

Features

- On-state rms current, $I_{T(RMS)}$ 1 A
- Repetitive peak off-state voltage, $V_{DRM/VRM}$ 600 or 800 V
- Triggering gate current, $I_{GT(Q1)}$ 3 to 25 mA

Applications

- AC switching
- Home appliances

Description

The Z01 series is suitable for general purpose AC switching applications. These devices are typically used in applications such as home appliances (electrovalve, pump, door lock, small lamp control), fan speed controllers,...

Different gate current sensitivities are available, allowing optimized performance when driven directly through microcontroller.

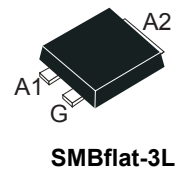
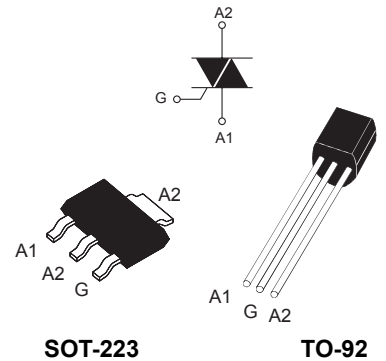
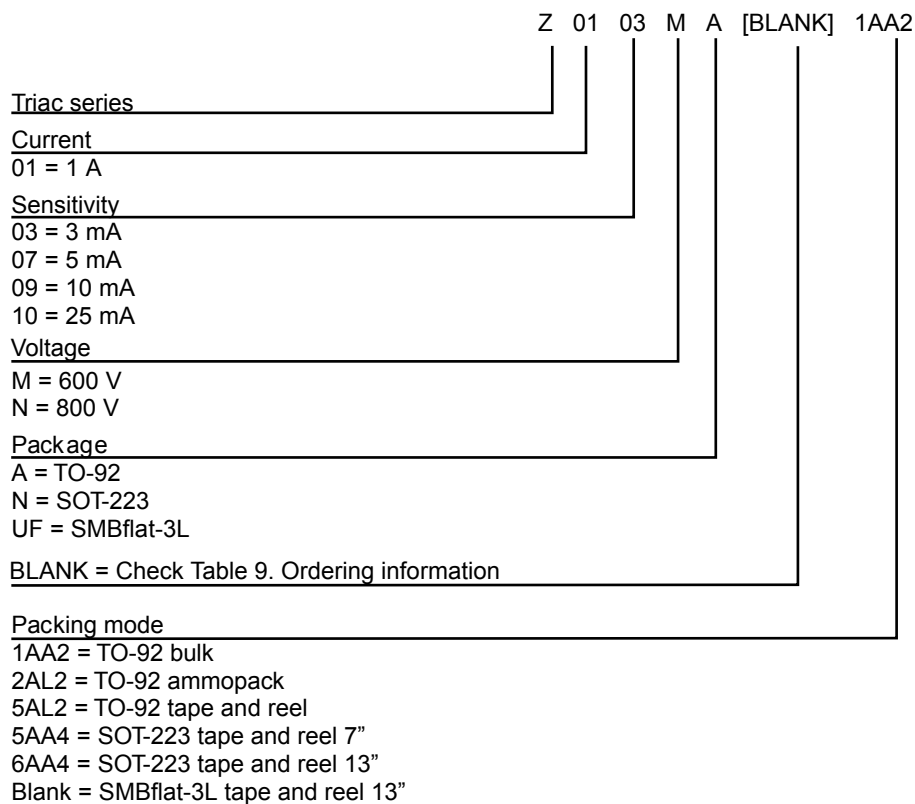


Figure1. Ordering information scheme



1 Characteristics

Table 1. Absolute maximum ratings

Symbol	Parameters	Value	Unit	
$I_{T(RMS)}$	RMS on-state current (full sine wave)	SOT-223 $T_{tab} = 90\text{ °C}$	1	A
		TO-92 $T_L = 50\text{ °C}$		
		SMBflat-3L $T_{tab} = 107\text{ °C}$		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz $t_p = 20\text{ ms}$	8	A
		F = 60 Hz $t_p = 16.7\text{ ms}$	8.5	
I^2t	I^2t value for fusing	$t_p = 10\text{ ms}$	0.35	A ² s
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$	F = 120 Hz $T_j = 125\text{ °C}$	20	A/ μ s
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu$ s $T_j = 125\text{ °C}$	1	A
$P_{G(AV)}$	Average gate power dissipation	$T_j = 125\text{ °C}$	1	W
T_{stg}	Storage junction temperature range		-40 to +150	°C
T_j	Operating junction temperature range		-40 to +125	°C

