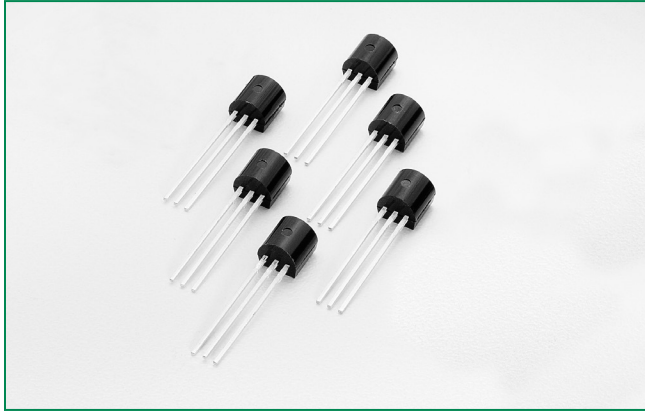




## S602ECS



### Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	1.5	A
$V_{DRM}/V_{RRM}$	600	V
$I_{GT}$	100	$\mu A$

### Applications

The S602ECS is specifically designed for Gas Ignition applications that require high pulse surge current capability.

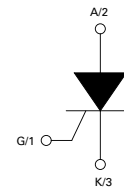
### Description

This new .8 A sensitive gate SCR in an TO-92 package with a GAK pin out, offers a high static component series with a high static  $dv/dt$  and a low turn off ( $t_q$ ) time by the use of small die planar construction implementation. All SCR's junctions are glass-passivated to ensure long term reliability and parametric stability.

### Features

- Surge capability >15Amps
- High  $dv/dt$  noise immunity
- Improved turn-off time ( $t_q$ )  $\leq 35 \mu s$
- TO-92 G-A-K pinout
- Sensitive gate for direct microprocessor interface
- RoHS compliant and Halogen-Free

### Schematic Symbol



### Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	$T_C = 65^\circ C$	1.5	A
$I_{T(AV)}$	Average on-state current	$T_C = 65^\circ C$	0.95	A
$I_{TSM}$	Non repetitive surge peak on-state current (Single cycle, $T_J$ initial = $25^\circ C$ )	F = 50 Hz	14.0	A
		F = 60 Hz	16.8	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10$ ms F = 50 Hz	0.78	$A^2s$
		$t_p = 8.3$ ms F = 60 Hz	0.93	
$di/dt$	Critical rate of rise of on-state current $I_G = 10mA$	$T_J = 125^\circ C$	50	$A/\mu s$
$I_{GM}$	Peak gate current	$t_p = 10 \mu s$ $T_J = 125^\circ C$	1.0	A
$P_{G(AV)}$	Average gate power dissipation	$T_J = 125^\circ C$	0.1	W
$T_{stg}$	Storage junction temperature range		-40 to 150	$^\circ C$
$T_J$	Operating junction temperature range		-40 to 125	$^\circ C$



### Electrical Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Description	Test Conditions	S602ECS		Unit
			Min	Max	
$I_{GT}$	DC Gate Trigger Current	$V_D = 12\text{V}$ $R_L = 60\ \Omega$	20	100	$\mu\text{A}$
$V_{GT}$	DC Gate Trigger Voltage		—	0.8	V
$V_{GRM}$	Peak Reverse Gate Voltage	$I_{RG} = 10\ \mu\text{A}$	5	—	V
$I_H$	Holding Current	$R_{GK} = 1\ \text{k}\Omega$	—	3	mA
(dv/dt)s	Critical Rate-of-Rise of Off-State Voltage	$T_J = 125^\circ\text{C}$ $V_D = V_{DRM} / V_{RRM}$ Exponential Waveform $R_{GK} = 1\ \text{k}\Omega$	50	—	V/ $\mu\text{s}$
$t_q$	Turn-Off Time	$T_J = 125^\circ\text{C @ } 600\text{ V}$ $R_{GK} = 1\ \text{k}\Omega$	—	35	$\mu\text{s}$
$t_{gt}$	Turn-On Time	$I_G = 10\text{mA}$ PW = 15 $\mu\text{sec}$ $I_T = 3.0\text{A (pk)}$	—	3	$\mu\text{s}$

