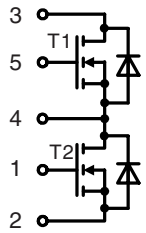
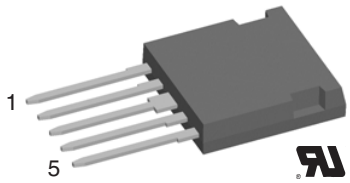
Trench Power MOSFET

Phaseleg Topology
in ISOPLUS i4-PAC™

I_{D25} = 150 A
V_{DSS} = 75 V
$R_{DS(on)\,typ}$ = 3.2 mΩ





MOSFET T1/T2

Symbol	Conditions	Maximum Ratings	
V_{DSS}	T_{VJ} = 25°C to T_{VJmax}	75	V
V_{GS}		±20	V
I_{D25}	T_C = 25°C	150	A
I_{D90}	T_C = 90°C	120	A
I_{F25}	(body diode) T_C = 25°C	150	A
I_{F90}	(body diode) T_C = 90°C	100	A

Symbol	Conditions (unless otherwise specified)	Characteristic Values min.	typ.	max.	
R_{DSon}	V_{GS} = 10 V; I_D = I_{D90}; on chip level		3.2	4.2	mΩ
V_{GSth}	V_{DS} = 20 V; I_D = 1 mA	2		4	V
I_{DSS}	V_{DS} = 75 V; V_{GS} = 0 V; T_{VJ} = 25°C			10	µA
	T_{VJ} = 125°C		0.1		mA
I_{GSS}	V_{GS} = ±20 V; V_{DS} = 0 V			200	nA
Q_g	V_{GS}= 10 V; V_{DS} = 60 V; I_D = 50 A		225		nC
Q_{gs}			30		nC
Q_{gd}			85		nC
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C		75		ns
t_r	V_{GS}= 10 V; V_{DS} = 30 V		100		ns
$t_{d(off)}$	I_D = 120 A; R_G = 10 Ω		400		ns
t_f			90		ns
E_{on}			0.31		mJ
E_{off}			0.5		mJ
$E_{rec(off)}$			0.05		mJ
V_F	(body diode) I_F = 75 A; V_{GS} = 0 V		1.1	1.5	V
t_{rr}	(body diode) I_F = 20A; -di/dt = 100A/µs; V_{DS} = 30V		90		ns
R_{thJC}				0.6	K/W
R_{thJH}	with heat transfer paste		1.0		K/W

Features

- trench MOSFET
  - very low on state resistance R_{DSon}
  - fast switching
- ISOPLUS i4-PAC™ package
  - isolated back surface
  - low coupling capacity between pins and heatsink
  - enlarged creepage towards heatsink
  - application friendly pinout
  - low inductive current path
  - high reliability
  - industry standard outline
  - UL registered E 72873

Applications

- automotive
  - AC drives - starter generator for 42V etc.
  - choppers - replacing series resistors for DC drives, heating etc.
  - DC-DC converters - between 12V and 42V system etc.
  - electronic switches -replacing relays and fuses
- power supplies
  - DC-DC converters
  - solar inverters
- battery supplied systems
  - choppers or inverters for drives in hand held tools
  - battery chargers

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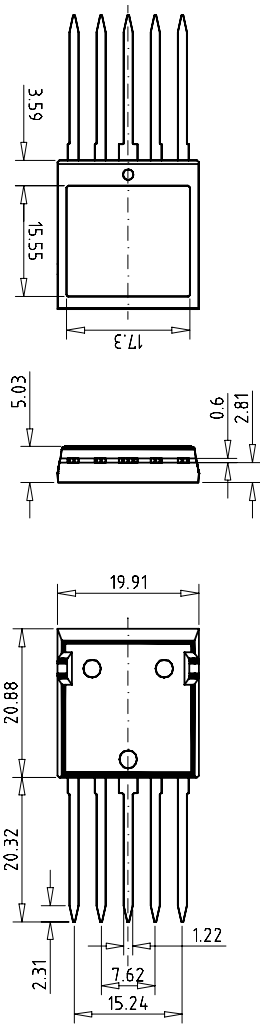
Component

Symbol	Conditions	Maximum Ratings	
I_{RMS}	per pin	75	A
T_{VJ}		-55...+175	°C
T_{stg}		-55...+125	°C
V_{ISOL}	$I_{ISOL} \leq 1$ mA; 50/60 Hz	2500	V~
F_C	mounting force with clip	20...120	N

