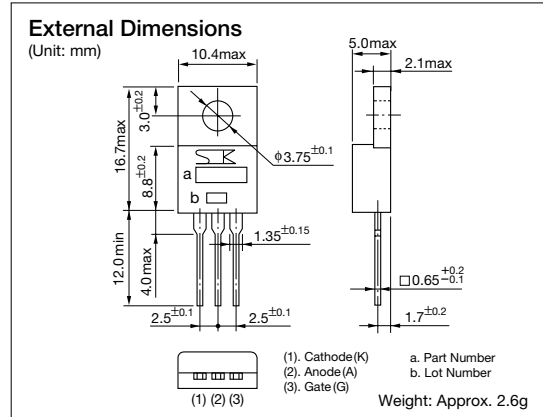# TF521M, TF541M, TF561M

■Features

● Repetitive peak off-state voltage: V_{DRM}=200, 400, 600V

● Average on-state current: $I_{T(AV)}$=5A

● Gate trigger current: I_{GT}=15mA max

External Dimensions
(Unit: mm)

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

a. Part Number
b. Lot Number

(1) (2) (3)　　Weight: Approx. 2.6g

■Absolute Maximum Ratings

Parameter	Symbol	Ratings			Unit	Conditions
		TF521M	TF541M	TF561M		
Repetitive peak off-state voltage	V_{DRM}	200	400	600	V	Tj=−40 to +125°C, R_{GK}=1kΩ
Repetitive peak reverse voltage	V_{RRM}	200	400	600	V	
Non-repetitive peak off-state voltage	V_{DSM}	300	500	700	V	
Non-repetitive peak reverse voltage	V_{RSM}	300	500	700	V	
Average on-state current	$I_{T(AV)}$	5.0			A	50Hz Half-cycle sinewave, Continuous current, Tc=96°C
RMS on-state current	$I_{T(RMS)}$	7.8			A	
Surge on-state current	I_{TSM}	80			A	50Hz Half-cycle sinewave, Single shot, Non-repetitive, Tj=125°C
Peak forward gate current	I_{FGM}	2.0			A	f≧50Hz, duty≦10%
Peak forward gate voltage	V_{FGM}	10			V	
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	−40 to +125			°C	
Storage temperature	Tstg	−40 to +125			°C	

■Electrical Characteristics

Parameter	Symbol	Ratings			Unit	Conditions
		min	typ	max		
Off-state current	I_{DRM}			2.0	mA	Tj=125°C, V_D=V_{DRM}(V_{RRM}), R_{GK}=1kΩ
Reverse current	I_{RRM}			2.0	mA	
On-state voltage	V_{TM}			1.4	V	T_C=25°C, I_{TM}=10A
Gate trigger voltage	V_{GT}			1.5	V	V_D=6V, R_L=10Ω, T_C=25°C
Gate trigger current	I_{GT}		3.0	15	mA	
Gate non-trigger voltage	V_{GD}	0.1			V	V_D=1/2×V_{DRM}, Tj=125°C, R_{GK}=1kΩ
Holding current	I_H		4.0		mA	R_{GK}=1kΩ, Tj=25°C
Critical rate-of-rise of off-state voltage	dv/dt		50		V/μS	V_D=1/2×V_{DRM}, Tj=125°C, R_{GK}=1kΩ, C_{GK}=0.033μF
Turn-off time	tq		30		μS	Tc=25°C
Thermal resistance	Rth			3.0	°C/W	Junction to case

10

$v_T - i_T$ Characteristics (max)

On-state current i_T (A) vs On-state voltage v_T (V)

Tj = 125°C
Tj = 25°C

I$_{TSM}$ Ratings

Surge on-state current I_{TSM} (A) vs Number of cycle

Initial junction temperature Tj = 125°C
10 ms
1 cycle
I_{TSM}

Gate Characteristics

Gate voltage v_{GF} (V) vs Gate current i_{GF} (A)

P_{GM} = 5W
See graph at the upper right

Gate trigger voltage V_{GT} (V) vs Gate trigger current I_{GT} (mA)
Tj = 25°C
Tj = −20°C
Tj = −40°C
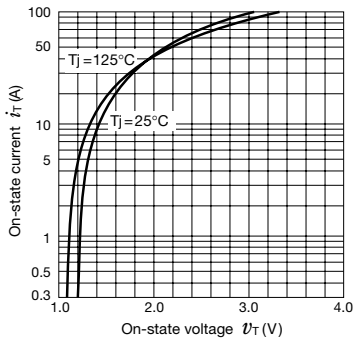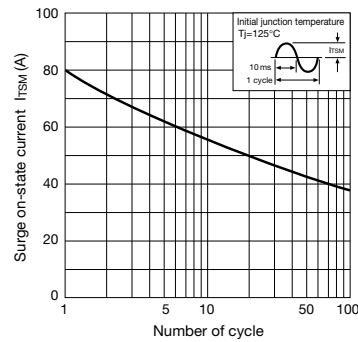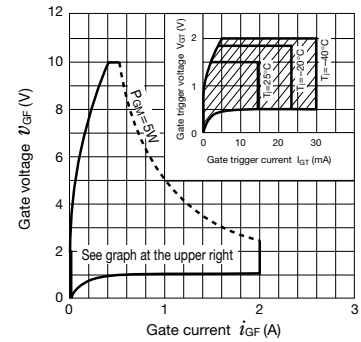
I$_{T(AV)}$ − P$_{T(AV)}$ Characteristics

