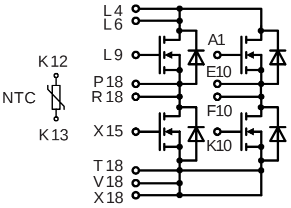
HiPerFET™ Power MOSFET

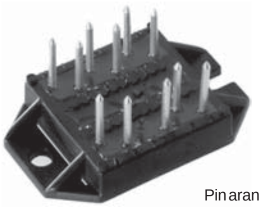
H-Bridge Topology in ECO-PAC 2

N-Channel Enhancement Mode
High dv/dt, Low t_{rr}, HDMOS™ Family

I_{D25} = 75 A
V_{DSS} = 100 V
R_{DSon} = 25 mΩ
t_{rr} ≤ 200 ns

Preliminary data sheet





Pin arangement see outlines

MOSFETs

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	100	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	100	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	75	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	300	A
I_{AR}	T_C = 25°C	75	A
E_{AR}	T_C = 25°C	30	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$, R_G = 2 Ω	5	V/ns
P_D	T_C = 25°C	300	W

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values min.	 typ.	 max.	
V_{DSS}	V_{GS} = 0 V, I_D = 250 µA	100			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA	2.0		4	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0			±100	nA
I_{DSS}	V_{DS} = 0.8 • V_{DSS}; T_J = 25°C V_{GS} = 0 V; T_J = 125°C			250 1	µA mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25} Pulse test, t ≤ 300 µs, duty cycle d ≤ 2%			0.020	Ω
g_{fs}	V_{DS} = 10 V; I_D = I_{D25}, pulse test	25	30		S
C_{iss}			4500		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1600		pF
C_{rss}			800		pF
$t_{d(on)}$			20	30	ns
t_r	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 I_{D25}		60	110	ns
$t_{d(off)}$	R_G = 2 Ω, (External)		80	110	ns
t_f			60	90	ns
$Q_{g(on)}$			180	260	nC
Q_{gs}	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 I_{D25}		36	70	nC
Q_{gd}			85	160	nC
R_{thJC}				0.5	K/W
R_{thCK}	with heatsink compound (0.42 K/m.K; 50 µm)		0.25		K/W

Features

- HiPerFET™ technology
  - low R_{DSon}
  - low gate charge for high frequency operation
  - unclamped inductive switching (UIS) capability
  - dv/dt ruggedness
  - fast intrinsic reverse diode
- ECO-PAC 2 package
  - isolated back surface
  - enlarged creepage towards heatsink
  - application friendly pinout
  - low inductive current path
  - high reliability
  - solderable pins for PCB mounting

Applications

- drives and power supplies
- battery or fuel cell powered
- automotive, industrial vehicle etc.
- secondary side of mains power supplies

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
I_S	V_{GS} = 0 V			75	A
I_{SM}	Repetitive;			300	A
V_{SD}	$I_F = I_{D25}$, V_{GS} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2%			1.75	V
t_{rr}	I_F = 25 A, -di/dt = 100 A/µs, T_J = 25°C V_R = 25 V T_J = 125°C		 300	200	ns ns

Temperature Sensor NTC

Symbol	Conditions	Characteristic Values min.	typ.	max.	
R_{25}	T = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$			3375		K

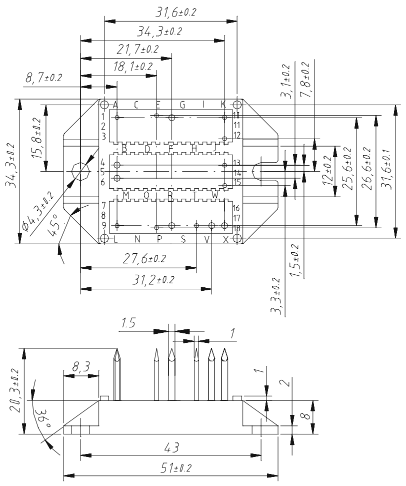
Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-40...+150	°C
T_{stg}		-40...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA; 50/60 Hz; t = 1 s	3600	V~
M_d	mounting torque (M4)	1.5 - 2.0 14 - 18	Nm lb.in.
a	Max. allowable acceleration	50	m/s²

