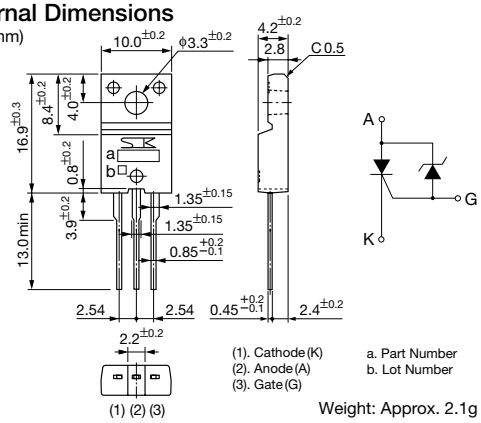
TO-220F 3A Thyristor with built-in Avalanche diode

TFD312S series

■Features

- ●With built-in Avalanche diode
- ●Average on-state current: $I_{T(AV)}$=3A
- ●Gate trigger current: I_{GT}=10mA max
- ●Isolation voltage: V_{ISO}=1500V(50Hz AC, RMS, 1min.)

External Dimensions
(Unit: mm)



(1). Cathode (K)
(2). Anode (A)
(3). Gate (G)

a. Part Number
b. Lot Number

Weight: Approx. 2.1g

■Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Conditions
Repetitive peak off-state voltage	V_{DRM}	*	V	Tj=−10 to +125°C, R_{GK}=1kΩ
Average on-state current	$I_{T(AV)}$	3.0	A	50Hz Half-cycle sinewave, 180°, Continuous current, Tc=92°C
RMS on-state current	$I_{T(RMS)}$	4.7	A	
Surge on-state current	I_{TSM}	60	A	50Hz Half-cycle sinewave, Peak value, Non-repetitive, Tj=125°C
Squared rated current and time product	I^2t	18	A^2・sec	2ms≦t≦10ms
Peak forward gate voltage	V_{FGM}	1.5	V	f≧50Hz, duty≦10%
Peak reverse gate voltage	V_{RGM}	5.0	V	f≧50Hz
Peak gate power loss	P_{GM}	5.0	W	f≧50Hz, duty≦10%
Average gate power loss	$P_{G(AV)}$	0.5	W	
Junction temperature	Tj	−10 to +125	°C	
Storage temperature	Tstg	−40 to +125	°C	
Isolation voltage	V_{ISO}	1500	V	50Hz Sine wave, RMS, Terminal to case, 1min.

*V_{DRM}

Rank	-C	-F	-G	-J	-K	-L	-M	-N	-O
Ratings	20	35	45	80	100	120	145	170	190

■Electrical Characteristics

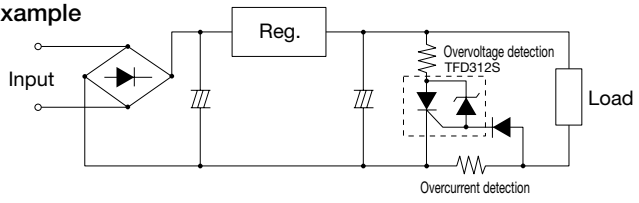
(Tj=25°C, unless otherwise specified)

Parameter	Symbol	Ratings min	Ratings typ	Ratings max	Unit	Conditions
Off-state current	I_{DRM}			1.0	mA	Tj=125°C, V_D=V_{DRM}, R_{GK}=1kΩ
				100	μA	Tj=25°C, V_D=V_{DRM}, R_{GK}=1kΩ
Breakover voltage	V_{BO}		*		V	
Breakover current	I_{BO}	0.2		15	mA	
On-state voltage	V_{TM}			1.4	V	I_{TM}=5A
Gate trigger voltage	V_{GT}			1.0	V	V_D=6V, R_L=10Ω
Gate trigger current	I_{GT}	0.2		10	mA	
Gate non-trigger voltage	V_{GT}	0.1			V	V_D=V_{DRM}, Tj=125°C, R_{GK}=1kΩ
Holding current	I_H			15	mA	R_{GK}=1kΩ, Tj=125°C
Critical rate-of-rise of off-state voltage	dv/dt		40		V/μS	V_D=V_{DRM}, Tj=125°C, R_{GK}=1kΩ, C_{GK}=0.033μF
Thermal resistance	Rth			5.0	°C/W	Junction to case

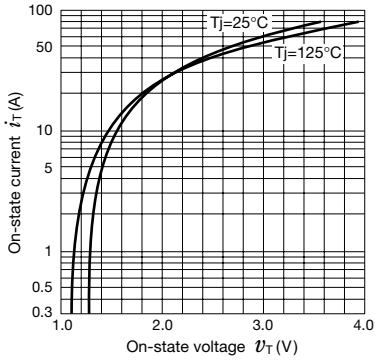
*V_{BO}

Rank		-C	-F	-G	-J	-K	-L	-M	-N	-O
Ratings	min	27	50	60	90	115	140	163	185	210
	typ	30	55	65	100	125	150	175	200	225
	max	33	60	70	110	135	160	187	215	240