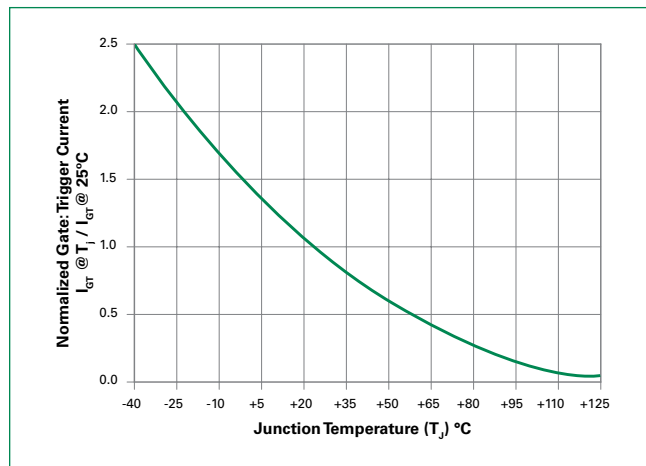
### Static Characteristics ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Description	Test Conditions	Value		Unit
			Min	Max	
$V_{TM}$	Peak On-State Voltage	$I_{TM} = 4\text{A (pk)}$	—	1.8	V
$I_{DRM}$	Off-State Current, Peak Repetitive	$T_J = 25^\circ\text{C @ } V_D = V_{DRM}$ $R_{GK} = 1\ \text{k}\Omega$	—	5	$\mu\text{A}$
		$T_J = 125^\circ\text{C @ } V_D = V_{DRM}$ $R_{GK} = 1\ \text{k}\Omega$	—	500	$\mu\text{A}$

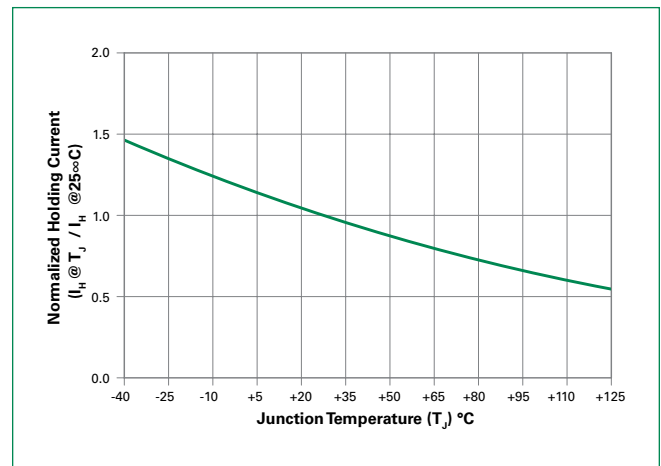
### Thermal Resistances

Symbol	Parameter	Test Conditions	Value	Unit
$R_{\theta(J-C)}$	Junction to case (AC)	$I_T = 1.5\text{A}_{(RMS)}$ , 60Hz AC resistive load condition, 100% conduction.	50	$^\circ\text{C/W}$
$R_{\theta(J-A)}$	Junction to ambient		160	$^\circ\text{C/W}$