Table 2. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Parameters	Quadrant	Value				Unit	
			Z01					
			03	07	09	10		
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$, $R_L = 30\text{ }\Omega$	I - II - III	Max.	3	5	10	25	mA
		IV		5	7	10	25	
V_{GT}		All	Max.	1.3				V
V_{GD}	$V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$, $T_j = 125\text{ °C}$	All	Min.	0.2				V
$I_H^{(2)}$	$I_T = 50\text{ mA}$		Max.	7	10	10	25	mA
I_L	$I_G = 1.2 I_{GT}$	I - III - IV	Max.	7	10	15	25	mA
		II	Max.	15	20	25	50	
$dV/dt^{(2)}$	$V_D = 67\% V_{DRM}$ gate open, $T_j = 110\text{ °C}$		Min.	10	20	50	100	V/ μ s
$(dV/dt)c^{(2)}$	$(di/dt)c = 0.44\text{ A/ms}$, $T_j = 110\text{ °C}$		Min.	0.5	1	2	5	V/ μ s

1. Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.

2. For both polarities of A2 referenced to A1

Table 3. Static electrical characteristics

Symbol	Test conditions	T _j		Value	Unit
V _T ⁽¹⁾	I _{TM} = 1.4 A, t _p = 380 μs	25 °C	Max.	1.60	V
V _{TO} ⁽¹⁾	Threshold on-state voltage	125 °C	Max.	0.95	V
R _d	Dynamic resistance	125 °C	Max.	400	mΩ
I _{DRM} I _{RDM}	V _{DRM} = V _{RDM}	25 °C	Max.	5	μA
		125 °C		0.5	mA

1. For both polarities of A2 referenced to A1

Table 4. Thermal resistance

Symbol	Parameters		Max. value	Unit
R _{th(j-t)}	Max. junction to tab (AC)	SOT-223	25	°C/W
		SMBflat-3L	14	
R _{th(j-l)}	Max. junction to lead (AC)	TO-92	60	
R _{th(j-a)}	Junction to ambient (S ⁽¹⁾ = 5 cm ²)	SOT-223	60	
		SMBflat-3L	75	
	Junction to ambient	TO-92	150	

1. Copper surface under tab.

1.1 Characteristics (curves)

Figure2. Maximum power dissipation versus on-state RMS current (full cycle)

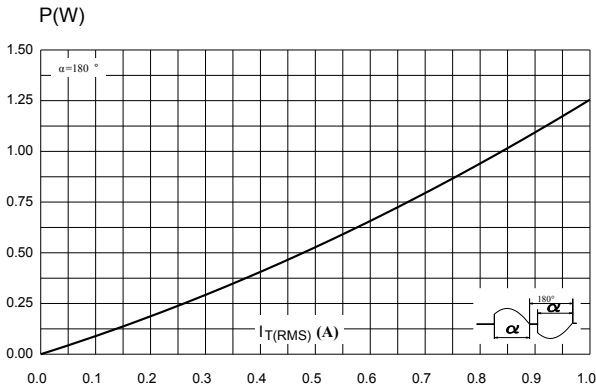


Figure3. RMS on-state current versus lead (TO-92) or tab (SOT-223, SMBflat-3L) temperature (full cycle)

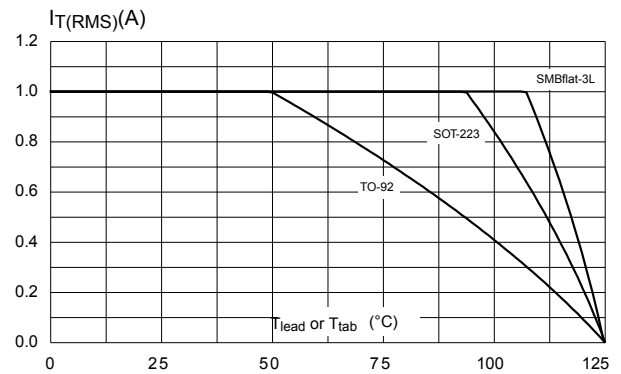


Figure4. On-state rms current versus ambient temperature (free air convection full cycle)

