

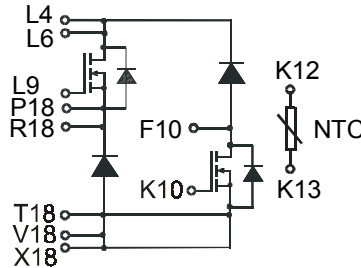
## Power MOSFET in ECO-PAC 2

## PSHM 120D/01

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



### MOSFETs

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	100	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	100	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	75	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	300	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	75	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	mJ
dv/dt	$I_S \leq I_{DM}$ , $di/dt \leq 100\text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 2\ \Omega$	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	300	W

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 250\ \mu\text{A}$	100		V	
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4\text{ mA}$	2.0		V	
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100\text{ nA}$	
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ ; $T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}$ ; $T_J = 125^\circ\text{C}$			250 $\mu\text{A}$ 1 mA	
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5 I_{D25}$ Pulse test, $t < 300\ \mu\text{s}$ , duty cycle $d < 2\%$		25	mΩ	
$g_{fs}$	$V_{DS} = 10\text{ V}$ ; $I_D = I_{D25}$ , pulse test	25	30	S	
$C_{iss}$	$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$		4500	pF	
$C_{oss}$			1600	pF	
$C_{rss}$			800	pF	
$t_{d(on)}$	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$ , (External)		20	30	ns
$t_r$			60	110	ns
$t_{d(off)}$			80	110	ns
$t_f$			60	90	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 I_{D25}$		180	260	nC
$Q_{gs}$			36	70	nC
$Q_{gd}$			85	160	nC
$R_{thJC}$	with heatsink compound (0.42 K/m.K; 50 $\mu\text{m}$ )			0.5	K/W
$R_{thCK}$			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
- UL registered, E 148688

### Applications

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

**Caution:** These Devices are sensitive to electrostatic discharge. Users should observe proper ESD handling precautions.

## Source-Drain Diode

Characteristic Values  
( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Test Conditions	Characteristic Values		
		min.	typ.	max.
$I_S$	$V_{GS} = 0\text{ V}$			75 A
$I_{SM}$	Repetitive;			300 A
$V_{SD}$	$I_F = I_{D25}$ , $V_{GS} = 0\text{ V}$ , Pulse test, $t < 300\ \mu\text{s}$ , duty cycle $d < 2\%$			1.75 V
$t_{rr}$	$I_F = 25\text{ A}$ , $-di/dt = 100\text{ A}/\mu\text{s}$ , $T_J = 25^\circ\text{C}$ $V_R = 25\text{ V}$ $T_J = 125^\circ\text{C}$		300	200 ns ns

## Temperature Sensor NTC

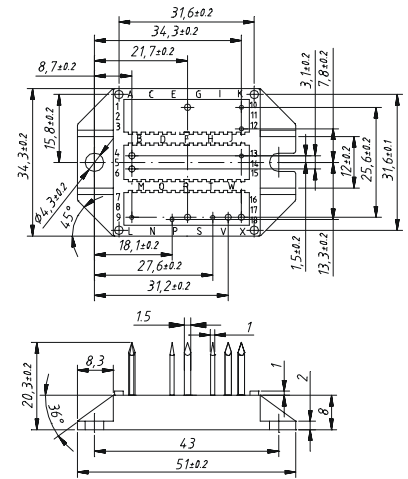
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$R_{25}$	$T = 25^\circ\text{C}$	4.75	5.0	5.25 k $\Omega$
$B_{25/50}$			3375	K

## 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 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	$\text{m/s}^2$

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")



