# TM1241S-L, TM1261S-L

■Features

- ●Repetitive peak off-state voltage: V$_{DRM}$=400, 600V
- ●RMS on-state current: I$_{T(RMS)}$=12A
- ●Gate trigger current: I$_{GT}$=30mA max (MODE Ⅰ, Ⅱ, Ⅲ)
- ●Isolation voltage: V$_{ISO}$=1500V (50Hz Sine wave, RMS)
- ●UL approved type available

External Dimensions
(Unit: mm)

(1). Terminal 1 (T$_1$)   a. Part Number
(2). Terminal 2 (T$_2$)   b. Lot Number
(3). Gate (G)

(1) (2) (3)   Weight: Approx. 2.1g
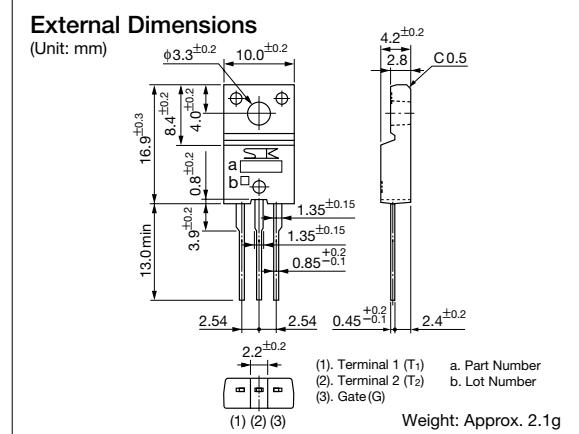
■Absolute Maximum Ratings

Parameter	Symbol	Ratings		Unit	Conditions
		TM1241S-L	TM1261S-L		
Repetitive peak off-state voltage	V$_{DRM}$	400	600	V	
RMS on-state current	I$_{T(RMS)}$	12.0		A	Conduction angle 360°, Tc=85°C
Surge on-state current	I$_{TSM}$	120		A	50Hz full-cycle sinewave, Peak value, Non-repetitive, Tj=125°C
Peak gate voltage	V$_{GM}$	10		V	
Peak gate current	I$_{GM}$	2		A	
Peak gate power loss	P$_{GM}$	5		W	
Average gate power loss	P$_{G(AV)}$	0.5		W	
Junction temperature	Tj	−40 to +125		°C	
Storage temperature	Tstg	−40 to +125		°C	
Isolation voltage	V$_{ISO}$	1500		Vrms	50Hz Sine wave, RMS, Terminal to Case, 1 min.

■Electrical Characteristics

(Tj=25°C, unless otherwise specified)

Parameter		Symbol	Ratings			Unit	Conditions	
			min	typ	max			
Off-state current		I$_{DRM}$		0.3	2.0	mA	V$_D$=V$_{DRM}$, R$_{GK}$=∞, Tj=125°C	
					0.1		V$_D$=V$_{DRM}$, R$_{GK}$=∞, Tj=25°C	
On-state voltage		V$_{TM}$			1.6	V	Pulse test, I$_{TM}$=16A	
Gate trigger voltage	Ⅰ	V$_{GT}$		0.8	2.0	V	V$_D$=6V, R$_L$=10Ω, T$_C$=25°C	T$_2^+$, G$^+$
	Ⅱ			0.7	2.0			T$_2^+$, G$^-$
	Ⅲ			0.8	2.0			T$_2^-$, G$^-$
	Ⅳ			1.0				T$_2^-$, G$^+$
Gate trigger current	Ⅰ	I$_{GT}$		12	30	mA	V$_D$=6V, R$_L$=10Ω, T$_C$=25°C	T$_2^+$, G$^+$
	Ⅱ			16	30			T$_2^+$, G$^-$
	Ⅲ			25	30			T$_2^-$, G$^-$
	Ⅳ			70				T$_2^-$, G$^+$
Gate non-trigger voltage		V$_{GD}$	0.2			V	V$_D$=1/2×V$_{DRM}$, Tj=125°C	
Holding current		I$_H$		20		mA	V$_D$=6V	
Thermal resistance		Rth			3.0	°C/W	Junction to case	