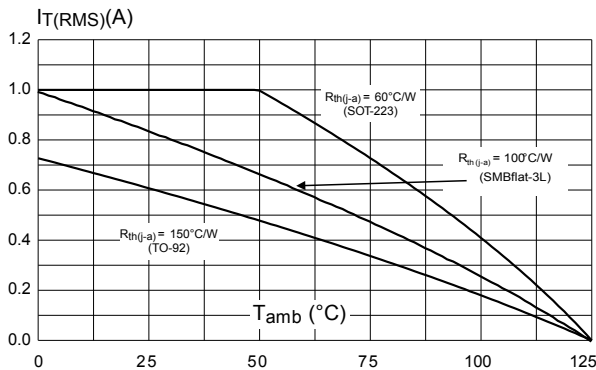


Figure5. Relative variation of thermal impedance versus pulse duration ($Z_{th(j-a)}$)

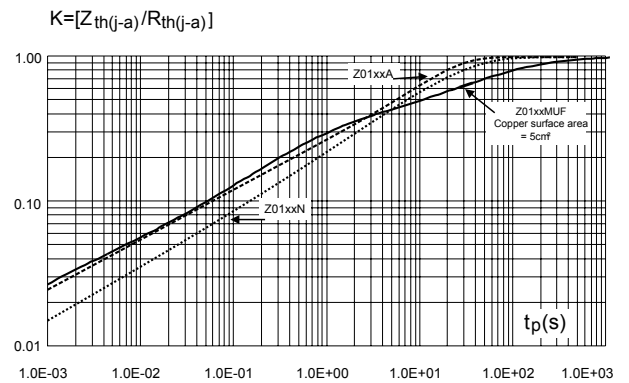


Figure6. Relative variation of holding current and latching current versus junction temperature (typ. values)

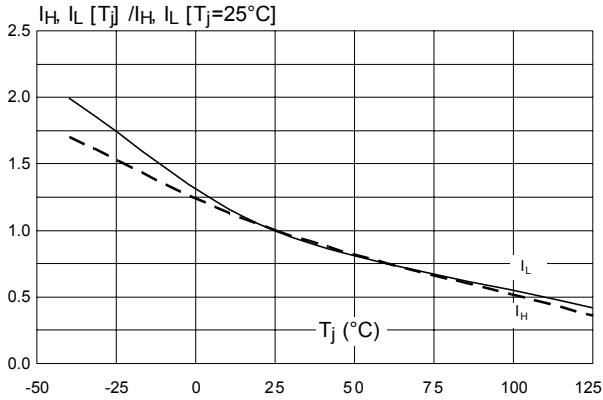


Figure7. Relative variation of gate trigger current (I_{GT}) and voltage (V_{GT}) versus junction temperature