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

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
Weight			24		g

Dimensions in mm (1 mm = 0.0394")



238

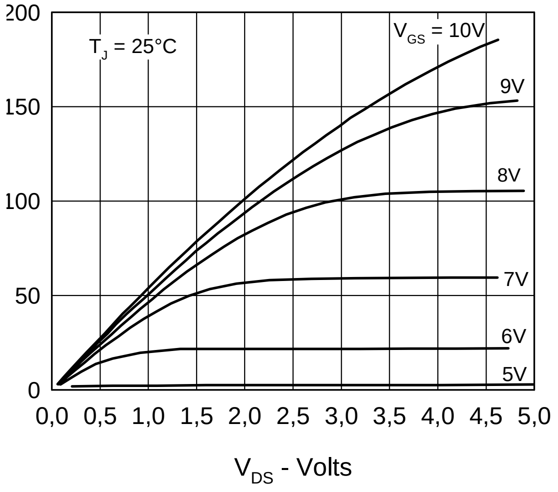


Fig. 1 Output Characteristics

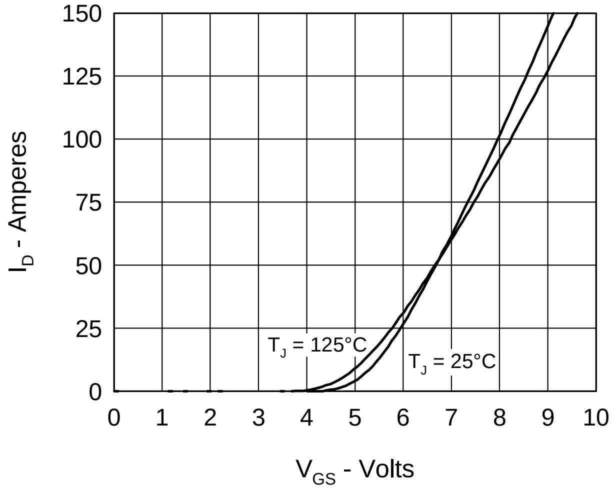


Fig. 2 Input Admittance

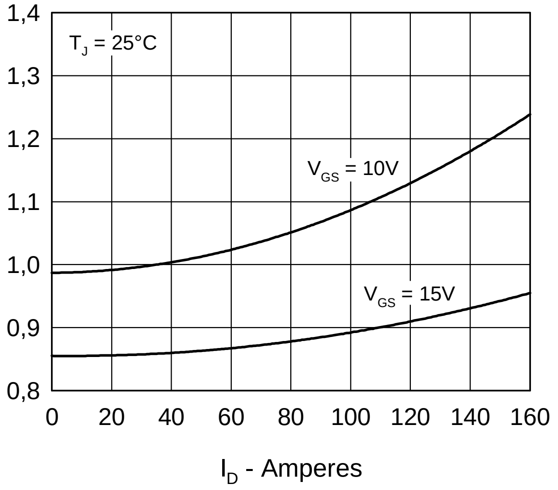


