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# SLA5022

**PNP Darlington + N-channel MOSFET**

**3-phase motor drive**

**External dimensions Ⓐ ··· SLA (12-pin)**

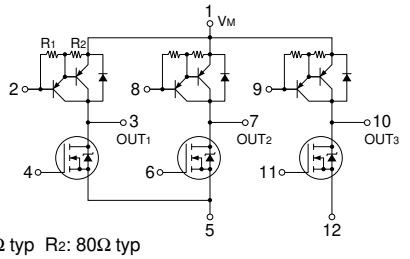
## Absolute maximum ratings (Ta=25°C)

| Symbol | Ratings | Unit |
|---|---|---|
| $V_M$ | 60 | V |
| $I_O$ | ±6 (PW≤100ms) | A |
| $I_{OP}$ | ±10 (PW≤1ms) | A |
| $V_{GSS}$ | ±10 | V |
| $I_B$ | –0.5 | A |
| $P_T$ | 5 ($T_a$=25°C) | W |
| | 35 ($T_C$=25°C) | |
| $\theta_{j\text{-}a}$ | 25 | °C/W |
| $\theta_{j\text{-}c}$ | 3.57 | °C/W |
| $V_{ISO}$ | 1000 (Between fin and lead pin, AC) | Vrms |
| $T_j$ | 150 | °C |
| $T_{stg}$ | –40 to +150 | °C |

## Electrical characteristics (Sink : N channel MOSFET) (Ta=25°C)

| Symbol | Specification | | | Unit | Conditions |
|---|---|---|---|---|---|
| | min | typ | max | | |
| $V_{(BR)DSS}$ | 60 | | | V | $I_D$=250μA, $V_{GS}$=0V |
| $I_{GSS}$ | | | ±500 | nA | $V_{GS}$=±10V |
| $I_{DSS}$ | | | 250 | μA | $V_{DS}$=60V, $V_{GS}$=0V |
| $V_{TH}$ | 1.0 | | 2.0 | V | $V_{DS}$=10V, $I_D$=250μA |
| Re(yfs) | 3.1 | 4.6 | | S | $V_{DS}$=10V, $I_D$=4A |
| $R_{DS(ON)}$ | | 0.17 | 0.22 | Ω | $V_{GS}$=10V, $I_D$=4A |
| | | 0.25 | 0.30 | | $V_{GS}$=4V, $I_D$=4A |
| Ciss | | 400 | | pF | $V_{DS}$=25V, f=1.0MHz, |
| Coss | | 160 | | pF | $V_{GS}$=0V |
| ton | | 80 | | ns | $I_D$=4A, $V_{DD}$=30V, |
| toff | | 50 | | ns | $V_{GS}$=5V |
| $V_{SD}$ | | 1.1 | 1.5 | V | $I_{SD}$=4A, $V_{GS}$=0V |
| trr | | 150 | | ns | $I_F$=±100mA |

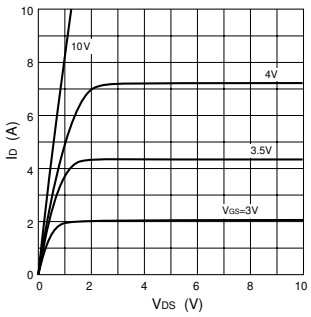
## ■Equivalent circuit diagram



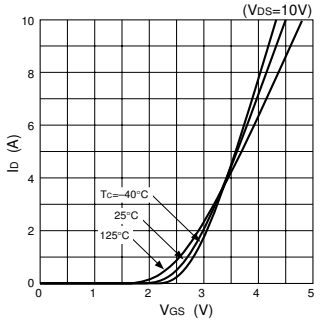

R1: 3kΩ typ R2: 80Ω typ

## Characteristic curves (N-channel)

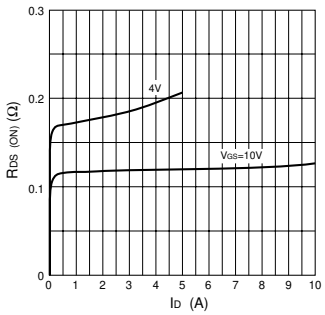
**$V_{DS}$-$I_D$ Characteristics (Typical)**



