

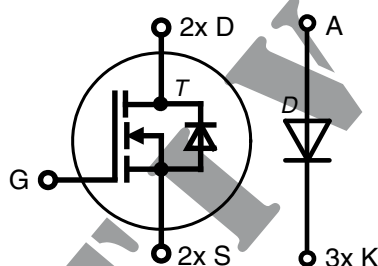
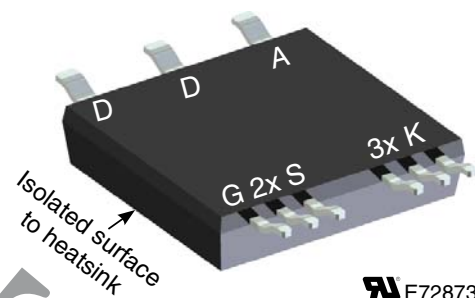
Buck / Boost Tpology

CoolMOS™¹⁾ with fast SONIC Diode

$$\begin{aligned} I_{D25} &= 54 \text{ A} \\ V_{DSS} &= 600 \text{ V} \\ R_{DS(on) \text{ max}} &= 41 \text{ m}\Omega \end{aligned}$$

ISOPLUS™ - electrically isolated surface to heatsink
Surface Mount Power Device

Part number
MKG40RK600LB



Features / Advantages:

- **Fast CoolMOS™¹⁾ C6 MOSFET**
 - very low on-resistance
 - low gate charge
 - avalanche rated for unclamped inductive switching (UIS)

Applications:

- Buck / boost chopper
- PFC stage
- Forward converter

Package: SMPD

- isolated surface to heatsink
- low coupling capacity between pins and heatsink
- PCB space saving
- enlarged creepage towards heatsink
- application friendly pinout
- low inductive current path
- high reliability

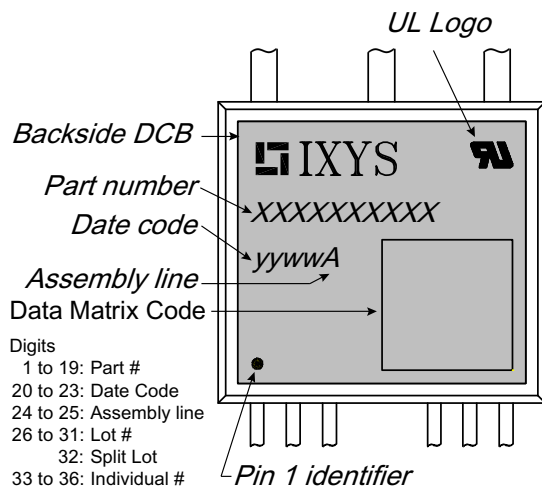
¹⁾ CoolMOS™ is a trademark of Infineon Technologies AG.

MOSFET T				Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	
V_{DS}	drain source breakdown voltage	up to $T_{VJ} = 150^{\circ}\text{C}$				600	V
V_{GS}	gate source voltage	continuous transient	$T_{VJ} = 25^{\circ}\text{C}$			± 20 ± 30	V V
I_{D25}	drain current		$T_C = 25^{\circ}\text{C}$			54	A
I_{D80}			$T_C = 80^{\circ}\text{C}$			41	A
I_{D100}			$T_C = 100^{\circ}\text{C}$			34	A
E_{AS}	non-repetitive avalanche energy	single pulse	$T_{VJ} = 25^{\circ}\text{C}$			1.95	J
I_A						13.4	A
dV/dt	rate of rise of voltage	$I_S \geq I_{DM}$; $V_{DD} \leq 400\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			15	V/ns
R_{DSon}	static drain source on resistance	$I_D = 44\text{ A}$; $V_{GS} = 10\text{ V}$ (Chip)	$T_{VJ} = 25^{\circ}\text{C}$		37	41	m Ω
$V_{GS(th)}$	gate threshold voltage	$I_D = 3\text{ mA}$; $V_{DS} = V_{GS}$	$T_{VJ} = 25^{\circ}\text{C}$	2.5	3	3.5	V
I_{DSS}	drain source leakage current	$V_{DS} = V_{DSS}$; $V_{GS} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			5	μA
			$T_{VJ} = 150^{\circ}\text{C}$		50		μA
I_{GSS}	gate source leakage current	$V_{DS} = 0\text{ V}$; $V_{GS} = \pm 20\text{ V}$				± 100	nA
C_{iss}	input capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 100\text{ V}$; $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		6.5		nF
C_{oss}	output capacitance		$T_{VJ} = 125^{\circ}\text{C}$		360		pF
Q_g	total gate charge	$V_{DS} = 480\text{ V}$; $I_D = 44\text{ A}$ $V_{GS} = 10\text{ V}$; $R_G = 1.6\text{ }\Omega$	$T_{VJ} = 25^{\circ}\text{C}$		290	190	nC
Q_{gs}	gate source charge				36		nC
Q_{gd}	gate drain (Miller) charge				150		nC
$t_{d(on)}$	turn-on delay time	Inductive switching boost mode with diode D $V_{DS} = 380\text{ V}$; $I_D = 44\text{ A}$ $V_{GS} = 13\text{ V}$; $R_G = 1.6\text{ }\Omega$	$T_{VJ} = 25^{\circ}\text{C}$		tbd		ns
t_r	current rise time				tbd		ns
$t_{d(off)}$	turn-off delay time				tbd		ns
t_f	current fall time				tbd		ns
E_{on}	turn-on energy per pulse				tbd		mJ
E_{off}	turn-off energy per pulse				tbd		mJ
$E_{rec(off)}$	reverse recovery losses at turn-off				tbd		mJ
R_{thJC}	thermal resistance junction to case	with heatsink compound; IXYS test setup				0.4	K/W
R_{thJH}	thermal resistance junction to heatsink				0.6		K/W