Symbol	Conditions	Characteristic Values min.	typ.	max.	
$R_{pin-chip}$	$R_{pin-P2} > R_{DS(on)} + R_{pin-chip}$		1.6		mΩ
C_p	coupling capacity between shorted pins and mounting tab in the case		40		pF
d_S, d_A	pin - pin	1.7			mm
d_S, d_A	pin - backside metal	5.5			mm
Weight			9		g

Dimensions in mm (1 mm = 0.0394")



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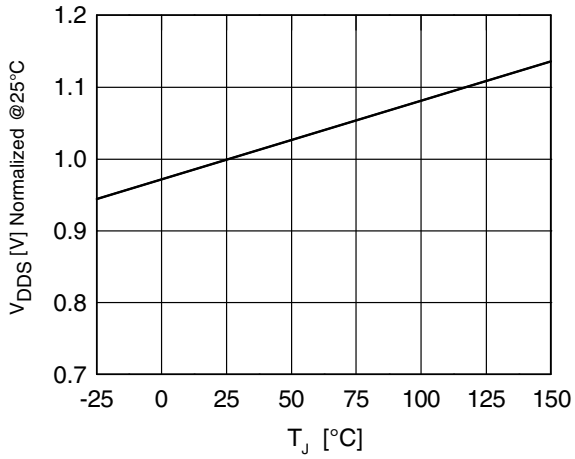

