

**/ Descriptions**

SOP-8          P          MOS

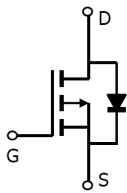
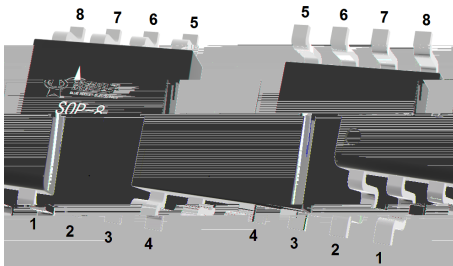
P-Channel Enhancement Mode Field Effect Transistor in a SOP-8 Plastic Package.

**/ Features** $V_{DS} (V) = -30V$  $I_D = -8.8 A$  $R_{DS(ON)} < 23m \quad (V_{GS} = -10V)$  $R_{DS(ON)} < 35m \quad (V_{GS} = -4.5V)$ 

HF Product.

**/ Applications**

Power Management in Notebook computer, Portable Equipment and Battery powered systems.

**/ Equivalent Circuit****/ Pinning**

|       |   |       |   |       |   |       |   |
|-------|---|-------|---|-------|---|-------|---|
| PIN1  | S | PIN 2 | S | PIN 3 | S | PIN 4 | G |
| PIN 5 | D | PIN 6 | D | PIN 7 | D | PIN 8 | D |

**/ Marking**

See Marking Instructions.

| Parameter                                           |                     | Symbol                         | Rating   | Unit |
|-----------------------------------------------------|---------------------|--------------------------------|----------|------|
| Drain-Source Voltage                                |                     | $V_{DSS}$                      | -30      | V    |
| Gate-Source Voltage                                 |                     | $V_{GSS}$                      | $\pm 20$ | V    |
| Continuous Drain Current <sup>A</sup>               |                     | $I_D (T_a=25^{\circ}\text{C})$ | -8.8     | A    |
| Continuous Drain Current <sup>A</sup>               |                     | $I_D (T_a=70^{\circ}\text{C})$ | -7.0     | A    |
| Pulsed Drain Current <sup>B</sup>                   |                     | $I_{DM}$                       | -50      | A    |
| Power Dissipation for Single Operation <sup>A</sup> |                     | $P_D (T_a=25^{\circ}\text{C})$ | 2.5      | W    |
| Power Dissipation for Single Operation <sup>A</sup> |                     | $P_D (T_a=70^{\circ}\text{C})$ | 1.2      | W    |
| Avalanche Current                                   |                     | $I_{AR}$                       | -20      | A    |
| Repetitive avalanche energy 0.3mH <sup>B</sup>      |                     | $E_{AR}$                       | 50       | mJ   |
| Maximum Junction Temperature                        |                     | $T_j$                          | 150      |      |
| Storage Temperature Range                           |                     | $T_{stg}$                      | -55 +150 |      |
| Thermal Resistance-Junction to Ambient <sup>A</sup> | $t \leq 10\text{s}$ | $R_{JA}$                       | 50       | /W   |
| Thermal Resistance-Junction to Ambient <sup>A</sup> | Steady State        | $R_{JA}$                       | 125      | /W   |
| Maximum Junction-to-Lead <sup>C</sup>               |                     | $R_{JL}$                       | 25       | /W   |

Note:

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^{\circ}\text{C}$ . The value in any given application depends on the user's specific board design. The current rating is based on the  $t = 10\text{s}$  thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using  $<300\mu\text{s}$  pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^{\circ}\text{C}$ . The SOA curve provides a single pulse rating.

