SMA5127

N-channel + P-channel

3-phase motor drive

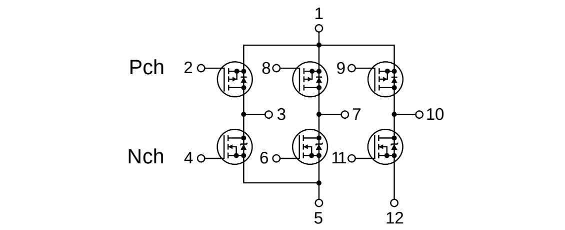
External dimensions Ⓑ···SMA

Absolute maximum ratings

(Ta=25°C)

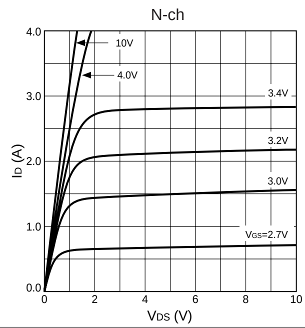
Symbol	Ratings: N channel	Ratings: P channel	Unit
V_{DSS}	60	–60	V
V_{GSS}	±20	∓20	V
I_D	4	–4	A
$I_{D(pulse)}$	8 (PW≤1ms, Duty≤1%)	–8 (PW≤1ms, Duty≤1%)	A
P_T	4 (Ta=25°C, with all circuits operating, without heatsink)		W
	28 (Tc=25°C, with all circuits operating, with infinite heatsink)		W
θ_{j-a}	31.25 (Junction-Air, Ta=25°C, with all circuits operating)		°C/W
θ_{j-c}	4.46 (Junction-Case, Tc=25°C, with all circuits operating)		°C/W
Tch	150		°C
Tstg	–40 to +150		°C

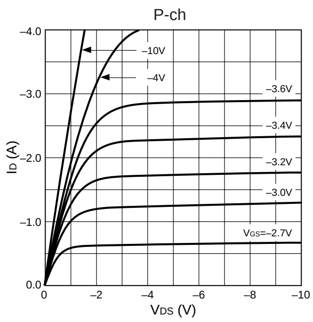
■Equivalent circuit diagram



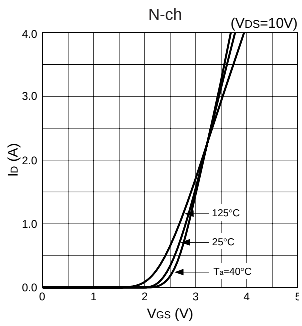
Characteristic curves

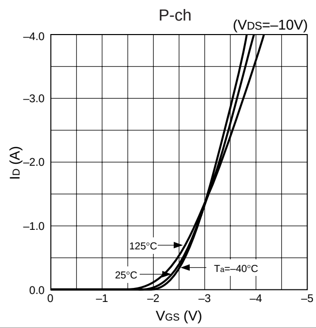
I_D-V_{DS} Characteristics (Typical)



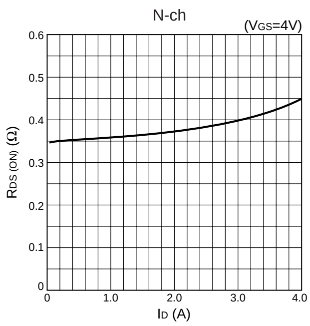


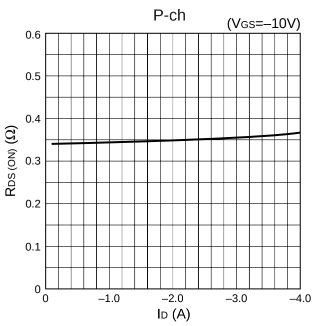
I_D-V_{GS} Characteristics (Typical)



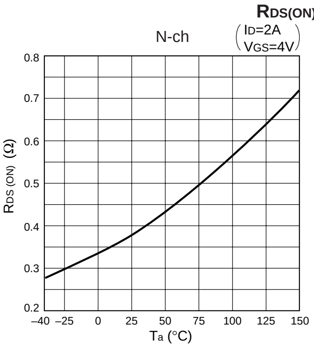


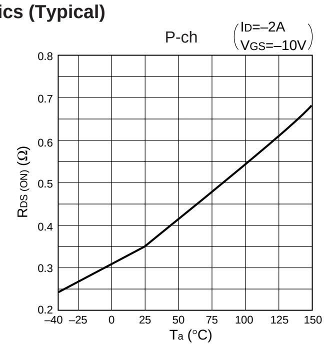
$R_{DS(ON)}$-I_D Characteristics (Typical)





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





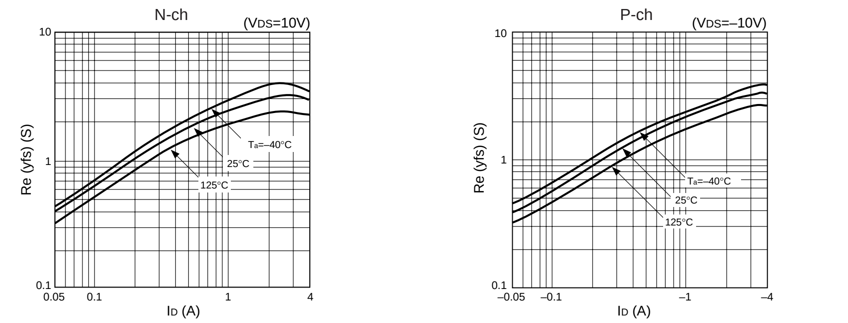
Electrical characteristics

(Ta=25°C)