Fig. 1 Drain source breakdown voltage V_{DSS} vs. junction temperature T_{VJ}

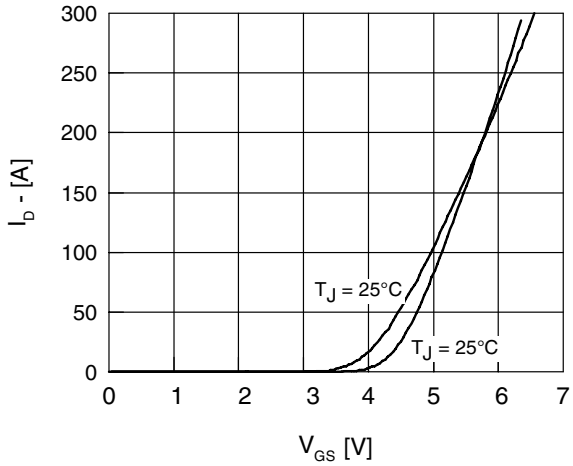

Fig. 2 Typical transfer characteristic

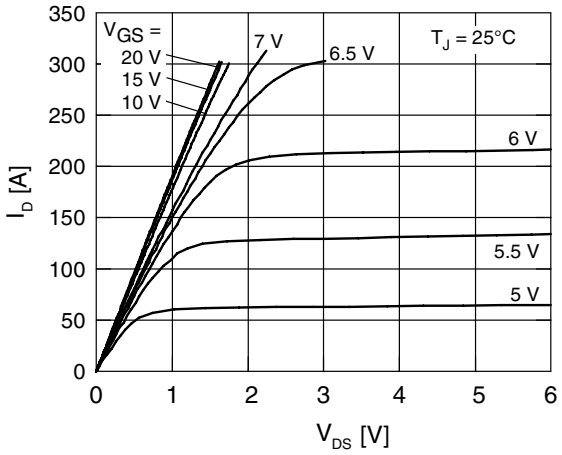

Fig. 3 Typical output characteristic

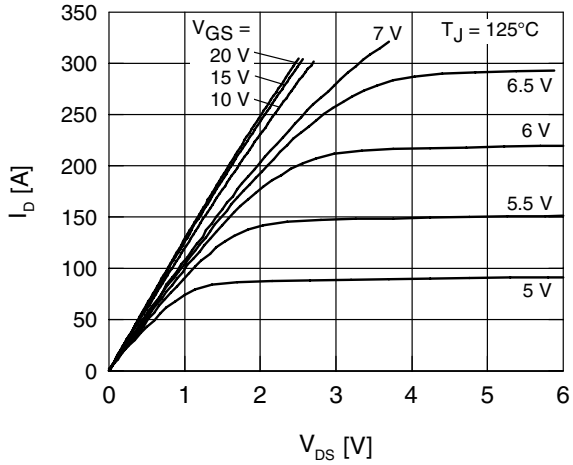

Fig. 4 Typical output characteristic

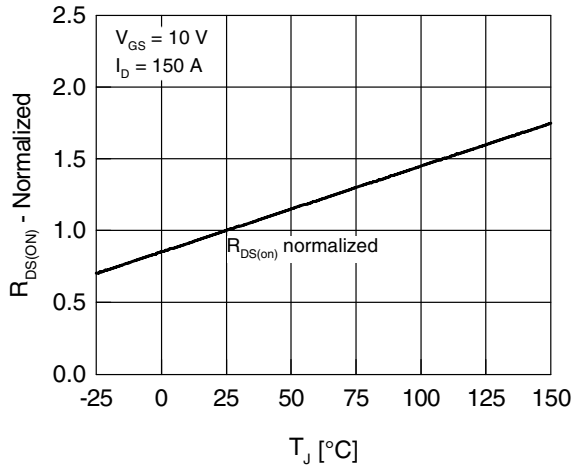

Fig. 5 Drain source on-state resistance $R_{DS(on)}$ vs. junction temperature T_{VJ}

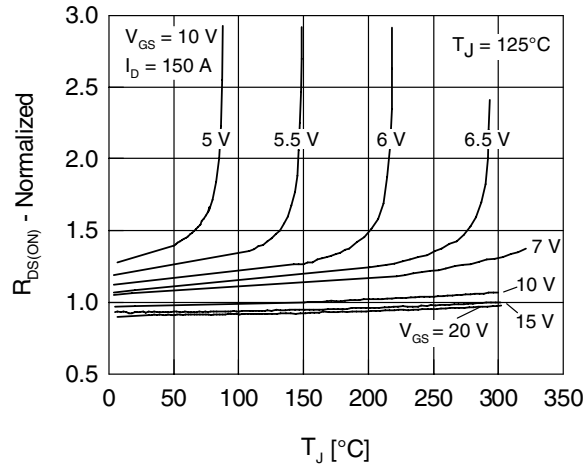

Fig. 6 Drain source on-state resistance $R_{DS(on)}$ versus I_D

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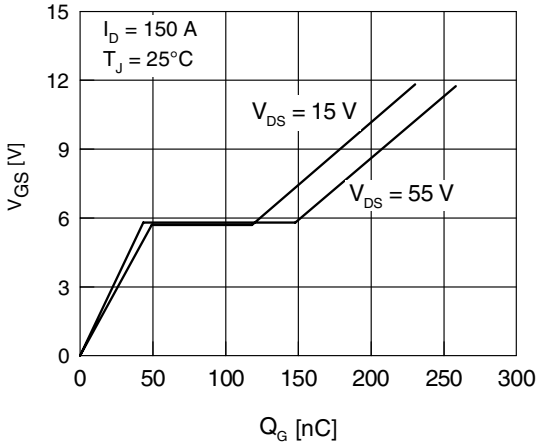

Fig.7 Gate charge characteristic

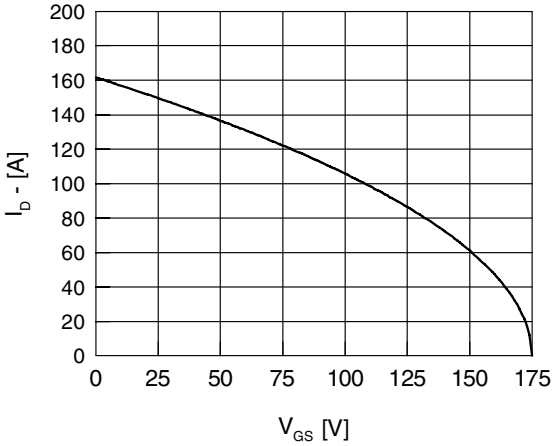

Fig. 8 Drain current I_D vs. case temperature T_C

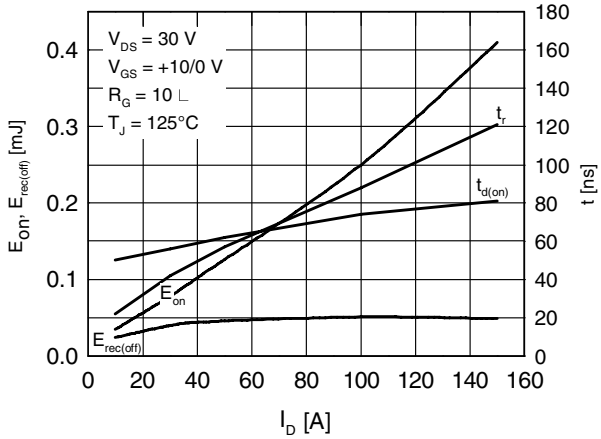

Fig. 9 Typ. turn-on energy & switching times vs. collector current, inductive switching