**Figure 1: Normalized DC Gate Trigger Current vs. Junction Temperature**

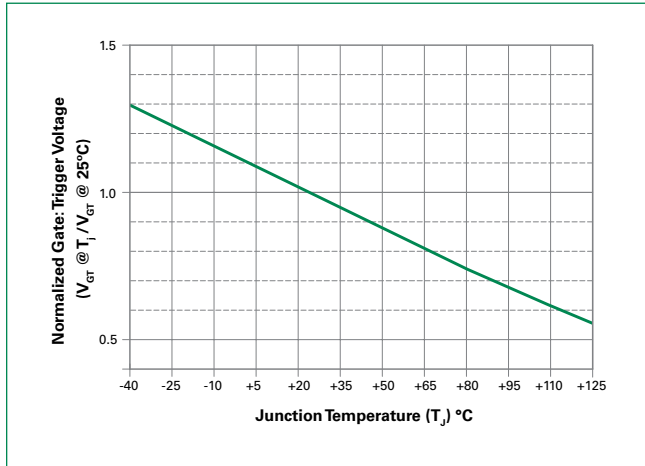


**Figure 2: Normalized DC Holding Current vs. Junction Temperature**

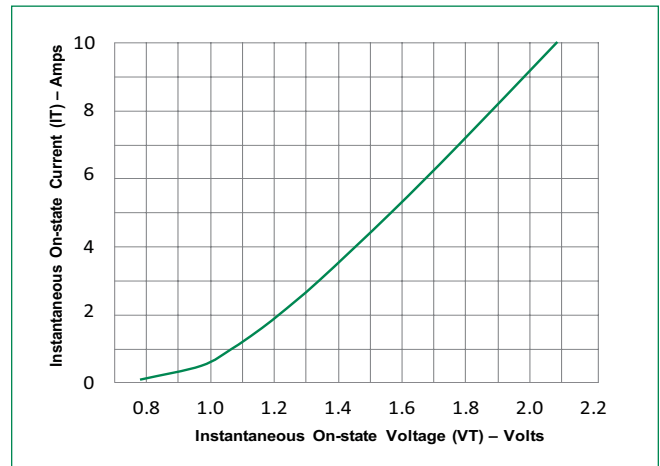




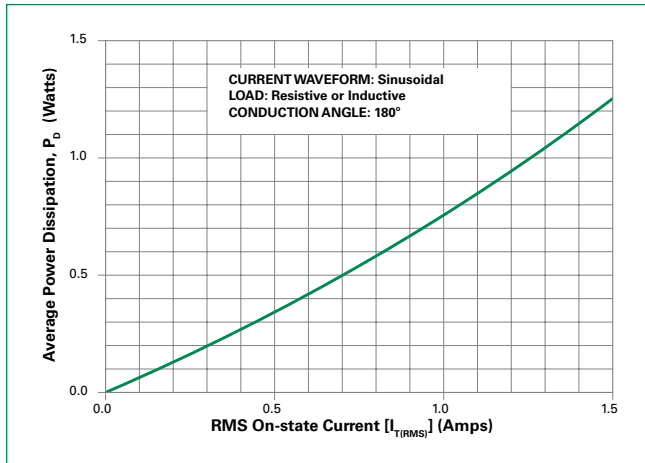
**Figure 3: Normalized DC Gate Trigger Voltage vs. Junction Temperature**



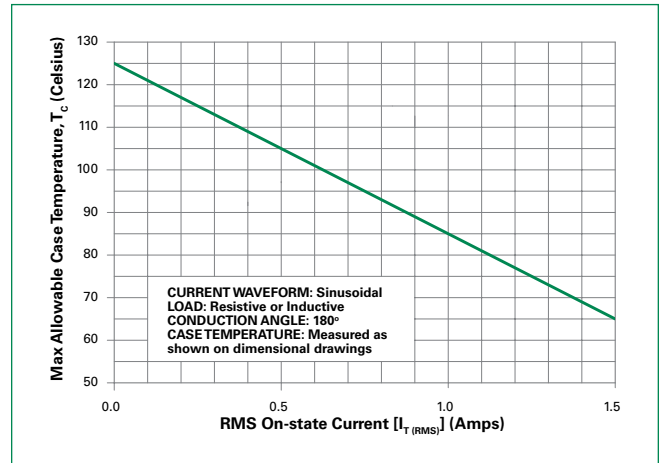
**Figure 4: On-State Current vs. On-State Voltage (Typical)**



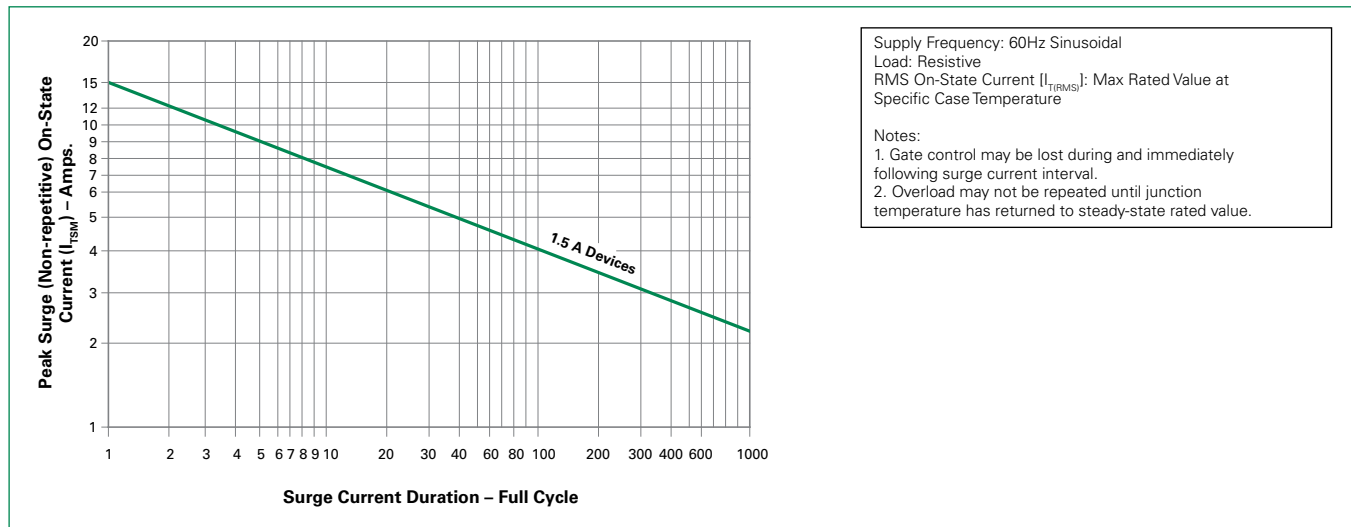
**Figure 5: Power Dissipation (Typical) vs. RMS On-State Current**



