STA513A

N-channel

General purpose/3-phase motor drive

External dimensions Ⓒ ··· STA (10-pin)

Absolute maximum ratings (Ta=25°C)

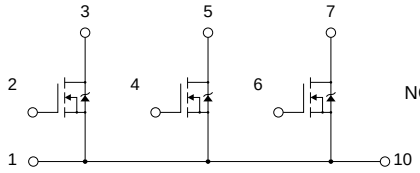
Symbol	Ratings	Unit
V_{DSS}	250	V
V_{GSS}	±20	V
I_D	3.5	A
$I_{D(pulse)}$	7 (PW≤1ms, duty≤1%)	A
V_{RSD}	250	V
I_{FSD}	7 (PW≤10ms)	A
E_{AS}*	25	mJ
I_{AS}	3.5	A
P_T	3.5 (Ta=25°C, with all circuits operating, without heatsink)	W
	15 (Tc=25°C, with all circuits operating, with infinite heatsink)	W
θ_{j-a}	35.7 (Junction-Air, Ta=25°C, with all circuits operating)	°C/W
θ_{j-c}	8.33 (Junction-Case, Tc=25°C, with all circuits operating)	°C/W
Tch	150	°C
Tstg	–40 to +150	°C

* : V_{DD}=25V, L=–4mH, I_D=3A, unclamped, R_G=50Ω, see Fig. E on page 15.

Electrical characteristics (Ta=25°C)

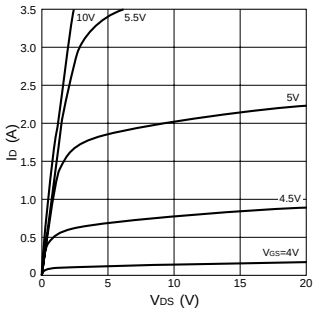
Symbol	Specification min	typ	max	Unit	Conditions
$V_{(BR)DSS}$	250			V	I_D=100μA, V_{GS}=0V
I_{GSS}			±100	nA	V_{GS}=±20V
I_{DSS}			100	μA	V_{DS}=250V, V_{GS}=0V
V_{TH}	2.0		4.0	V	V_{DS}=10V, I_D=1mA
$Re_{(yfs)}$	1.6	2.5		S	V_{DS}=10V, I_D=1.5A
$R_{DS(ON)}$		650	900	mΩ	V_{GS}=10V, I_D=1.5A
Ciss	175	250	325	pF	V_{DS}=10V,
Coss	110	160	210	pF	f=1.0MHz,
Crss	40	60	80	pF	V_{GS}=0V
$t_{d(on)}$	12	18	24	ns	I_D=1.5A,
t_r	21	30	40	ns	V_{DD}≒100V,
$t_{d(off)}$	56	80	104	ns	R_L=66.7Ω,
t_f	38	55	72	ns	V_{GS}=10V, R_{GS}=50Ω, see Fig. 3 on page 16.
V_{SD}		1.0	1.5	V	I_{SD}=3A, V_{GS}=0V
t_{rr}	50	75	150	ns	I_{SD}=3.5A, V_{GS}=0V, di/dt=100A/μs

■Equivalent circuit diagram

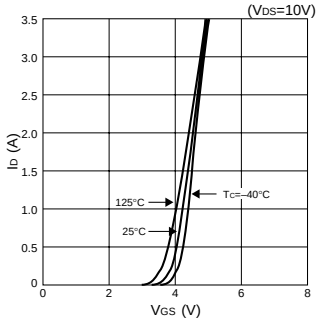


Characteristic curves

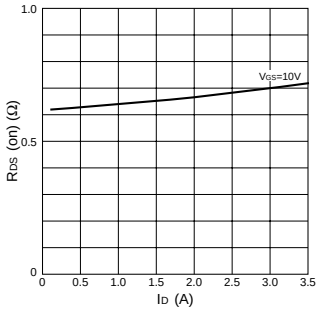
I_D-V_{DS} Characteristics (Typical)



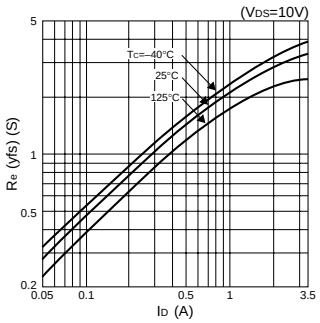
I_D-V_{GS} Characteristics (Typical)



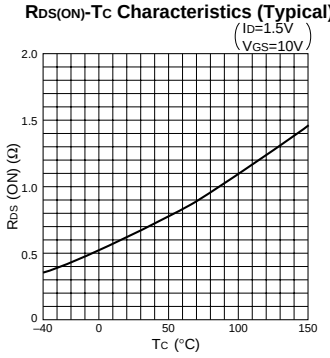
$R_{DS(ON)}$-I_D Characteristics (Typical)



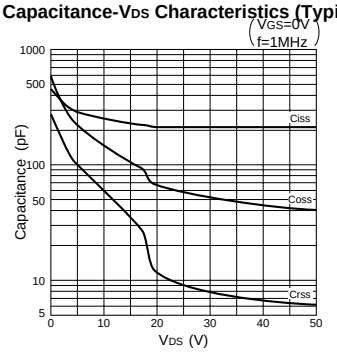
$Re_{(yfs)}$-I_D Characteristics (Typical)



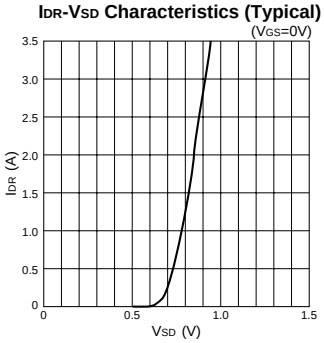
$R_{DS(ON)}$-T_C Characteristics (Typical)



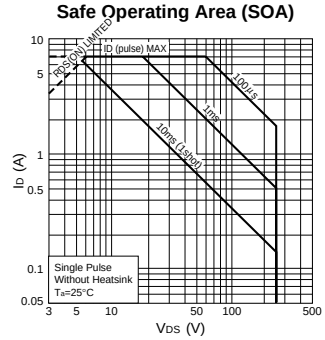
Capacitance-V_{DS} Characteristics (Typical)



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



Safe Operating Area (SOA)



P_T-T_a Characteristics