Average on-state power $P_{T(AV)}$ (W) vs Average on-state current $I_{T(AV)}$ (A)

50Hz Half-cycle sinewave
θ : Conduction angle
0° | θ | 180°
θ=30°, 60°, 90°, 120°, 150°, 180°, DC

I$_{T(AV)}$ − Tc Ratings

Case temperature T_C (°C) vs Average on-state current $I_{T(AV)}$ (A)

50Hz Half-cycle sinewave
θ: Conduction angle
180° | θ | 0°
θ=30°, 60°, 90°, 120°, 150°, 180°, DC
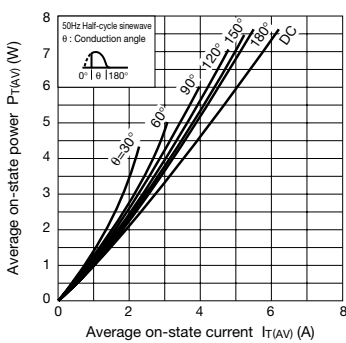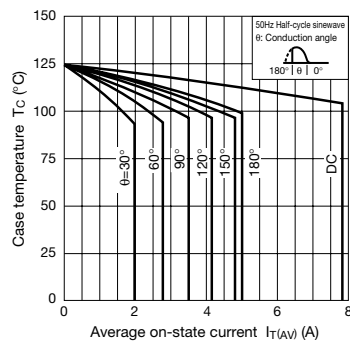
Pulse trigger temperature Characteristics v_{gt} (Typical)

v_{gt} (Gate trigger voltage at Ta and tw) / V_{GT} (DC gate trigger voltage at 25°C) vs Pulse width t_w (µs)

v_{gt} 50%, t_w
T_C = −40°C, −20°C, 25°C, 75°C, 125°C
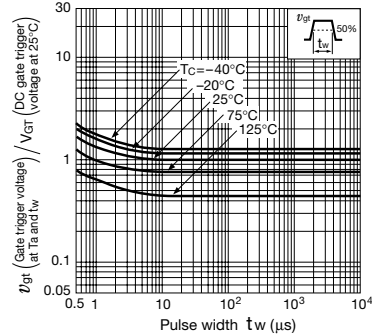
Pulse trigger temperature Characteristics i_{gt} (Typical)
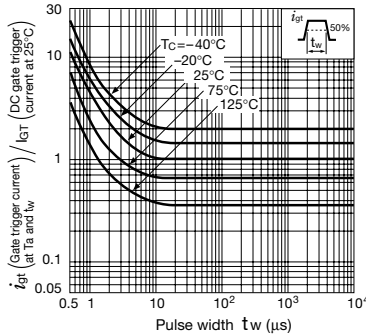
i_{gt} (Gate trigger current at Ta and tw) / I_{GT} (DC gate trigger current at 25°C) vs Pulse width t_w (µs)
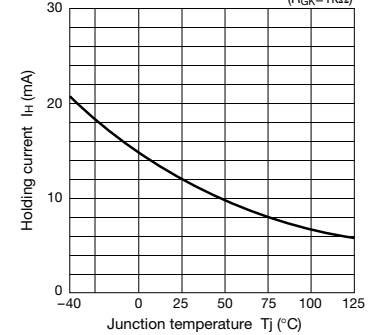
i_{gt} 50%, t_w
T_C = −40°C, −20°C, 25°C, 75°C, 125°C

I$_H$ temperature Characteristics (Typical)

(R_{GK} = 1kΩ)

Holding current I_H (mA) vs Junction temperature T_j (°C)

V$_{GT}$ temperature Characteristics (Typical)

(V_D = 6V, R_L = 10Ω)

Gate trigger voltage V_{GT} (V) vs Junction temperature T_j (°C)

I$_{GT}$ temperature Characteristics (Typical)

(V_D = 6V, R_L = 10Ω)

Gate trigger current I_{GT} (mA) vs Junction temperature T_j (°C)
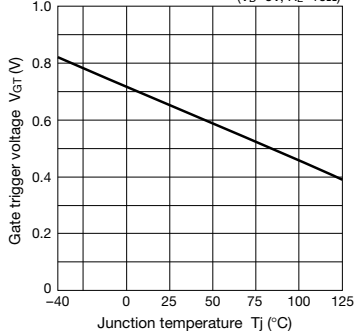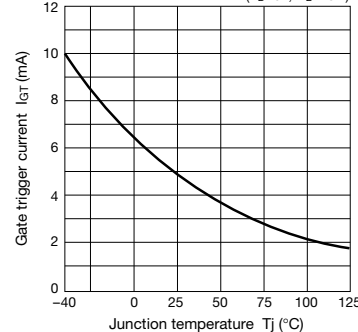
Transient thermal resistance Characteristics (Junction to case)

Transient thermal resistance r_{th} (°C/W) vs t, Time (ms)

11