Fig. 3 $R_{DS(on)}$ vs. Drain Current

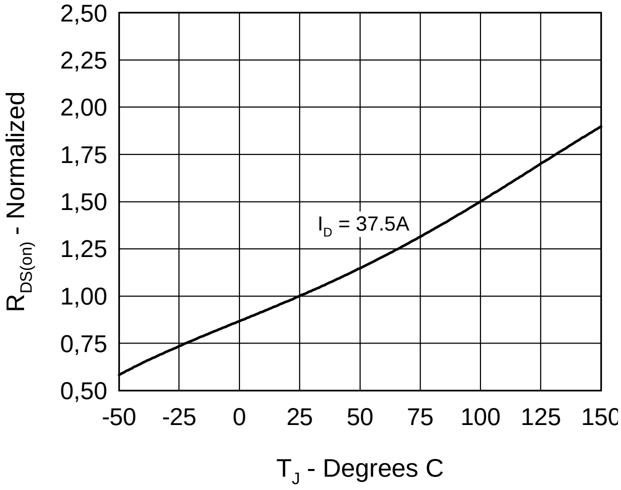


Fig. 4 Temperature Dependence of Drain to Source Resistance

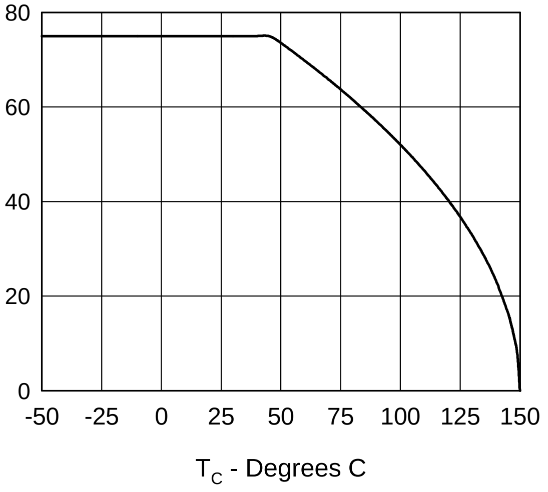


Fig. 5 Drain Current vs. Case Temperature

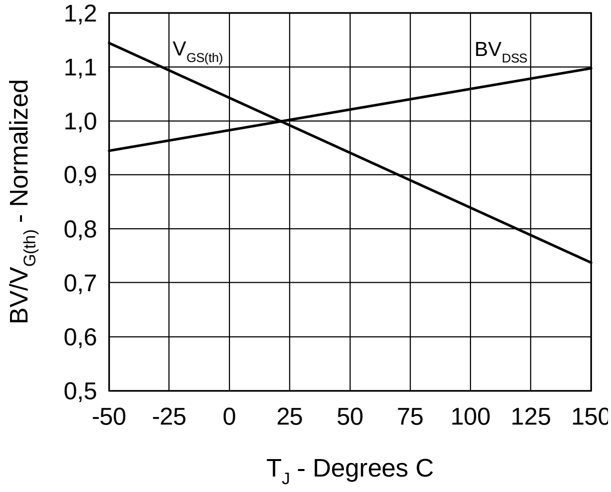


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

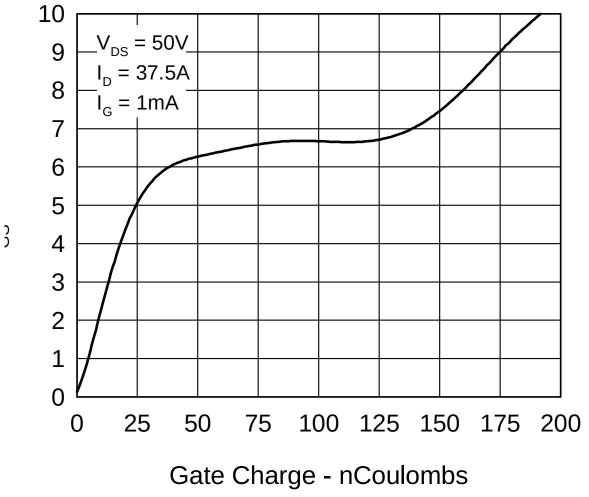