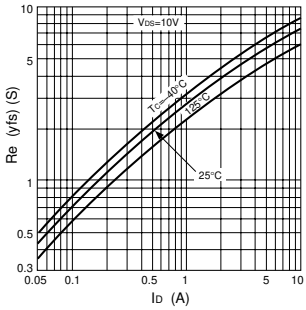

**$V_{GS}$-$I_D$ Temperature Characteristics (Typical)**



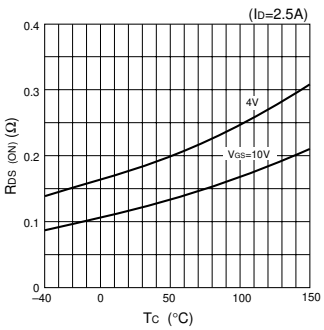

**$I_{DS}$-$R_{DS(ON)}$ Characteristics (Typical)**



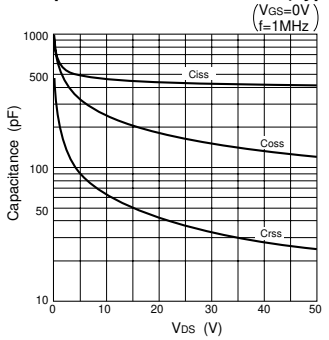

**$I_D$-Re(yfs) Temperature Characteristics (Typical)**



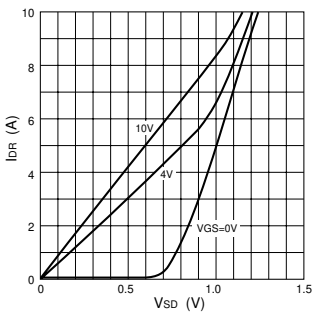

**$T_C$-$R_{DS(ON)}$ Characteristics (Typical)**



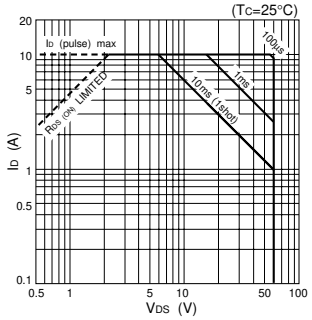

**$V_{DS}$-Cpacitance Characteristics (Typical)**




**$V_{SD}$-$I_{DR}$ Characteristics (Typical)**




**Safe Operating Area (SOA)**

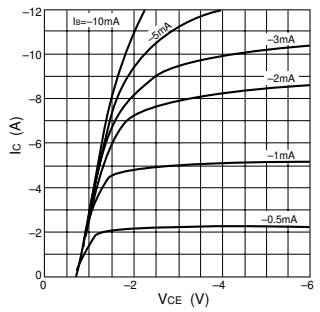


## Electrical characteristics (Source: PNP transistor) (Ta=25°C)

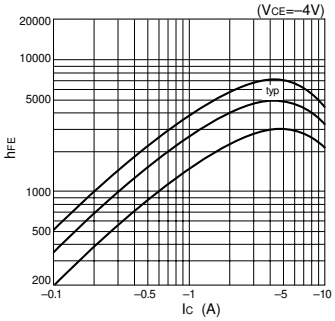
| Symbol | Specification | | | Unit | Conditions |
|---|---|---|---|---|---|
| | min | typ | max | | |
| $I_{CBO}$ | | | –10 | μA | $V_{CB}$=–60V |
| $I_{EBO}$ | –1 | | –5 | mA | $V_{EB}$=–6V |
| $V_{CEO}$ | –60 | | | V | $I_C$=–25mA |
| $h_{FE}$ | 2000 | 5000 | 12000 | | $V_{CE}$=–4V, $I_C$=–4A |
| $V_{CE}$(sat) | | | –1.5 | V | $I_C$=–4A, $I_B$=–10mA |