**Figure 6: Maximum Allowable Case Temperature vs. On-State Current**

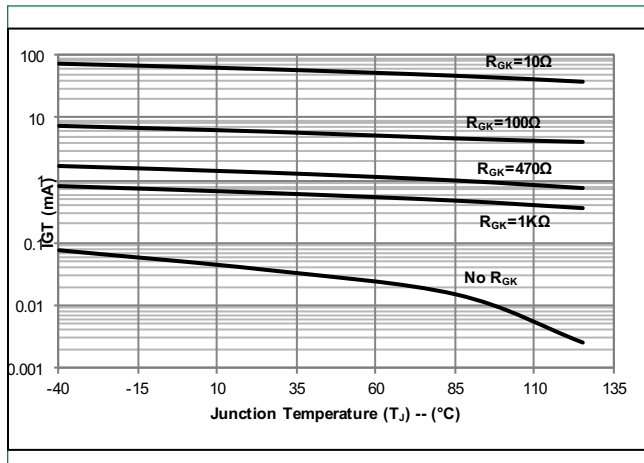


**Figure 6: Surge Peak On-State Current vs. Number of Cycles**

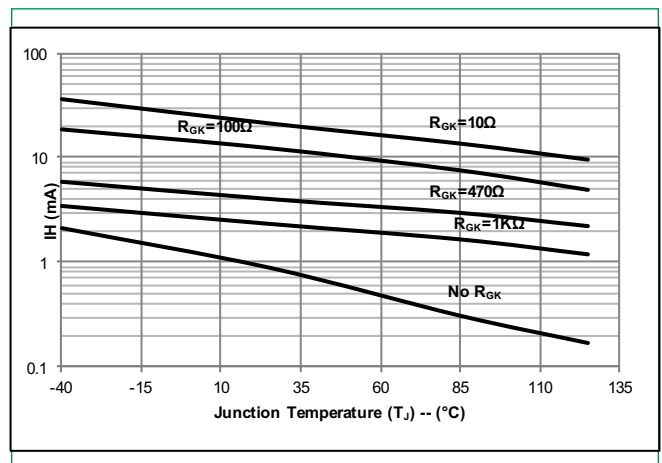




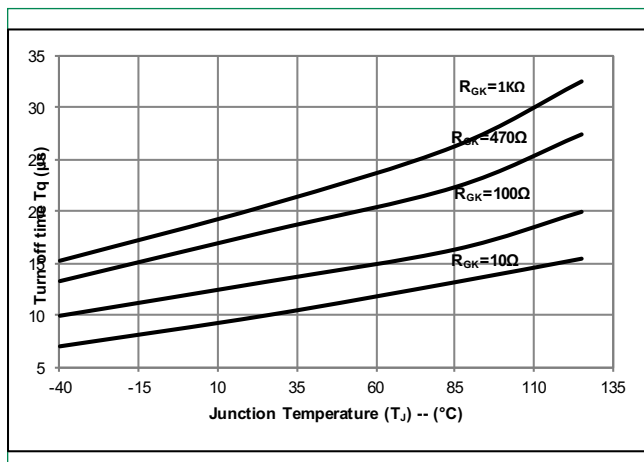
**Figure 7: Typical DC Gate Trigger Current with R<sub>GK</sub> vs. Junction Temperature**



