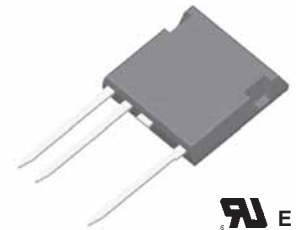


# CoolMOS Power MOSFET with Series Schottky Diode and Ultra Fast Antiparallel Diode in High Voltage ISOPLUS i4-PAC™

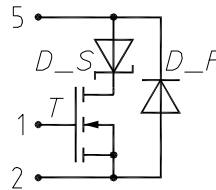
$I_{D25} = 38 \text{ A}$   
 $V_{DSS} = 600 \text{ V}$   
 $R_{DSon} = 60 \text{ m}\Omega$   
 $t_{rr} = 70 \text{ ns}$

**COOLMOS**  
Power Semiconductors



E 72873

Preliminary data



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

### Features

- fast CoolMOS power MOSFET- 3<sup>rd</sup> 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
  - UL registered E 72873

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 $\Omega$
$V_{GSth}$	$V_{DS} = 20 \text{ V}; I_D = 3 \text{ mA};$	2.1		3.9 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
$Q_g$ $Q_{gs}$ $Q_{gd}$	} $V_{GS} = 10 \text{ V}; V_{DS} = 350 \text{ V}; I_D = 50 \text{ A}$		250	nC
			25	nC
			120	nC
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	} $V_{GS} = 10 \text{ V}; V_{DS} = 380 \text{ V};$ $I_D = 50 \text{ A}; R_G = 1.8 \Omega$		20	ns
			30	ns
			110	ns
			10	ns
$R_{thJC}$ $R_{thJH}$	with heat transfer paste		0.9	0.45 K/W K/W

### 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

### Series Schottky Diode $D_S$

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_C = 25^\circ\text{C}$	60	A
$I_{F90}$	$T_C = 90^\circ\text{C}$	40	A

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_F$	$I_F = 20\text{ A}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	0.7	0.9	V V
$R_{thJC}$ $R_{thJH}$	with heat transfer paste	2.9	2	K/W K/W

### Anti Parallel Diode $D_F$

Symbol	Conditions	Maximum Ratings	
$I_{F25}$	$T_C = 25^\circ\text{C}$	32	A
$I_{F90}$	$T_C = 90^\circ\text{C}$	16	A

Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_F$	$I_F = 20\text{ A}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.1 1.4	2.5	V V
$I_{RM}$ $t_{rr}$	$I_F = 30\text{ A}; di_F/dt = -500\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V}$	15 70		A ns
$R_{thJC}$ $R_{thJH}$	with heat transfer paste	2.6	1.3	K/W K/W

### Component

Symbol	Conditions	Maximum Ratings	
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	2500	V~
$T_{VJ}$		-40...+150	$^\circ\text{C}$
$T_{stg}$		-40...+125	$^\circ\text{C}$
$F_C$	mounting force with clip	20 ... 120	N

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$C_p$	coupling capacity between shorted pins and mounting tab in the case		40	pF
$d_S, d_A$ $d_S, d_A$	D pin - S pin pin - backside metal	7 5.5		mm mm
Weight			9	g

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