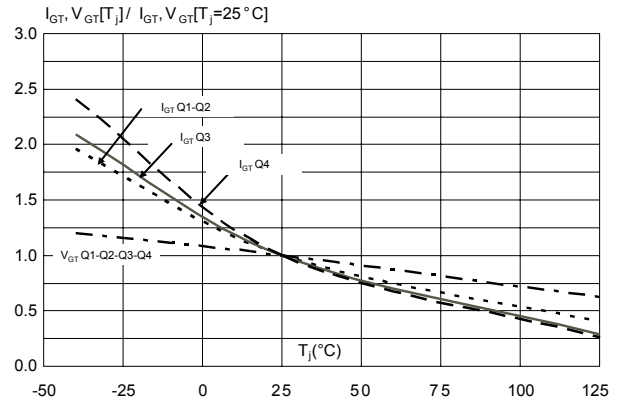


Figure8. Surge peak on-state current versus number of cycles

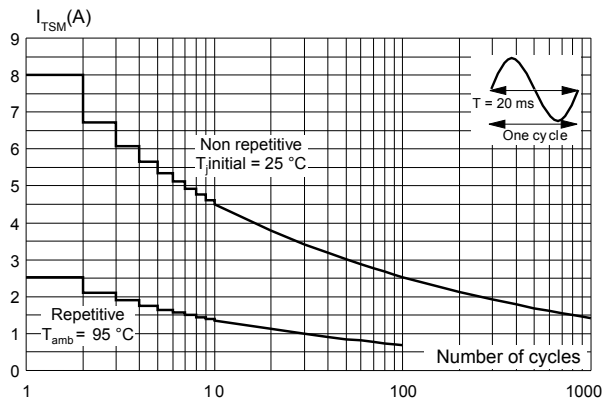


Figure9. Non-repetitive surge peak on-state current and corresponding value of I^2t sinusoidal pulse width

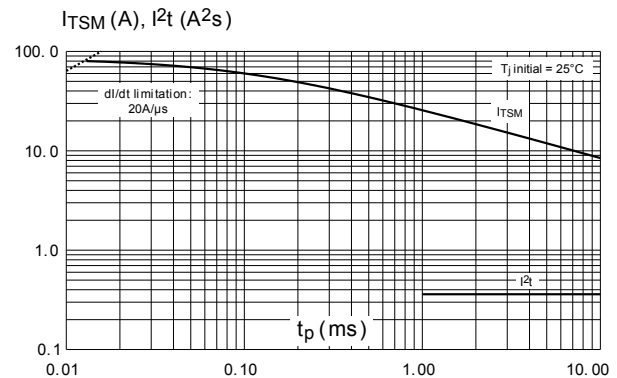


Figure10. On-state characteristics (maximum values) ($I_{TM} = f(V_{TM})$)

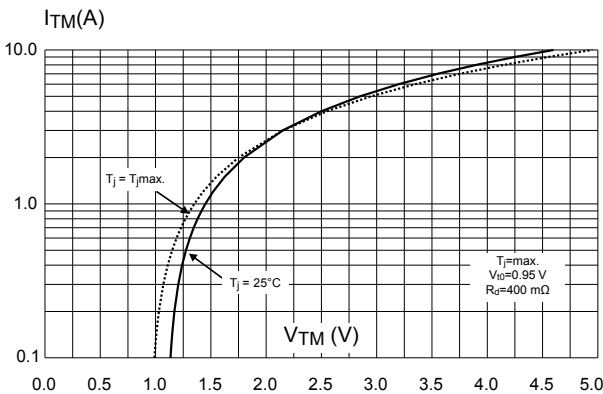


Figure11. Relative variation of critical rate of decrease of main current (dI/dt) versus junction temperature

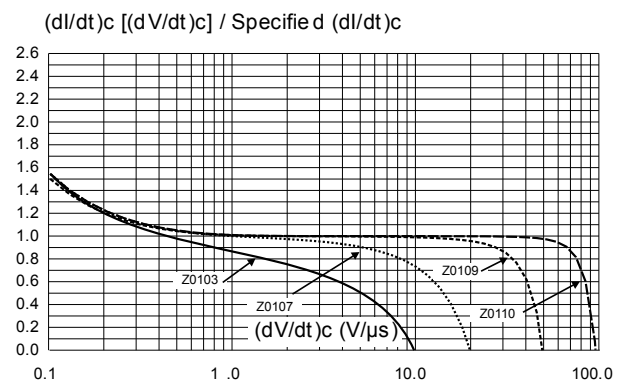


Figure12. Relative variation of critical rate of decrease of main current (dI/dt) versus junction temperature

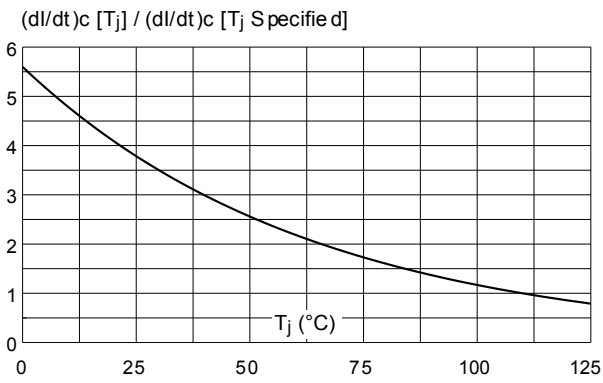


Figure13. SOT-223 and SMBflat-3L thermal resistance junction to ambient versus copper surface under case