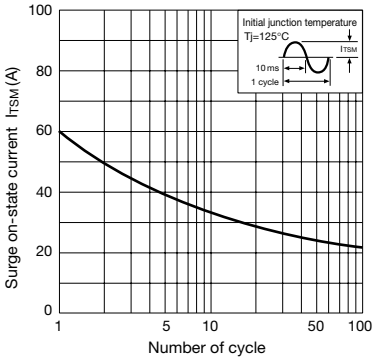
Application example



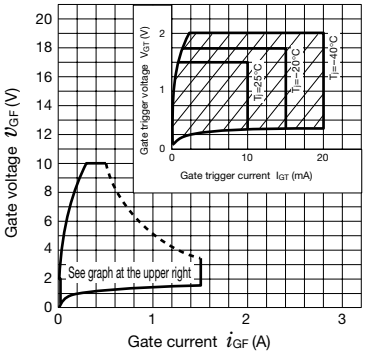
$v_T - i_T$ Characteristics (max)



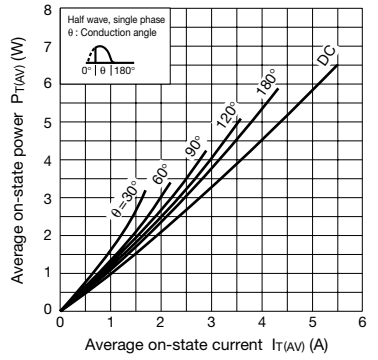
ITSM Ratings



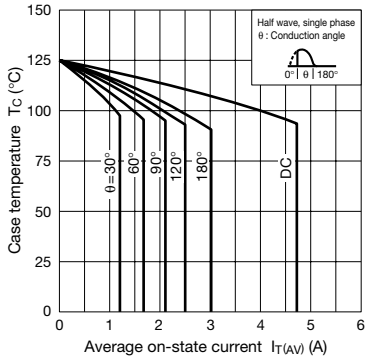
Gate Characteristics



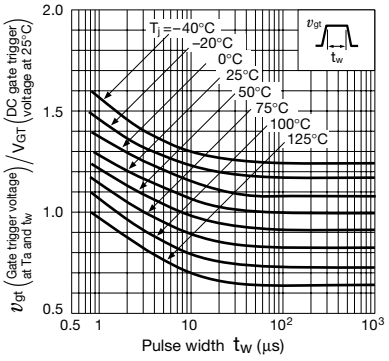
IT(AV) – PT(AV) Characteristics



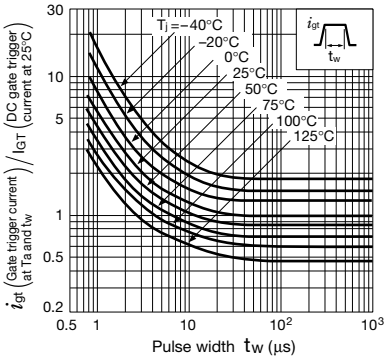
IT(AV) – Tc Ratings



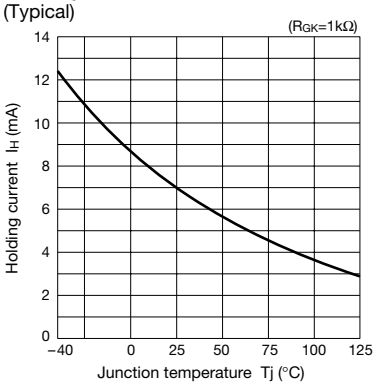
Pulse trigger temperature Characteristics v_{gt} (Typical)



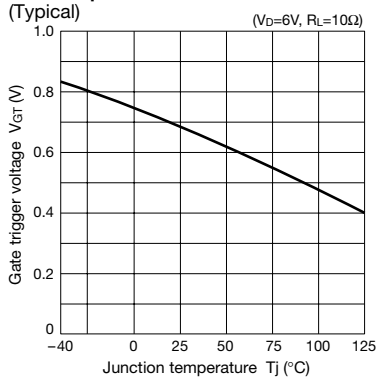
Pulse trigger temperature Characteristics i_{gt} (Typical)



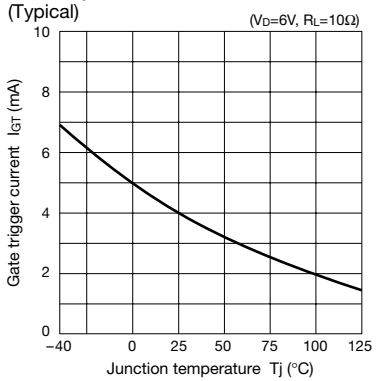
IH temperature Characteristics (Typical)



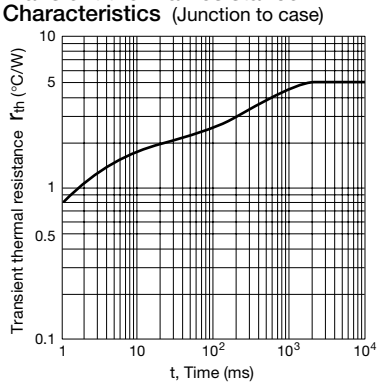
VGT temperature Characteristics (Typical)



IGT temperature Characteristics (Typical)



Transient thermal resistance Characteristics (Junction to case)



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