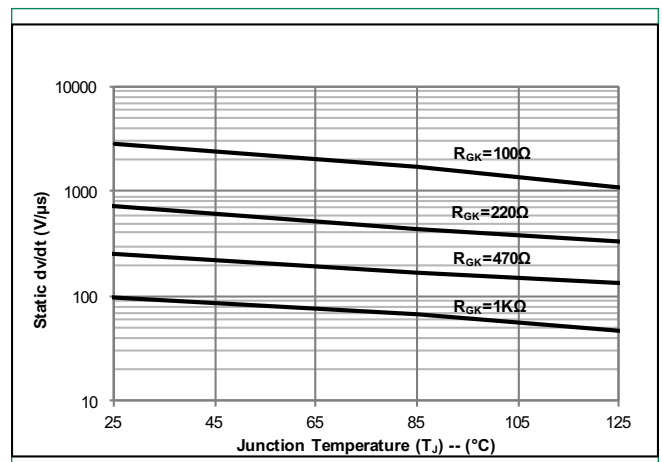
**Figure 8: Typical DC Holding Current with R<sub>GK</sub> vs. Junction Temperature**



**Figure 9: Typical Turn Off Time with R<sub>GK</sub> vs. Junction Temperature**

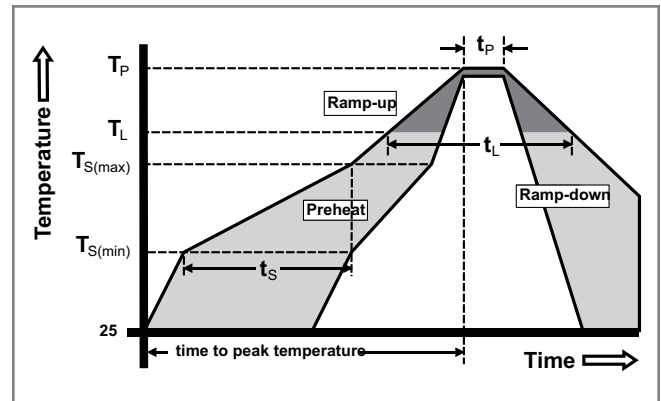


**Figure 10: Typical Static dV/dt with R<sub>GK</sub> vs. Junction Temperature**



### Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak		5°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		5°C/second max
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_s$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes Max.
Do not exceed		280°C



### Physical Specifications

<b>Terminal Finish</b>	100% Matte Tin-plated.
<b>Body Material</b>	UL Recognized epoxy meeting flammability rating V-0.
<b>Lead Material</b>	Copper Alloy

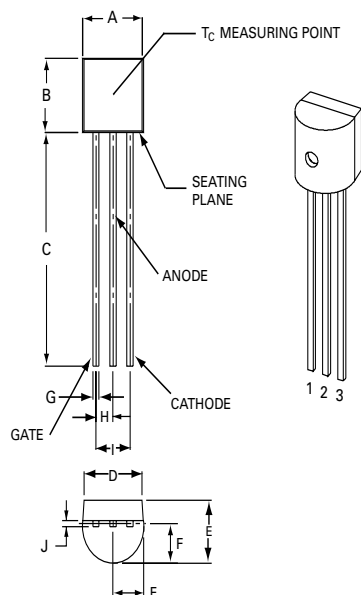
### Design Considerations

Careful selection of the correct component for the application's operating parameters and environment will go a long way toward extending the operating life of the Thyristor. Good design practice should limit the maximum continuous current through the main terminals to 75% of the component rating. Other ways to ensure long life for a power discrete semiconductor are proper heat sinking and selection of voltage ratings for worst case conditions. Overheating, overvoltage (including dv/dt), and surge currents are the main killers of semiconductors. Correct mounting, soldering, and forming of the leads also help protect against component damage.

### Environmental Specifications

Test	Specifications and Conditions
<b>AC Blocking</b>	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 125°C for 1008 hours
<b>Temperature Cycling</b>	MIL-STD-750, M-1051, 100 cycles; -40°C to +150°C; 15-min dwell-time
<b>Temperature/Humidity</b>	EIA / JEDEC, JESD22-A101 1008 hours; 320V - DC: 85°C; 85% rel humidity
<b>High Temp Storage</b>	MIL-STD-750, M-1031, 1008 hours; 150°C
<b>Low-Temp Storage</b>	1008 hours; -40°C
<b>Resistance to Solder Heat</b>	MIL-STD-750 Method 2031
<b>Solderability</b>	ANSI/J-STD-002, category 3, Test A
<b>Lead Bend</b>	MIL-STD-750, M-2036 Cond E