Fig.7 Gate Charge Characteristic Curve

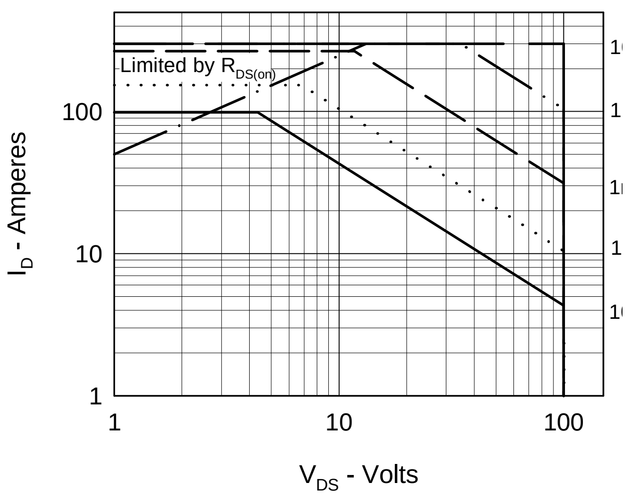


Fig.8 Forward Bias Safe Operating Area

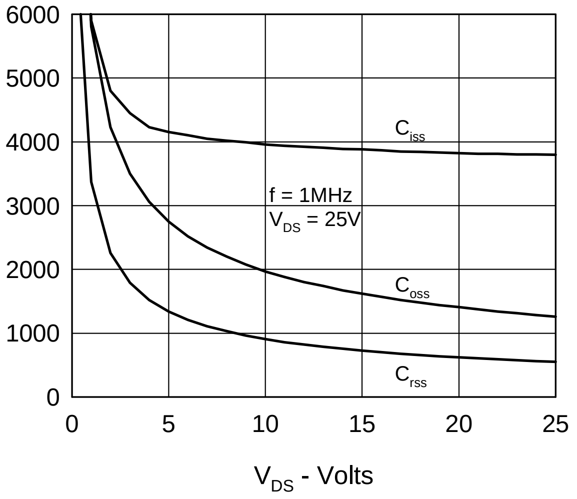


Fig.9 Capacitance Curves

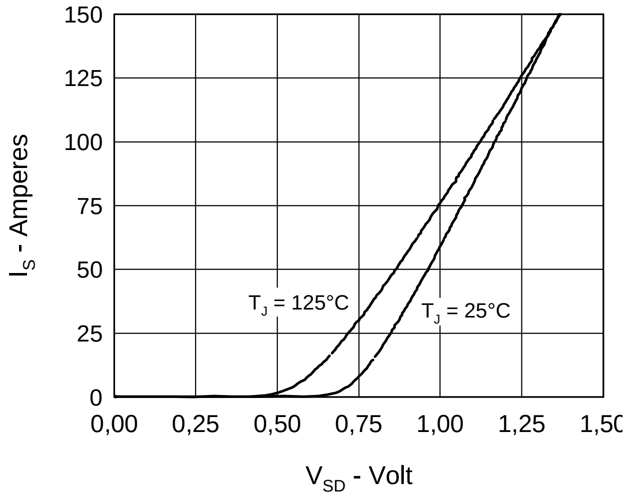


Fig.10 Source Current vs. Source to Drain Voltage

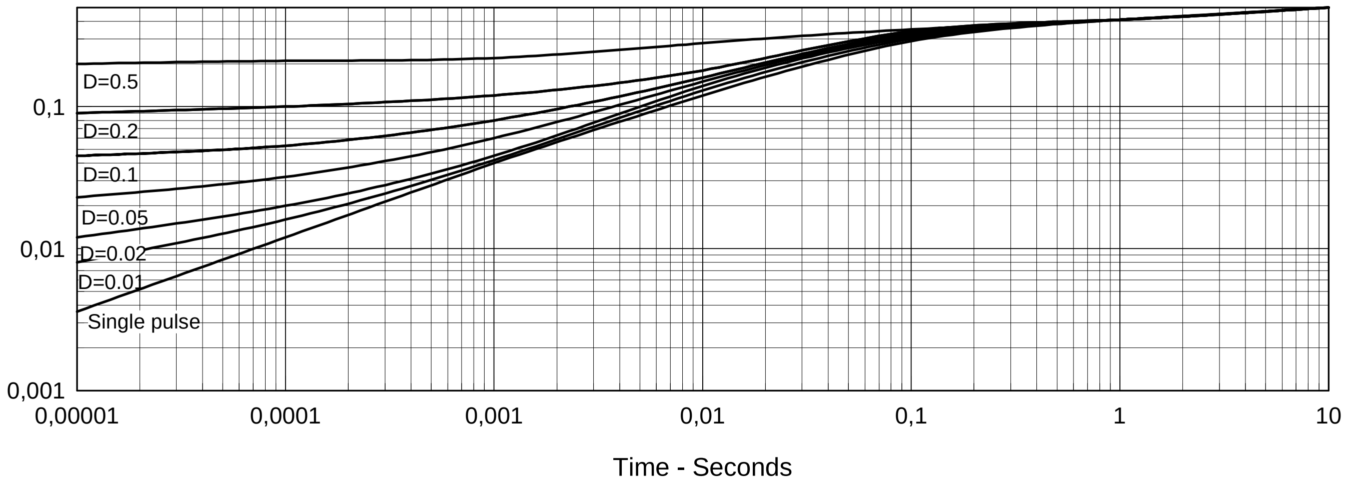


Fig.11 Transient Thermal Impedance

238