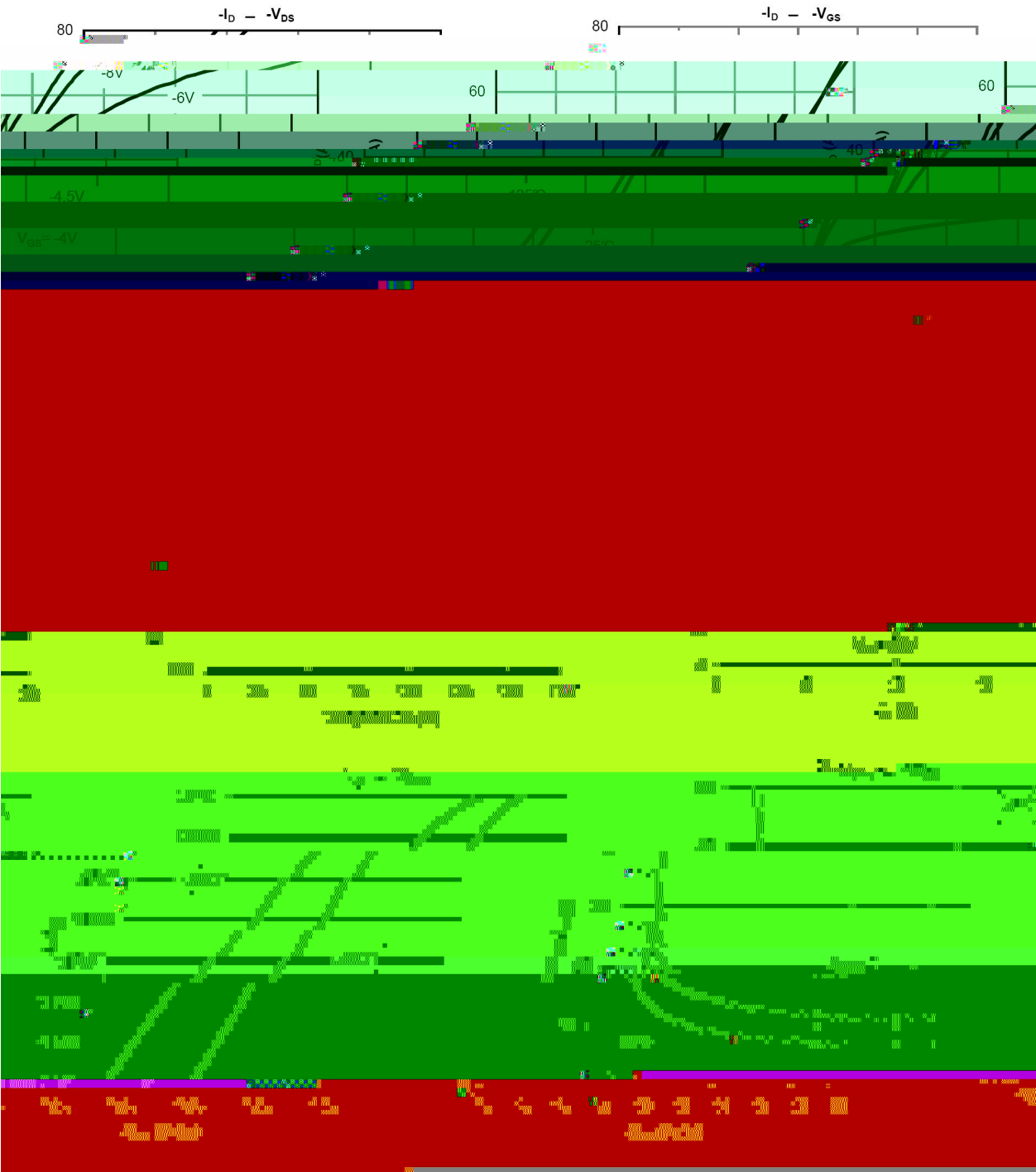
F: The current rating is based on the  $t = 10\text{s}$  thermal resistance rating.

G:  $E_{AR}$  and  $I_{AR}$  ratings are based on low frequency and duty cycles to keep  $T_j=25^{\circ}\text{C}$ .