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

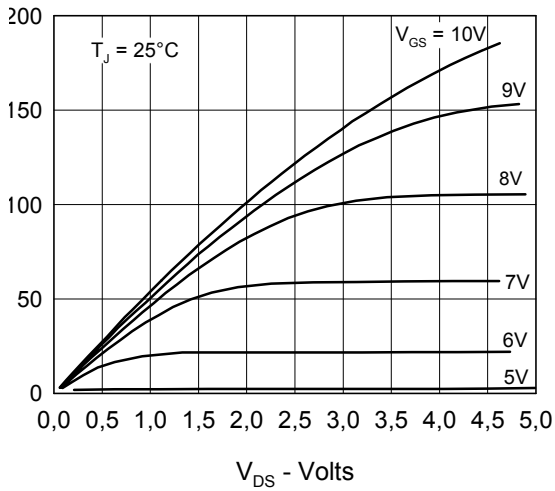


Fig. 1 Output Characteristics

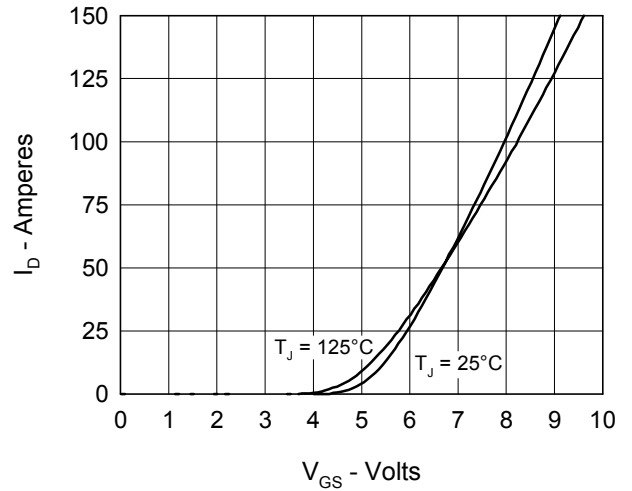


Fig. 2 Input Admittance

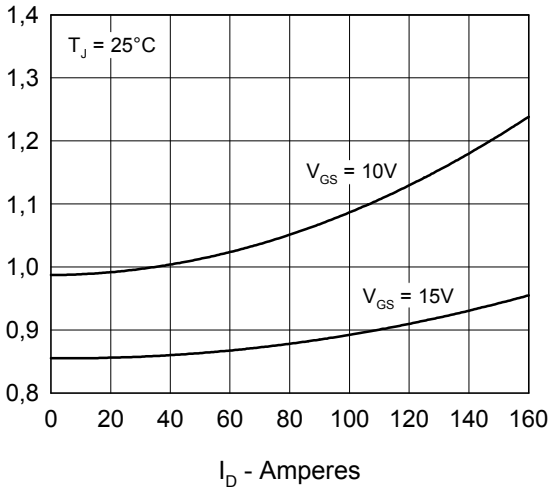


Fig. 3  $R_{DS(on)}$  vs. Drain Current

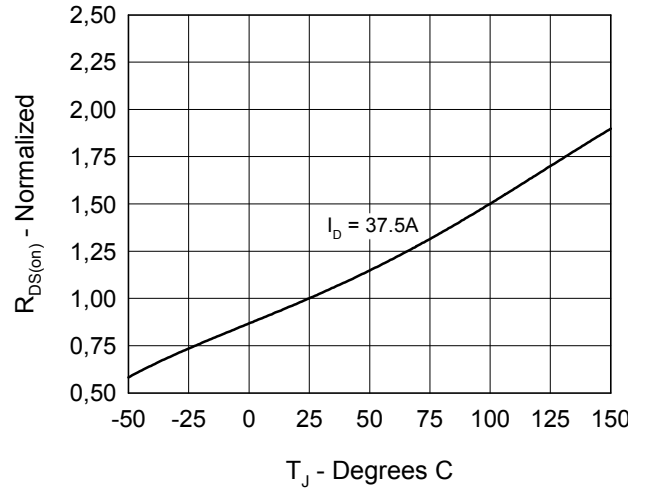