$v_T - i_T$ 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=-40°C
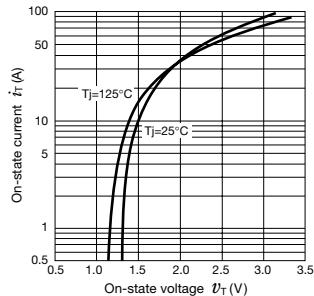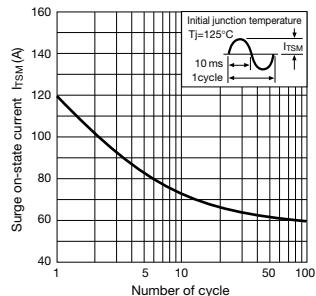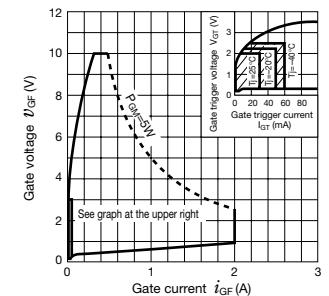
$I_{T(RMS)} - P_{T(AV)}$ Characteristics
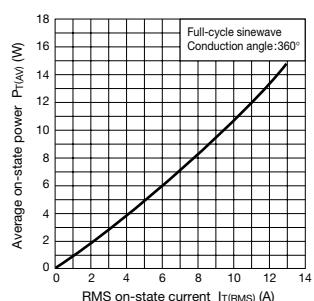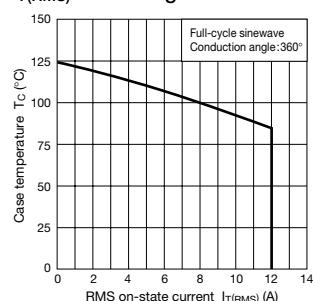
Average on-state power $P_{T(AV)}$ (W) vs RMS on-state current $I_{T(RMS)}$ (A)

Full-cycle sinewave
Conduction angle : 360°

$I_{T(RMS)} - Tc$ Ratings

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

Full-cycle sinewave
Conduction angle : 360°

$I_{T(RMS)} - Ta$ Ratings

Ambient temperature T_a (°C) vs RMS on-state current $I_{T(RMS)}$ (A)

Full-cycle sinewave
Conduction angle : 360°
Self-supporting
Natural cooling
No wind

I_H temperature Characteristics (Typical)

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

$(V_D$=30V, R_{GK}=∞$)$

$(T_2{}^+ - T_1{}^-)$
$(T_2{}^- - T_1{}^+)$
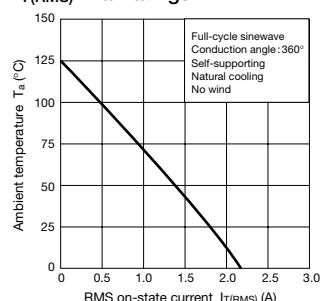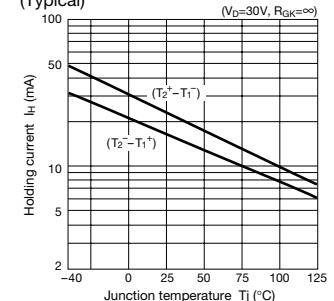
Pulse trigger temperature Characteristics v_{gt} (Typical)

(MODE-I)

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

Tj=-40°C, -20°C, 0°C, 25°C, 50°C, 75°C, 100°C, 125°C

(MODE-II)

Tj=-40°C, -20°C, 0°C, 25°C, 50°C, 75°C, 100°C, 125°C

(MODE-III)