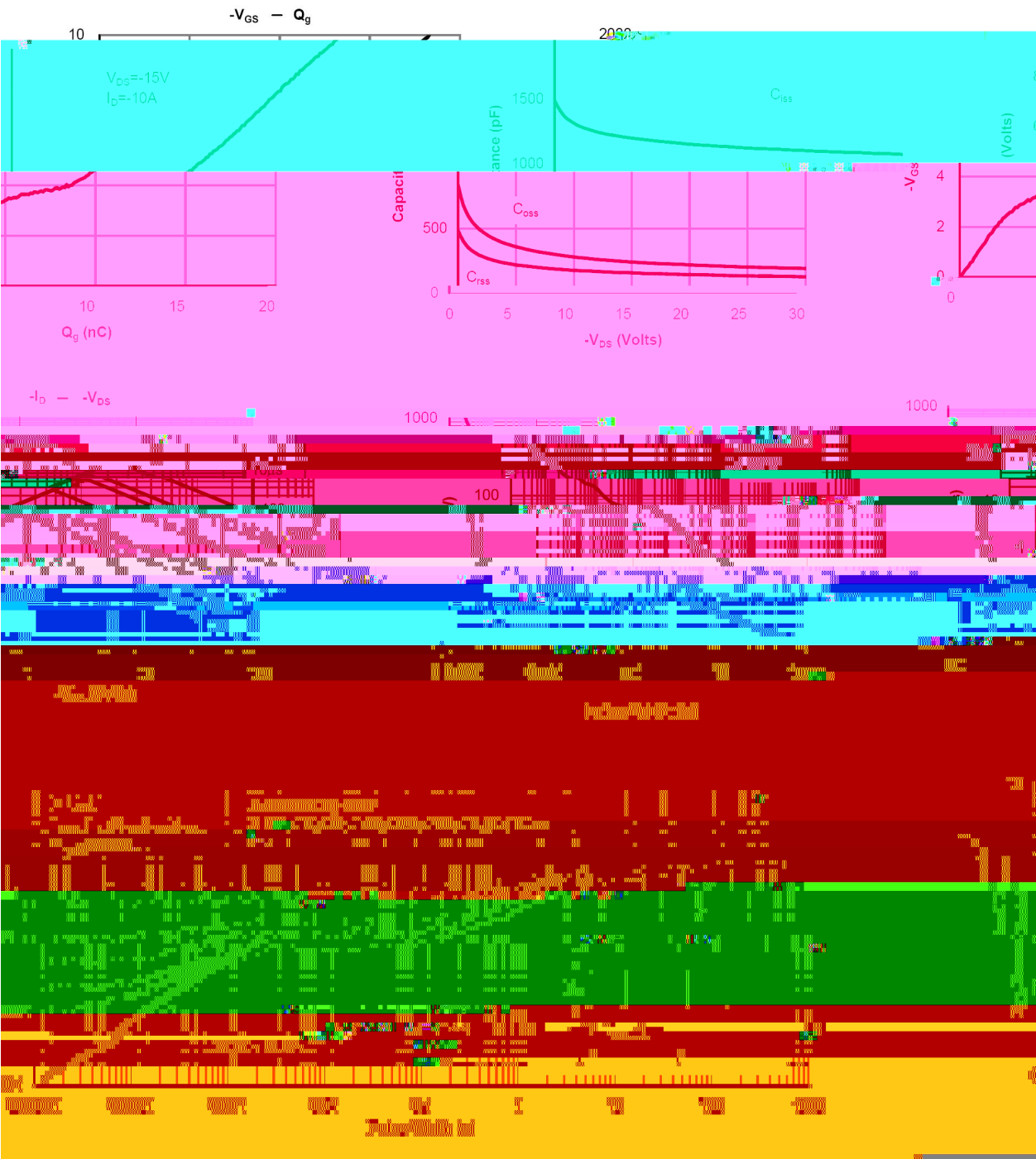
## / Electrical Characteristics(Ta=25 )

