

# CoolMOS Power MOSFET with Series Schottky Diode and Ultra Fast Antiparallel Diode in High Voltage ISOPLUS i4-PAC™

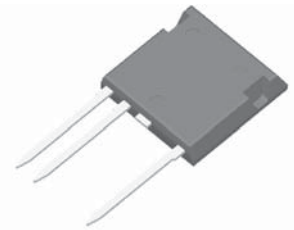
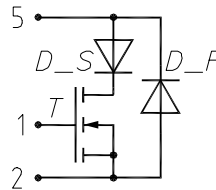
$$I_{D25} = 38 \text{ A}$$

$$V_{DSS} = 600 \text{ V}$$

$$R_{DSon} = 60 \text{ m}\Omega$$

$$t_{rr} = 70 \text{ ns}$$

**COOLMOS**  
Power Semiconductors



## MOSFET T

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

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$R_{DSon}$	$V_{GS} = 10 \text{ V}; I_D = I_{D90}$		60	70 m $\Omega$	
$V_{GSth}$	$V_{DS} = 20 \text{ V}; I_D = 3 \text{ mA};$	3.5		5.5 V	
$I_{DSS}$	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		0.5	0.3 mA	
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$			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
$R_{thJC}$ $R_{thJH}$	with heat transfer paste		0.9	0.45 K/W K/W	

## Features

- fast CoolMOS power MOSFET - 2nd generation
- High blocking voltage
- Low on resistance
- Low thermal resistance due to reduced chip thickness
- Series Schottky diode prevents current flow through MOSFET's body diode
- very low forward voltage
- fast switching
- Ultra fast HiPerFRED™ anti parallel diode
- low operating forward voltage
- fast and soft reverse recovery - low switching losses
- ISOPLUS i4-PAC™ high voltage package
- isolated back surface
- low coupling capacity between pins and heatsink
- enlarged creepage towards heatsink
- enlarged creepage between high voltage pins
- application friendly pinout
- high reliability
- industry standard outline

## Applications

### Converters with

- circuit operation leading to current flow through switches in reverse direction - e. g.
  - phaseleg with inductive load
  - resonant circuits
- high switching frequency

### Examples

- switched mode power supplies (SMPS)
- uninterruptable power supplies (UPS)
- DC-DC converters
- welding converters
- converters for inductive heating
- drive converters

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### Series Schottky Diode D<sub>S</sub>

Symbol	Conditions	Maximum Ratings	
I <sub>F25</sub>	T <sub>C</sub> = 25°C	60	A
I <sub>F90</sub>	T <sub>C</sub> = 90°C	40	A

Symbol	Conditions	Characteristic Values (T <sub>VJ</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
V <sub>F</sub>	I <sub>F</sub> = 20 A; T <sub>VJ</sub> = 25°C T <sub>VJ</sub> = 125°C	0.7	0.9	V
R <sub>thJC</sub> R <sub>thJH</sub>	with heat transfer paste	2.9	2	K/W K/W

### Anti Parallel Diode D<sub>F</sub>

Symbol	Conditions	Maximum Ratings	
I <sub>F25</sub>	T <sub>C</sub> = 25°C	32	A
I <sub>F90</sub>	T <sub>C</sub> = 90°C	16	A

Symbol	Conditions	Characteristic Values (T <sub>VJ</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
V <sub>F</sub>	I <sub>F</sub> = 20 A; T <sub>VJ</sub> = 25°C T <sub>VJ</sub> = 125°C	2.1 1.4	2.5	V V
I <sub>RM</sub> t <sub>rr</sub>	I <sub>F</sub> = 30 A; di <sub>F</sub> /dt = -500 A/μs; T <sub>VJ</sub> = 125°C V <sub>R</sub> = 600 V; V <sub>GE</sub> = 0 V	15 70		A ns
R <sub>thJC</sub> R <sub>thJH</sub>	with heat transfer paste	2.6	1.3	K/W K/W

### Component

Symbol	Conditions	Maximum Ratings	
V <sub>ISOL</sub>	I <sub>ISOL</sub> ≤ 1 mA; 50/60 Hz	2500	V~
T <sub>VJ</sub>		-40...+150	°C
T <sub>stg</sub>		-40...+125	°C
F <sub>C</sub>	mounting force with clip	20 ... 120	N

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
C <sub>p</sub>	coupling capacity between shorted pins and mounting tab in the case		40	pF
d <sub>S</sub> , d <sub>A</sub>	D pin - S pin	7		mm
d <sub>S</sub> , d <sub>A</sub>	pin - backside metal	5.5		mm
Weight			9	g

### Dimensions in mm (1 mm = 0.0394")