Tj=-40°C, -20°C, 0°C, 25°C, 50°C, 75°C, 100°C, 125°C
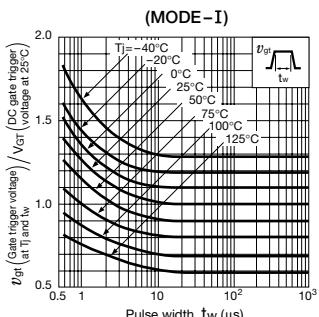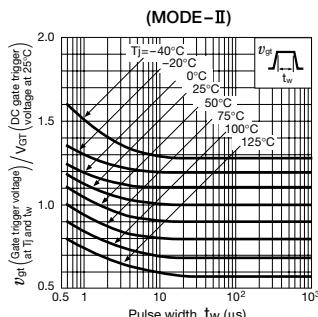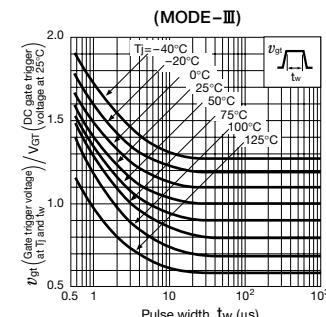
Pulse trigger temperature Characteristics i_{gt} (Typical)
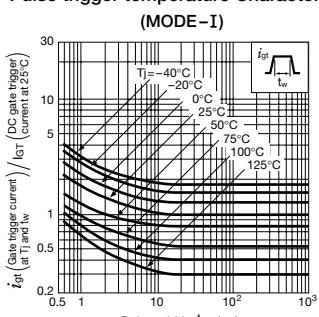
(MODE-I)
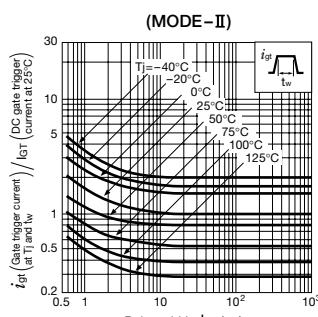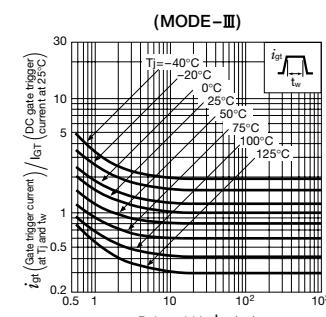
i_{gt} (Gate trigger current at Tj and tw) / I_{GT} (DC gate trigger current at 25°C) vs Pulse width t_W (μs)

Tj=-40°C, -20°C, 0°C, 25°C, 50°C, 75°C, 100°C, 125°C

(MODE-II)

Tj=-40°C, -20°C, 0°C, 25°C, 50°C, 75°C, 100°C, 125°C

(MODE-III)

Tj=-40°C, -20°C, 0°C, 25°C, 50°C, 75°C, 100°C, 125°C

V_{GT} temperature characteristics (Typical)

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

$(V_D$=6V, R_L=10Ω$)$

MODE III $(T_2{}^-, G^-)$
MODE I $(T_2{}^+, G^+)$
MODE II $(T_2{}^+, G^-)$

I_{GT} temperature characteristics (Typical)

Gate trigger current I_{GT} (mA) vs Junction temperature Tj (°C)

$(V_D$=6V, R_L=10Ω$)$

MODE III $(T_2{}^-, G^-)$
MODE II $(T_2{}^+, G^-)$
MODE I $(T_2{}^+, G^+)$
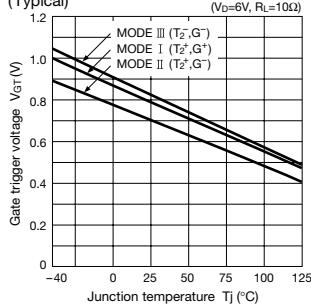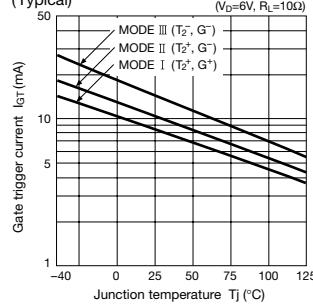
Transient thermal resistance Characteristics

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

Junction to operating environment
Junction to case