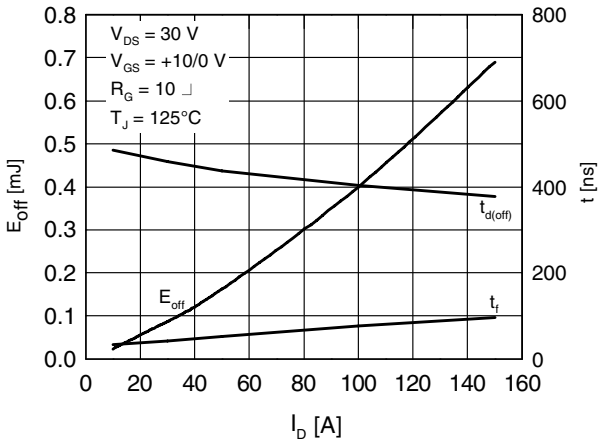

Fig. 10 Typ. turn-off energy & switching times vs. collector current, inductive switching

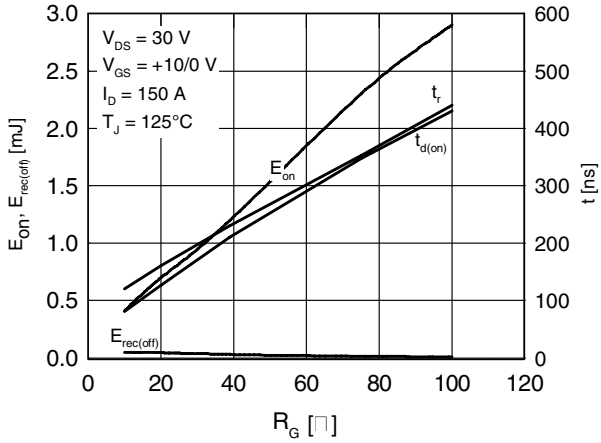

Fig. 11 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

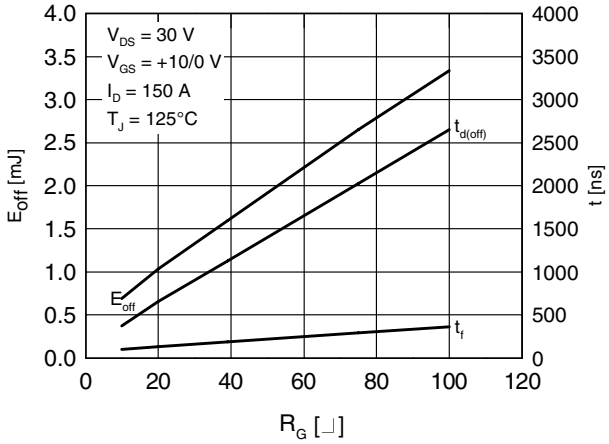

Fig. 12 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

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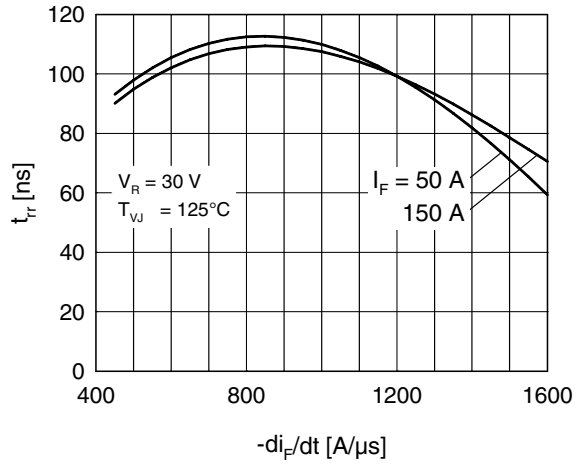