| Parameter                             | Symbol              | Test Conditions                                                                        | Min  | Typ   | Max  | Unit |
|---------------------------------------|---------------------|----------------------------------------------------------------------------------------|------|-------|------|------|
| Drain-Source Breakdown Voltage        | BV <sub>DSS</sub>   | I <sub>D</sub> =-250 A V <sub>GS</sub> =0V                                             | -30  |       |      | V    |
| Zero Gate Voltage Drain Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =-30V V <sub>GS</sub> =0V                                              |      |       | -1.0 | A    |
|                                       |                     | V <sub>DS</sub> =-30V V <sub>GS</sub> =0V<br>T <sub>J</sub> =55°C                      |      |       | -5.0 |      |
| Gate-Body leakage current             | I <sub>GSS</sub>    | V <sub>DS</sub> =0V V <sub>GS</sub> =±20V                                              |      |       | ±100 | nA   |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250 A                                | -1.0 | -1.7  | -3.0 | V    |
| Static Drain-Source On-Resistance     | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-10V I <sub>D</sub> =-8.8A                                            |      | 18    | 23   | m    |
|                                       |                     | V <sub>GS</sub> =-10V I <sub>D</sub> =-8.8A<br>T <sub>J</sub> =125°C                   |      | 25    | 32   |      |
|                                       |                     | V <sub>GS</sub> =-4.5V I <sub>D</sub> =-6.7A                                           |      | 27    | 35   |      |
| Forward Transconductance              | g <sub>FS</sub>     | V <sub>DS</sub> =-5V I <sub>D</sub> =-8.8A                                             |      | 12    |      | S    |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =-2.1A V <sub>GS</sub> =0V                                              |      | -0.73 | -1.2 | V    |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |                                                                                        |      |       | -2.1 | A    |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =-5V V <sub>DS</sub> =-15V<br>I <sub>D</sub> =-8.8A                    |      | 17    | 24   | nC   |
| Gate-Source Charge                    | Q <sub>gs</sub>     |                                                                                        |      | 5     |      |      |
| Gate-Drain Charge                     | Q <sub>gd</sub>     |                                                                                        |      | 6     |      |      |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>GS</sub> =0V V <sub>DS</sub> =-15V<br>f=1MHz                                    |      | 1604  |      | pF   |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                        |      | 408   |      |      |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                        |      | 202   |      |      |
| Turn-on Delay Time                    | t <sub>d(ON)</sub>  | V <sub>GS</sub> =-10V V <sub>DS</sub> =-15V<br>I <sub>D</sub> =-1A R <sub>GEN</sub> =6 |      | 13    | 23   | ns   |
| Turn-on Rise Time                     | t <sub>r</sub>      |                                                                                        |      | 13.5  | 24   |      |
| Turn-off Delay Time                   | t <sub>d(OFF)</sub> |                                                                                        |      | 42    | 68   |      |
| Turn-off Fall Time                    | t <sub>f</sub>      |                                                                                        |      | 25    | 40   |      |