### Dimensions

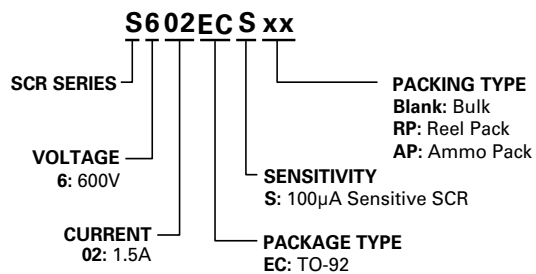


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.175	0.205	4.450	5.200
B	0.170	0.210	4.320	5.330
C	0.500	—	12.700	—
D	0.135	—	3.430	—
E	0.125	0.165	3.180	4.190
F	0.080	0.105	2.040	2.660
G	0.016	0.021	0.407	0.533
H	0.045	0.055	1.150	1.390
I	0.095	0.105	2.420	2.660
J	0.015	0.020	0.380	0.500

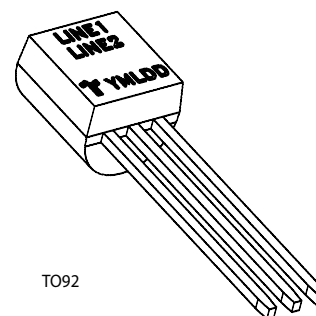
### Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
S602ECS	S602ECS	0.170 g	Bulk	2500
S602ECSAP	S602ECS	0.170 g	Ammo Pack	2000
S602ECSR	S602ECS	0.170 g	Tape & Reel	2000

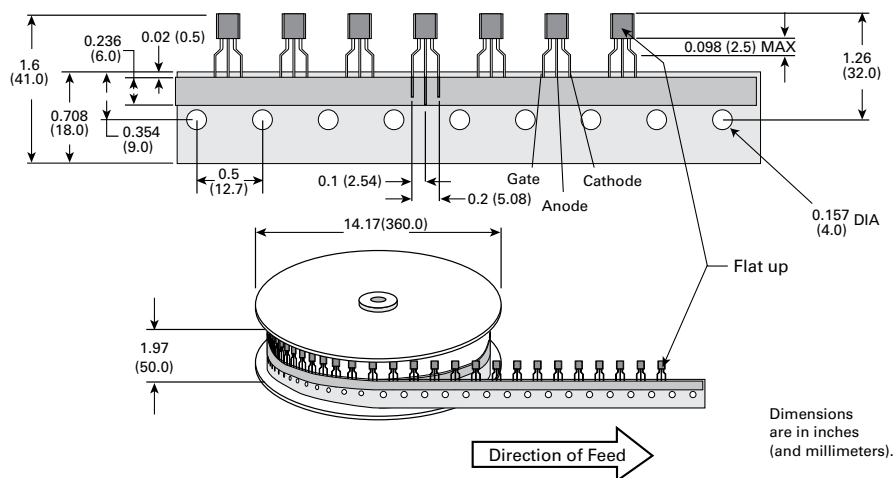
### Part Numbering System



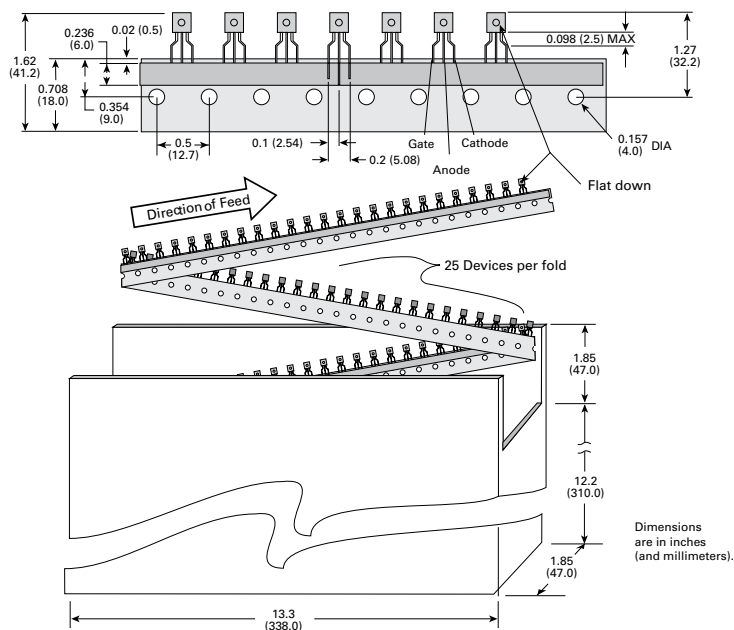
### Part Marking System



## Meets all EIA-468-C Standards



## Meets all EIA-468-C Standards



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Revised: 09/18/17

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