Fig. 4 Temperature Dependence of Drain to Source Resistance

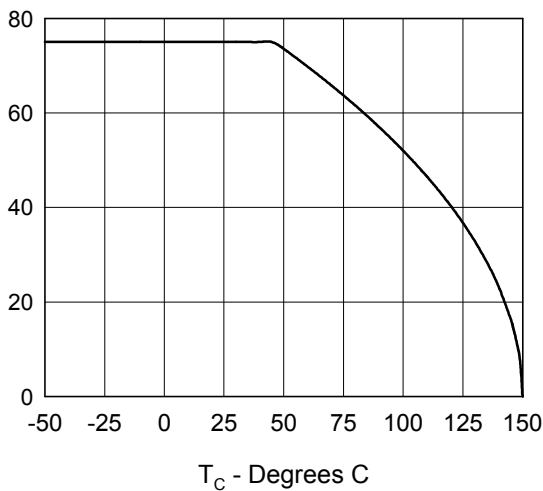


Fig. 5 Drain Current vs. Case Temperature

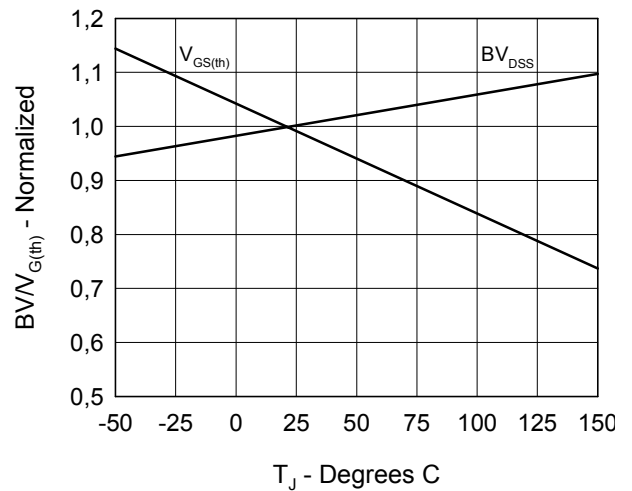


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

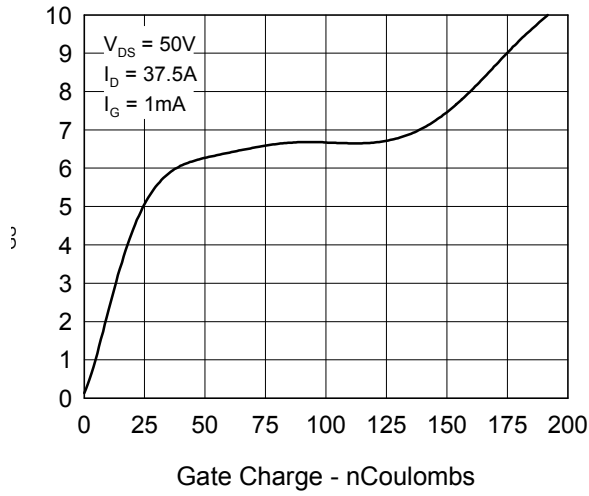


Fig.7 Gate Charge Characteristic Curve