Fig. 13 Reverse recovery time t_{rr} of the body diode vs. di/dt

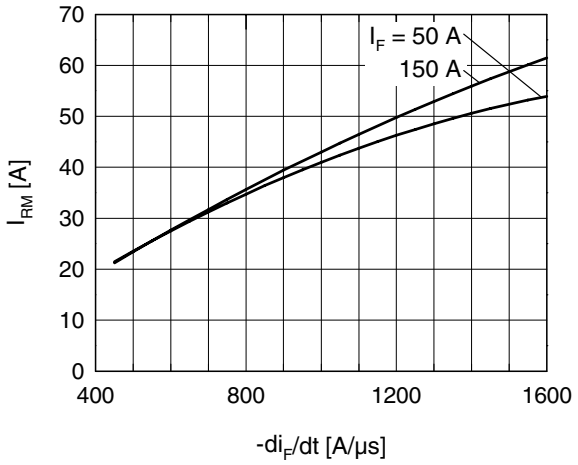

Fig. 14 Reverse recovery current I_{RM} of the body diode vs. di/dt

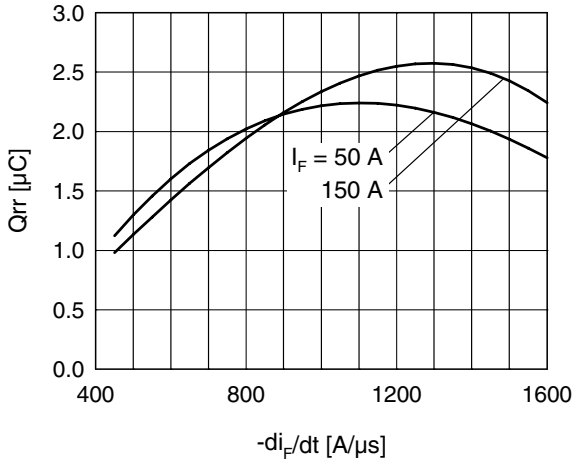

Fig. 15 Reverse recovery charge Q_{rr} of the body diode vs. di/dt

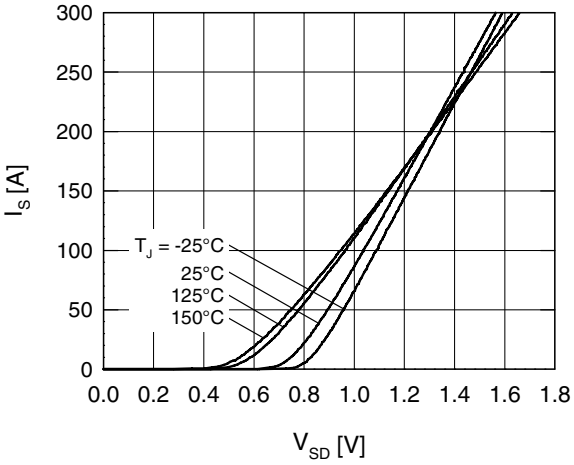

Fig. 16 Source current I_S vs. source drain voltage V_{SD} (body diode)

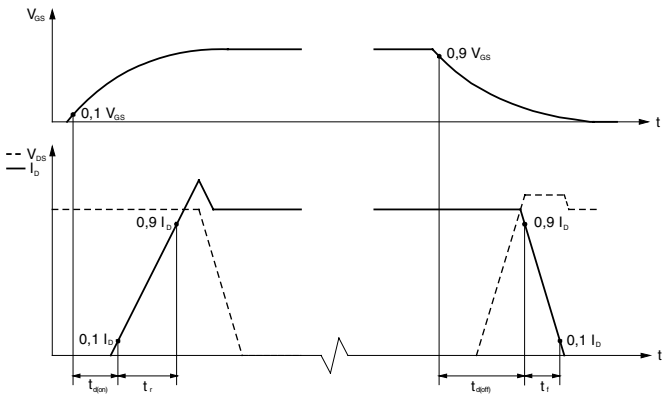

Fig. 17 Definition of switching times

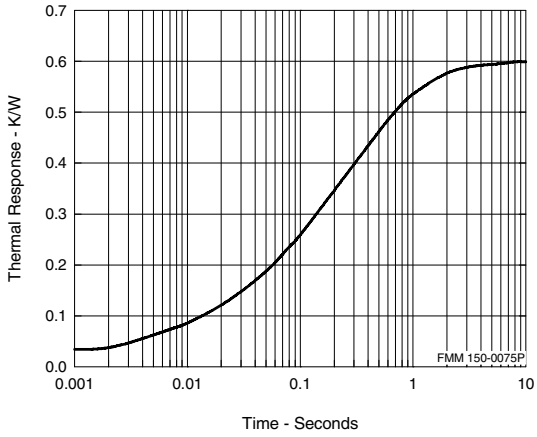

Fig. 18 Therm. impedance junction to case Z_{thJC}

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