

# CoolMOS Power MOSFET in ECO-PAC 2

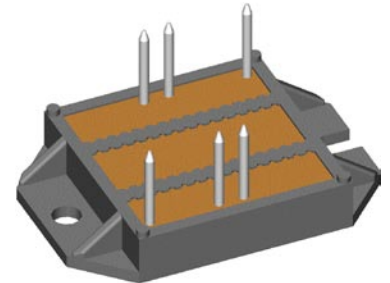
N-Channel Enhancement Mode  
Low  $R_{DSon}$ , High  $V_{DSS}$  MOSFET

Package with Electrically Isolated Base

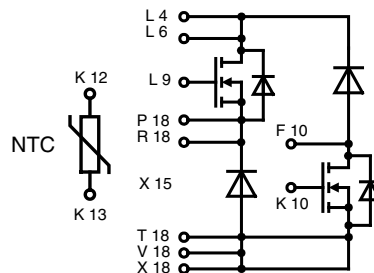
Preliminary data

$I_{D25} = 38 \text{ A}$   
 $V_{DSS} = 600 \text{ V}$   
 $R_{DSon} = 70 \text{ m}\Omega$

**COOLMOS**<sup>1)</sup>  
Power Semiconductors



Pin arrangement see outlines



MOSFET			
Symbol	Conditions	Maximum Ratings	
$V_{DSS}$	$T_{VJ} = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
$V_{GS}$		$\pm 20$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	38	A
$I_{D90}$	$T_C = 90^\circ\text{C}$	25	A
$dV/dt$	$V_{DS} < V_{DSS}; I_F \leq 50 \text{ A};  di_F/dt  \leq 200 \text{ A}/\mu\text{s}$ $T_{VJ} = 150^\circ\text{C}$	6	V/ns
$E_{AS}$	$I_D = 10 \text{ A}; L = 36 \text{ mH}; T_C = 25^\circ\text{C}$	1.8	J
$E_{AR}$	$I_D = 20 \text{ A}; L = 5 \text{ mH}; T_C = 25^\circ\text{C}$	1	mJ

## Applications

- ECO-PAC 2 with DCB Base
  - Electrical isolation towards the heatsink
  - Low coupling capacitance to the heatsink for reduced EMI
  - High power dissipation
  - High temperature cycling capability of chip on DCB
  - solderable pins for DCB mounting
- fast CoolMOS power MOSFET
  - High blocking capability
  - Low on resistance
  - Avalanche rated for unclamped inductive switching (UIS)
  - Low thermal resistance due to reduced chip thickness
- Enhanced total power density

Symbol	Conditions	Characteristic Values				
		$(T_{VJ} = 25^\circ\text{C}, \text{ unless otherwise specified})$				
		min.	typ.	max.		
$R_{DSon}$	$V_{GS} = 10 \text{ V}; I_D = I_{D90}$			70	m $\Omega$	
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}; I_D = 3 \text{ mA}$	3.5		5.5	V	
$I_{DSS}$	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		60	25	$\mu\text{A}$ $\mu\text{A}$	
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$			100	nA	
$Q_g$ $Q_{gs}$ $Q_{gd}$	$V_{GS} = 10 \text{ V}; V_{DS} = 350 \text{ V}; I_D = 50 \text{ A}$		220		nC	
				55		nC
				125		nC
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	$V_{GS} = 10 \text{ V}; V_{DS} = 380 \text{ V}$ $I_D = 25 \text{ A}; R_G = 1.8 \Omega$		30		ns	
				95		ns
				100		ns
				10		ns
$R_{thJC}$	per MOSFET			0.45	K/W	

Data according to IEC 60747 refer to a single diode or transistor unless otherwise stated

## Applications

- Switched mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)
- Power factor correction (PFC)
- Welding
- Inductive heating

1) CoolMOS is a trademark of Infineon Technologies AG.

**Source-Drain Diode**

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)					
$I_S$	Inverse diode forward current			47	A
$I_{SM}$	Inverse diode direct current pulsed			141	A
$V_{SD}$	Inverse diode forward voltage $V_{GS} = 0\text{ V}; I_F = I_S$		1	1.2	V
$t_{rr}$	$\left. \begin{array}{l} V_R = 350\text{ V} \\ I_F = I_S \\ di_F/dt = 100\text{ A}/\mu\text{s} \end{array} \right\}$		580		ns
$Q_{rr}$			23		$\mu\text{C}$
$I_{RM}$			73		A
$di_{rr}/dt$			900		$\text{A}/\mu\text{s}$

**Reverse diodes (FRED)**

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T = 25^{\circ}\text{C}$	18.5	A
$I_{F80}$	$T = 80^{\circ}\text{C}$	12.0	A

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$V_F$	$I_F = 15\text{ A}; T = 25^{\circ}\text{C}$ $T = 125^{\circ}\text{C}$	11.2 11.2			mm mm
$I_{RM}$	$I_F = 10\text{ A}; di_F/dt = 400\text{ A}/\mu\text{s}; T = 125^{\circ}\text{C}$		7		A
$t_{rr}$	$V_R = 300\text{ V}; V_{GE} = 0\text{ V}$		70		ns
$R_{thJC}$	with heatsink compound (0.42 K/m.K; 50 $\mu\text{m}$ )		7	0.35	K/W
$R_{thJH}$					

**Temperature Sensor NTC**

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$R_{25}$	$T = 25^{\circ}\text{C}$	4.75	5.0	5.25	$\text{k}\Omega$
$B_{25/50}$			3375		K

**Module**

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$		-40...+150	$^{\circ}\text{C}$
$T_{stg}$		-40...+125	$^{\circ}\text{C}$
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}; t = 1\text{ s}$	3600	V~
$M_d$	mounting torque (M4)	1.5 - 2.0 14 - 18	Nm lb.in
$a$	Max. allowable acceleration	50	$\text{m}/\text{s}^2$

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$d_S$	Creepage distance on surface (pin to heatsink)	11.2			mm
$d_A$	Strike distance in air (pin to heatsink)	11.2			mm
<b>Weight</b>			24		g

Dimensions in mm (1 mm = 0.0394")