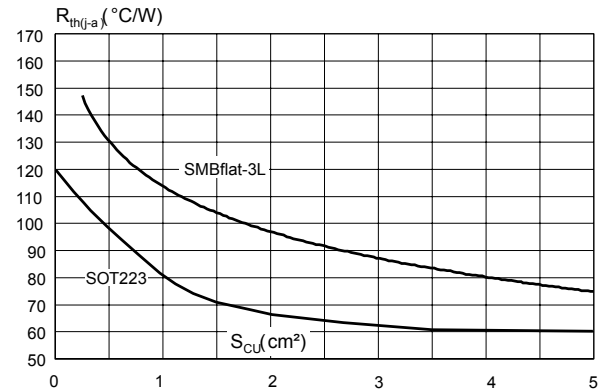


Figure14. Relative variation of static dV/dt immunity versus junction temperature (gate open)

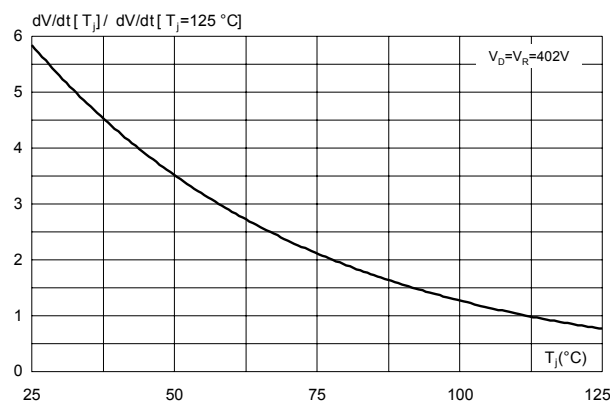


Figure15. SOT-223 package outline

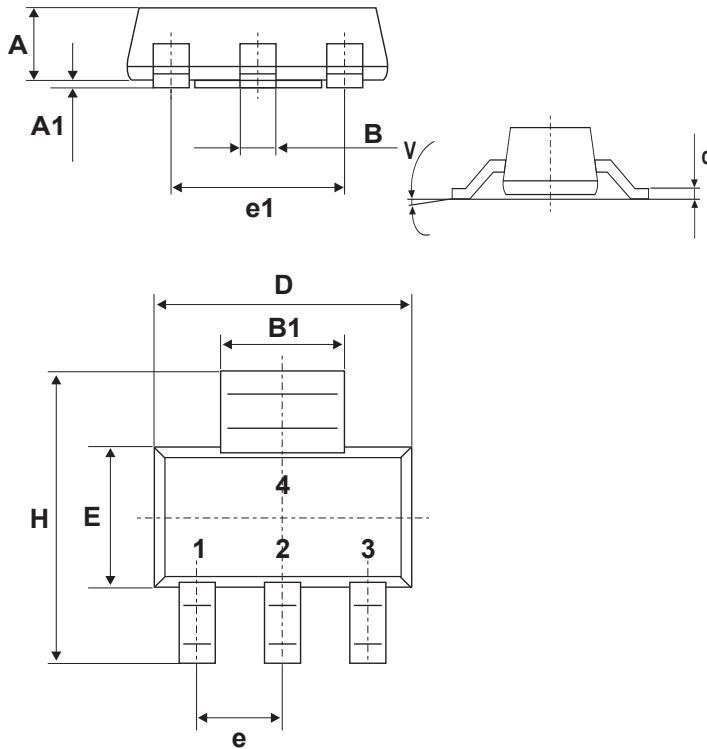


Table 5. SOT-223 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.80			0.0709
A1		0.02	0.10		0.0008	0.0039
B	0.60	0.70	0.85	0.024	0.0276	0.0335
B1	2.90	3.00	3.15	0.114	0.1181	0.1240
c	0.24	0.26	0.35	0.009	0.0102	0.0138
D	6.30	6.50	6.70	0.248	0.2559	0.2638
e		2.3			0.0906	
e1		4.6			0.1811	
E	3.30	3.50	3.70	0.130	0.1378	0.1457
H	6.70	7.00	7.30	0.264	0.2756	0.2874
V	10° max.					

