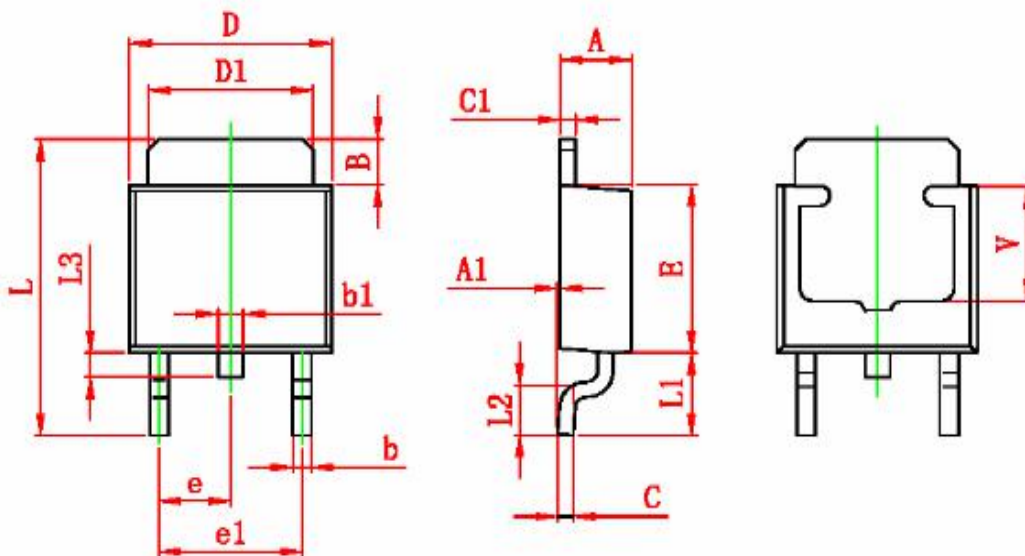
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	V(BR)DSS	VGS = 0V, ID = -250μA	-40			V
Gate-source threshold voltage	VGS(th)	VDS =VGS, ID = -250μA	-1		-2.5	V
Gate-source leakage	IGSS	VDS =0V, VGS = ±20V			±100	nA
Zero gate voltage drain current	IDSS	VDS = -35V, VGS =0V			-1	μA
Drain-source on-state resistancea	RDS(on)	VGS = -10V, ID = -6A		35	45	mΩ
	RDS(on)	VGS = -4.5V, ID = -6A		50	70	mΩ
Forward transconductancea	gfs	VDS = -5V, ID = -12A		22		S
Diode forward voltage	VSD	IS= -1A, VGS=0V		-0.8	-1.2	V
Dynamic						
Input capacitance	Ciss	VDS = -20V, VGS =0V, f=1MHz		900		pF
Output capacitance	Coss			97		pF
Reverse transfer capacitanceb	Crss			68		pF
Total gate charge	Qg	VDS = -20V, VGS = - 10V, ID = -12A		16.5		nC
Gate-source charge	Qgs			7.2		nC
Gate-drain charge	Qgd			3.8		nC
Gate resistance	Rg	f=1MHz		14		Ω
Switchingb						
Turn-on delay time	td(on)	VDD= -20V RL= 2Ω, ID = -12A, VGEN= -10V,Rg= 3.5Ω		6.5		ns
Rise time	tr			8.5		ns
Turn-off delay time	td(off)			45		ns
Fall time	tf			41.2		ns
Drain-Source Diode Characteristics						
Reverse Recovery Time	trr	IF= -12A, dI/dt=100A/s		22		ns
Reverse Recovery Charde	Qrr	IF= -12A, dI/dt=100A/s		14		nC

Note :

- 1.The power dissipation P_{DSM} and current rating I_{DSM} are based on T_{J(MAX)}=150°C, using t ≤ 10s junction-to-ambient thermal resistance.
- 2.The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.
3. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=175°C..
- 4.The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.



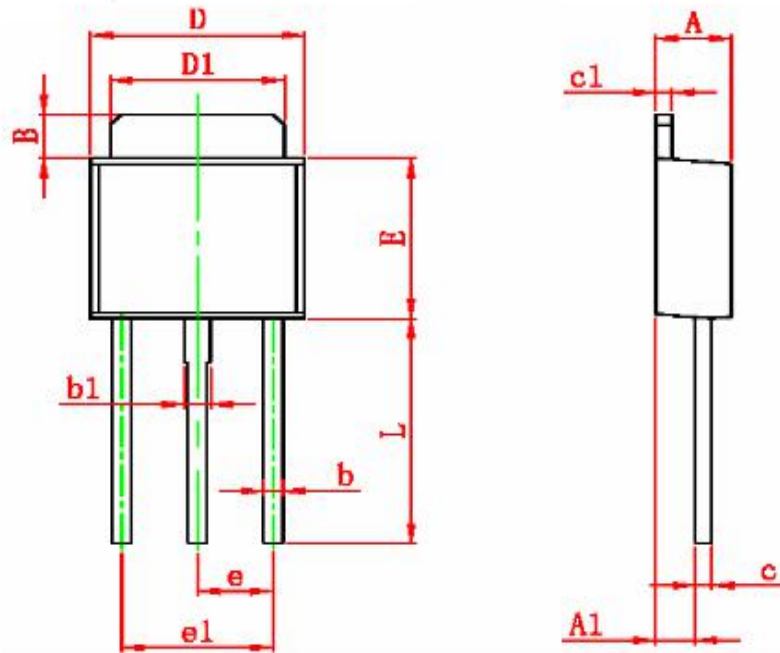
PACKAGE OUTLINE DIMENSIONS :



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.350	0.650	0.014	0.026
V	3.80 REF		0.150 REF	



PACKAGE OUTLINE DIMENSIONS :



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	1.020	1.270	0.040	0.050
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311