Source-Drain Diode of MOSFET T				Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	
I_{S25}	continuous source current		$T_C = 25^{\circ}\text{C}$			70	A
I_{S80}			$T_C = 80^{\circ}\text{C}$			tbd	A
V_{SD}	forward voltage drop	$I_F = 44\text{ A}$; $V_{GS} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		0.9	1.1	V
t_{rr}	reverse recovery time	$I_F = 44\text{ A}$; $V_R = 400\text{ V}$ $-di_F/dt = 100\text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$			950	ns
Q_{RM}	reverse recovery charge (intrinsic diode)				32		μC
I_{RM}	max. reverse recovery current				62		A

Diode D				Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	
V_{RRM}	max. repetitive reverse voltage		$T_{VJ} = 25^{\circ}\text{C}$			600	V
I_{F25}	continuous source current	DC	$T_C = 25^{\circ}\text{C}$			65	A
I_{F80}		DC	$T_C = 80^{\circ}\text{C}$			45	A
V_F	forward voltage	$I_F = 44\text{ A}$ (Chip)	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		1.70 1.65	2.0	V V
I_R	reverse current	$V_R = V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			100 8	μA mA
I_{RM}	max. reverse recovery current	$I_F = 30\text{ A}$; $V_R = 350\text{ V}$ $-di/dt = 240\text{ A}/\mu\text{s}$	$T_{VJ} = 100^{\circ}\text{C}$		tbd		A
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $-di/dt = 100\text{ A}/\mu\text{s}$	$T_{VJ} = 100^{\circ}\text{C}$		tbd		ns
R_{thJC}	thermal resistance junction to case	with heatsink compound; IXYS test setup				0.6	K/W
R_{thJH}	thermal resistance junction to heatsink				0.85		K/W

Package SMPD			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	
T_{stg}	storage temperature		-55		125	°C
T_{vj}	virtual junction temperature		-55		150	°C
Weight				8		g
F_C	mounting force with clip		40		130	N
$d_{Spp/App}$	creepage distance on surface /	terminal to terminal	1.65			mm
$d_{Spb/Apb}$	striking distance through air	terminal to backside	4.0			mm
V_{ISOL}	isolation voltage	$t = 1$ second $t = 1$ minute		3000 2500		V V
C_P	coupling capacity	between shorted terminals and backside metal		90		pF
CTI			400			
$R_{pin-chip}$	resistance pin to chip	$V = (R_{DSon} + 2 \cdot R) \cdot I_D$ resp. $V = V_F + 2 \cdot R \cdot I_F$		1		mΩ



Part number

M = MOSFET

K = CoolMOS™¹⁾

G = C6

40 = Current Rating [A]

RK = Boost/Brake Chopper

600 = Reverse Voltage [V]

LB = SMPD-B

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MKG40RK600LB-TRR	MKG40RK600LB	Tape&Reel	200	514630