| $V_{BE}$(sat) | | | –2.0 | V | |
| $V_{FEC}$ | | | 2.0 | V | $I_{FEC}$=4A |
| $t_{rr}$ | | 1.0 | | μs | $I_F$=±0.5A |
| $t_{on}$ | | 1.0 | | μs | $V_{CC}$≒–25V, |
| $t_{stg}$ | | 1.4 | | μs | $I_C$=–4A, |
| $t_f$ | | 0.6 | | μs | $I_{B1}$=–$I_{B2}$=–10mA |
| $f_T$ | | 120 | | MHz | $V_{CE}$=–12V, $I_E$=1A |
| $C_{ob}$ | | 150 | | pF | $V_{CB}$=–10V, f=1MHz |

## Characteristic curves (PNP)

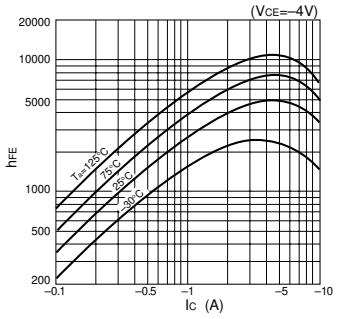
**$I_C$-$V_{CE}$ Characteristics (Typical)**



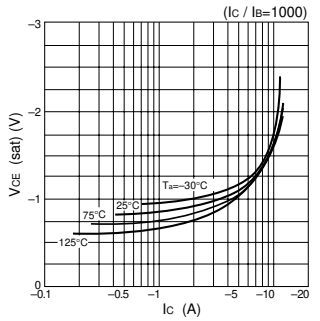

**$h_{FE}$-$I_C$ Characteristics (Typical)**



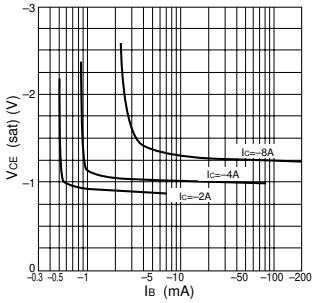

**$h_{FE}$-$I_C$ Temperature Characteristics (Typical)**



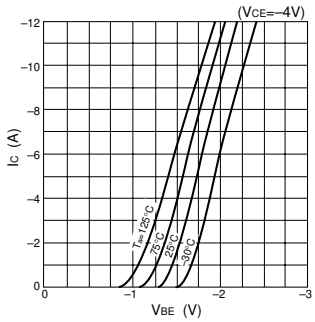

**$V_{CE}$(sat)-$I_C$ Temperature Characteristics (Typical)**



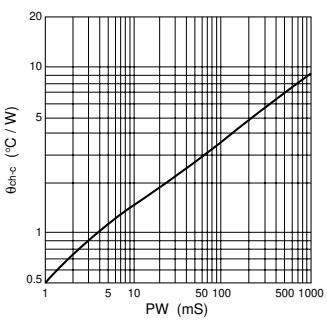

**$V_{CE}$(sat)-$I_B$ Characteristics (Typical)**



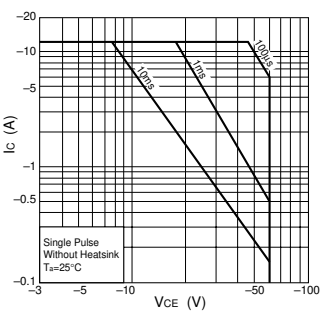

**$I_C$-$V_{BE}$ Temperature Characteristics (Typical)**




**$\theta_{j\text{-}a}$-PW Characteristics**




**Safe Operating Area (SOA)**




**$P_T$-$T_a$ Characteristics**