1. Inches only for reference

Figure16. SOT-223 footprint (dimensions in mm)

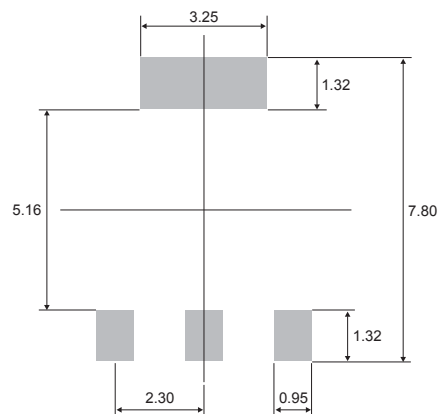


Figure17. TO-92 package outline

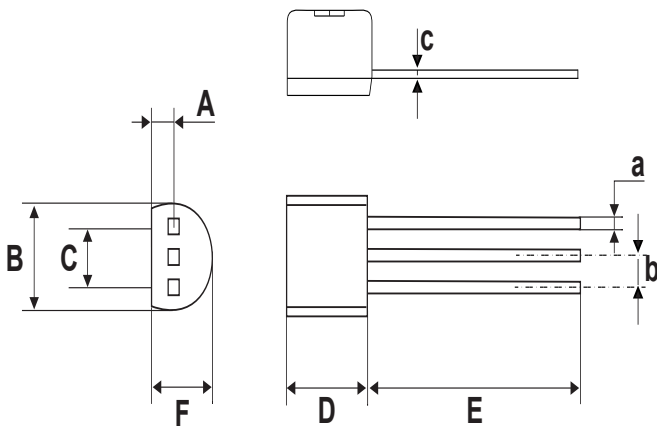


Table 6. TO-92 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches ⁽¹⁾		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		1.35			0.0531	
B			4.70			0.1850
C		2.54			0.1000	
D	4.40			0.1732		
E	12.70			0.5000		
F			3.70			0.1457
a			0.50			0.0197
b		1.27			0.500	
c			0.48			0.0189

1. Inches dimensions given for information

Figure18. SMBflat-3L package outline

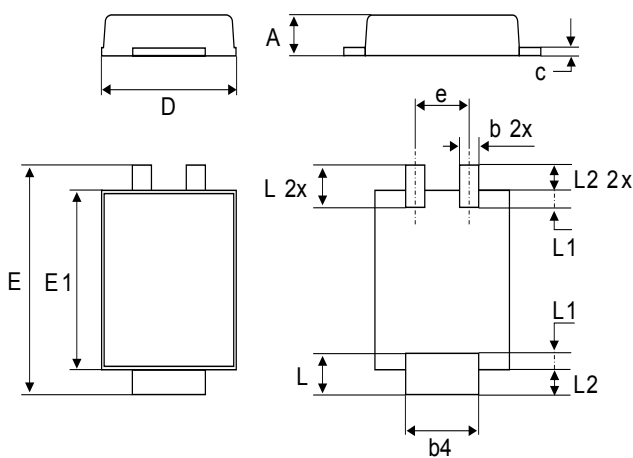


Table 7. SMBflat-3L mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.044
b	0.35		0.65	0.014		0.026
b4	1.95		2.20	0.070		0.087
c	0.15		0.40	0.005		0.016
D	3.30		3.95	0.129		0.156
E	5.10		5.60	0.200		0.221
E1	4.05		4.60	0.159		0.182
L	0.75		1.50	0.029		0.060
L1		0.40			0.016	
L2		0.60			0.024	
e		1.60			0.063	

IMPORTANT NOTICE – PLEASE READ CAREFULLY

SZGKTMicroelectronics NV and its subsidiaries reserve the right to make changes, corrections, enhancements, modifications, and improvements to SZGKT.