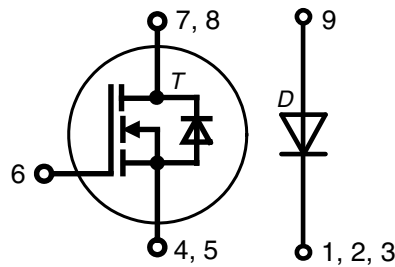
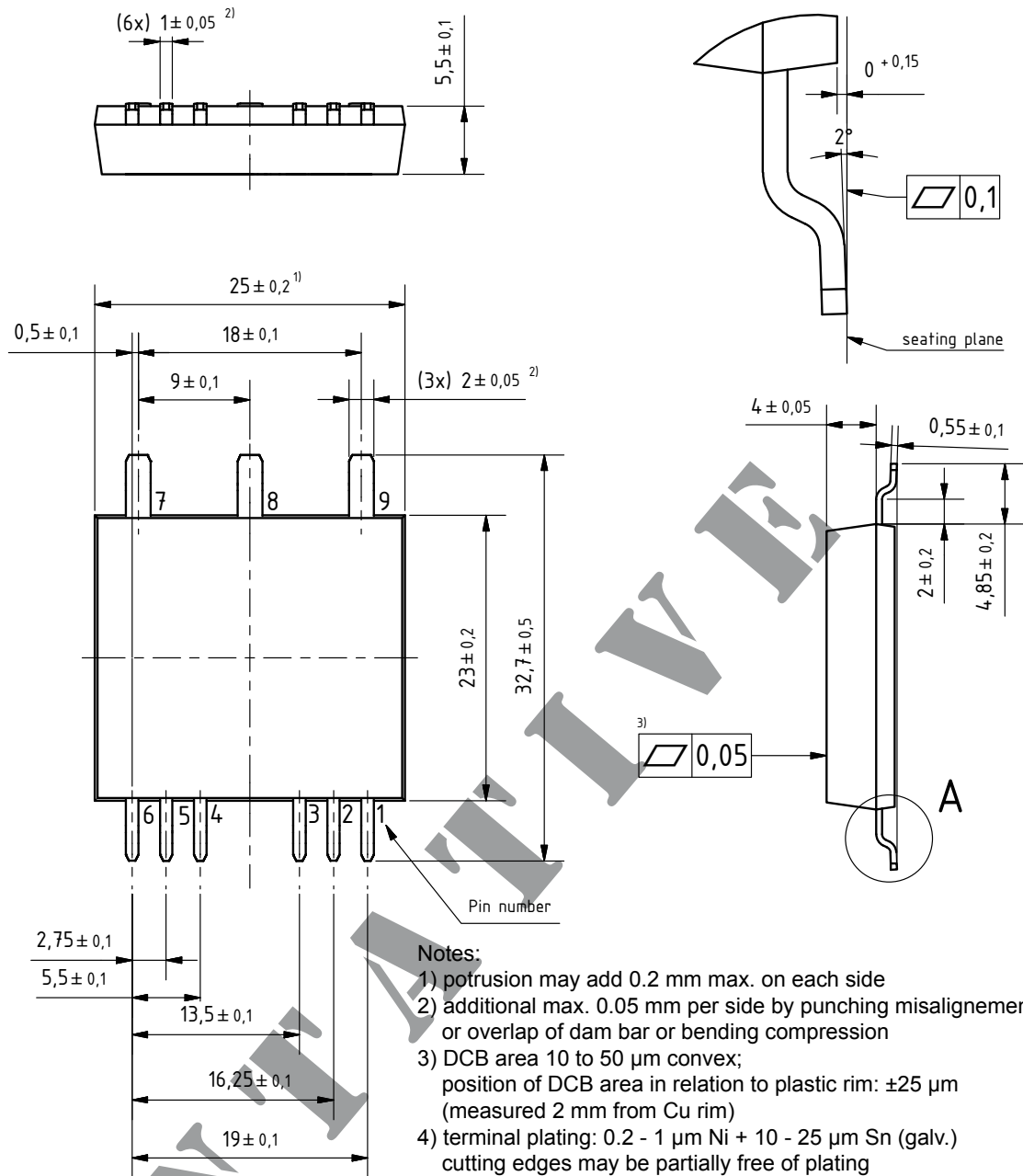
Equivalent Circuits for Simulation *on die level



Outlines SMPD

A (8 : 1)

Dimensions in mm
(1 mm = 0.0394")





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