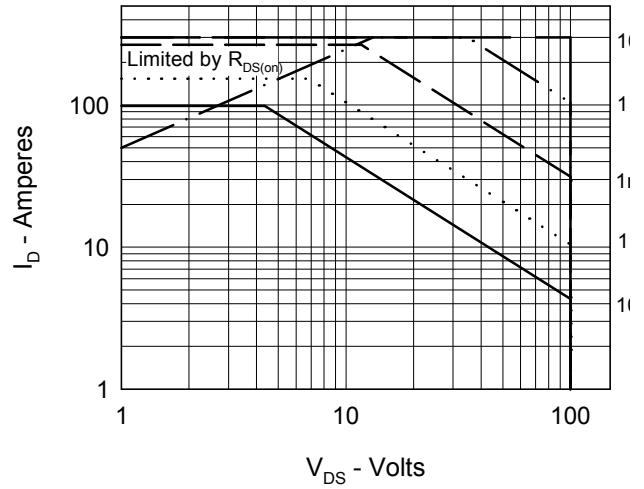


Fig.8 Forward Bias Safe Operating Area

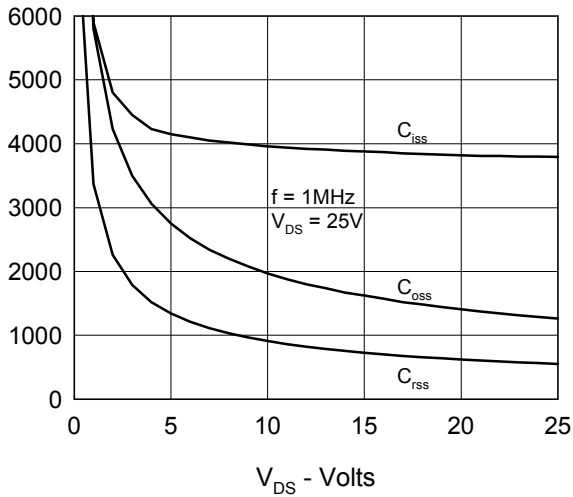


Fig.9 Capacitance Curves

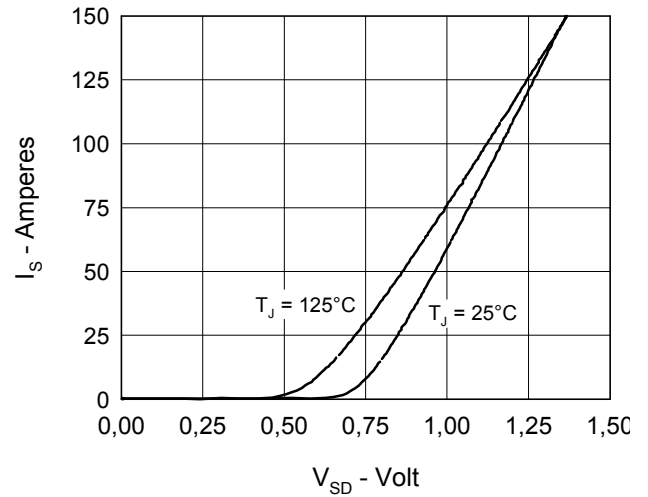


Fig.10 Source Current vs. Source to Drain Voltage

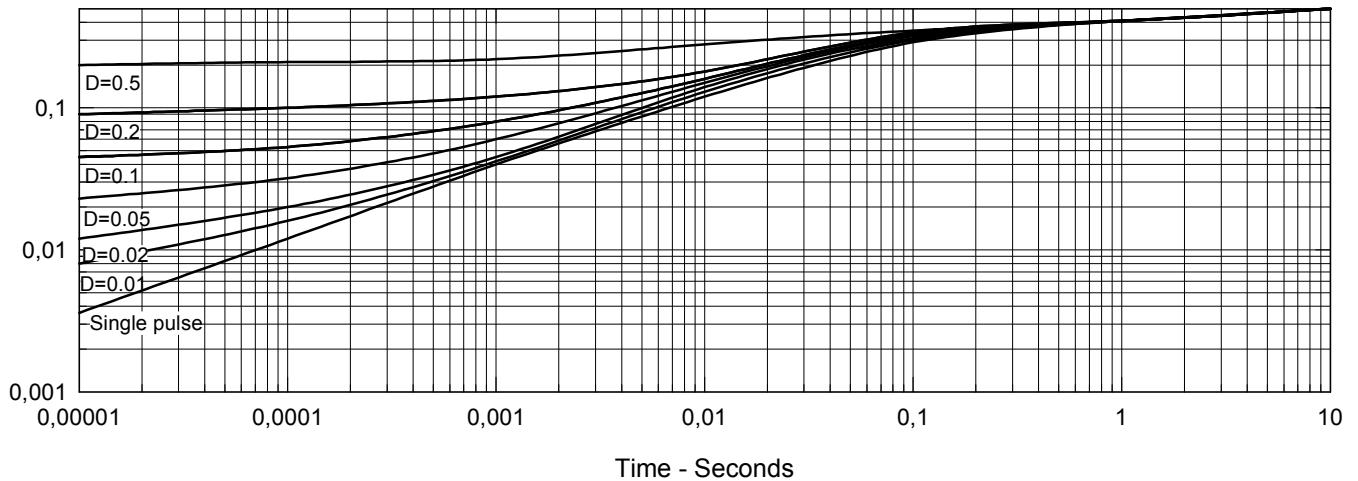


Fig.11 Transient Thermal Impedance