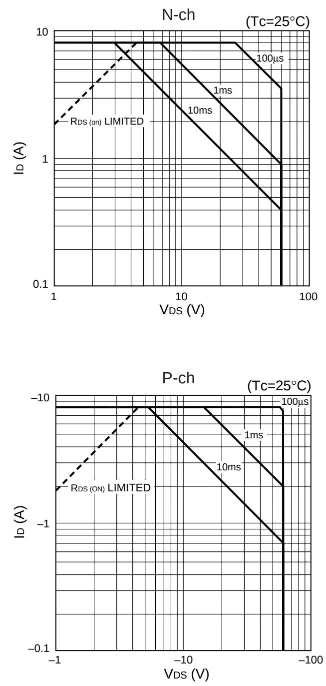
Symbol	N channel					P channel				
	Specification			Unit	Conditions	Specification			Unit	Conditions
	min	typ	max			min	typ	max		
$V_{(BR)DSS}$	60			V	I_D=100µA, V_{GS}=0V	–60			V	I_D=–100µA, V_{GS}=0V
I_{GSS}			±10	µA	V_{GS}=±20V			∓10	µA	V_{GS}=∓20V
I_{DSS}			100	µA	V_{DS}=60V, V_{GS}=0V			–100	µA	V_{DS}=–60V, V_{GS}=0V
V_{TH}	1.0		2.0	V	V_{DS}=10V, I_D=250µA	–1.0		–2.0	V	V_{DS}=–10V, I_D=–250µA
$Re_{(yfs)}$		2.5		S	V_{DS}=10V, I_D=2A		3		S	V_{DS}=–10V, I_D=–2A
$R_{DS(ON)}$			0.55	Ω	V_{GS}=4V, I_D=2A			0.55	Ω	V_{GS}=–10V, I_D=–2A
Ciss		150		pF	V_{DS}=10V, f=1.0MHz, V_{GS}=0V		320		pF	V_{DS}=–10V, f=1.0MHz, V_{GS}=0V
Coss		70		pF			130		pF	
Crss		15		pF			40		pF	
$t_{d(on)}$		12		ns	I_D=2A, V_{DD}≒20V, R_L=10Ω, V_{GS}=5V see Fig. 3 on page 16.		20		ns	I_D=–2A, V_{DD}≒–20V, R_L=10Ω, V_{GS}=–5V see Fig. 4 on page 16.
t_r		40		ns			95		ns	
$t_{d(off)}$		40		ns			70		ns	
t_f		25		ns			60		ns	
V_{SD}		1.2		V	I_{SD}=5A, V_{GS}=0V		1.1		V	I_{SD}=–4A, V_{GS}=0V
t_{rr}		75		ns	I_{SD}=2A, V_{GS}=0V di/dt=100A/µs		75		ns	I_{SD}=–2A, V_{GS}=0V di/dt=100A/µs

Characteristic curves

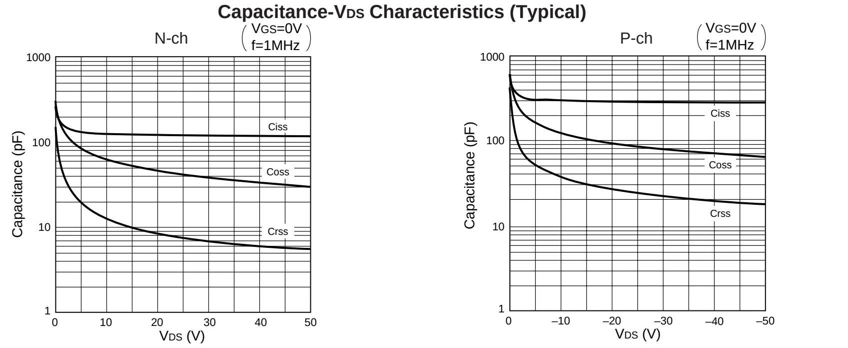
Re(yfs)-ID Characteristics (Typical)



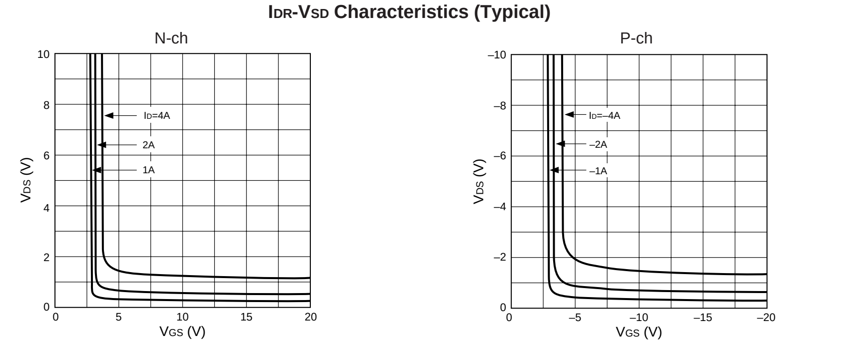
Safe Operating Area (SOA)



Capacitance-VDS Characteristics (Typical)



IDR-VSD Characteristics (Typical)



PT-Ta Characteristics