/ Electrical Characteristic Curve

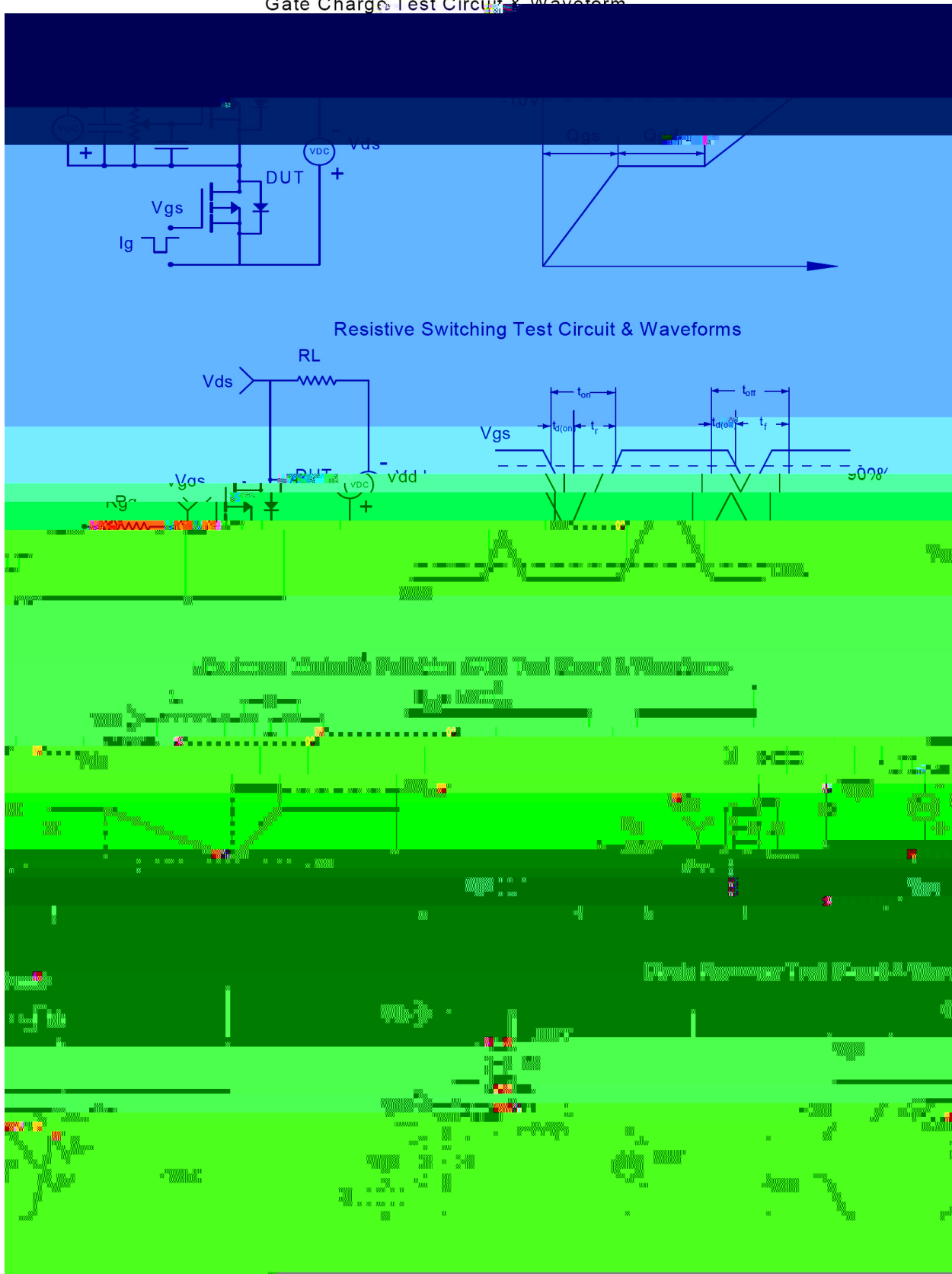


/ Electrical Characteristic Curve

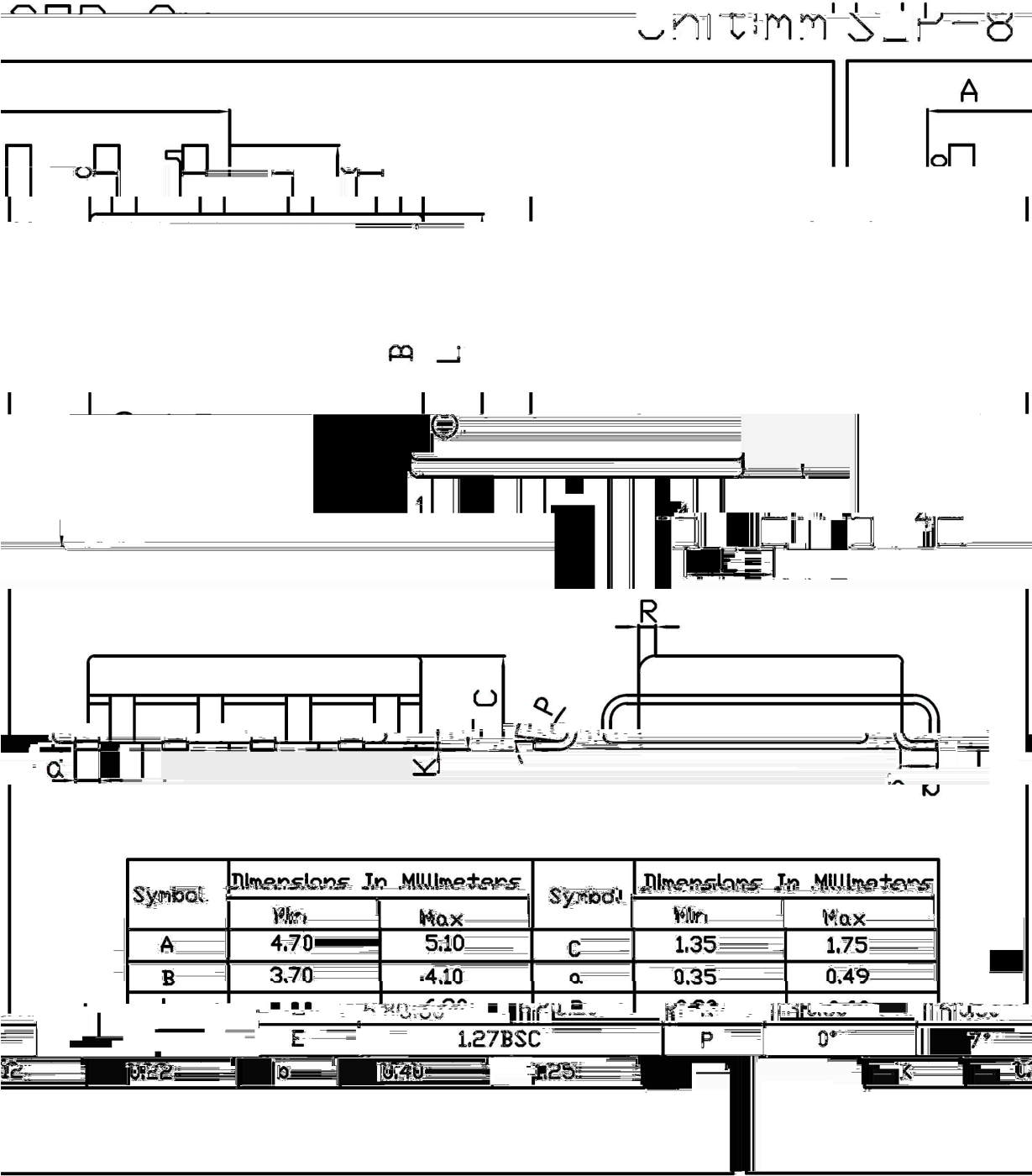


## / Test Waveform

### Gate Charge Test Circuit & Waveform

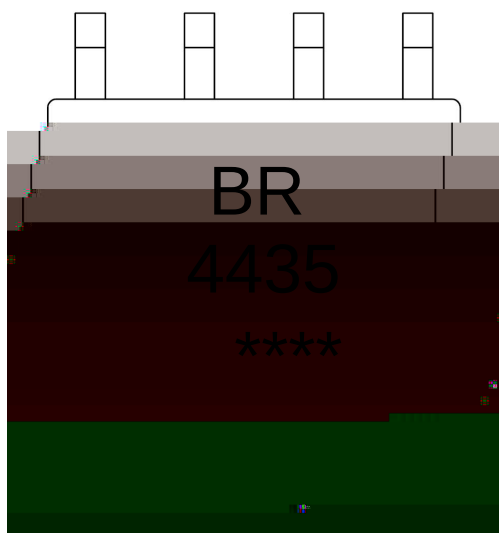


/ Package Dimensions





/ Marking Instructions



BR

4435

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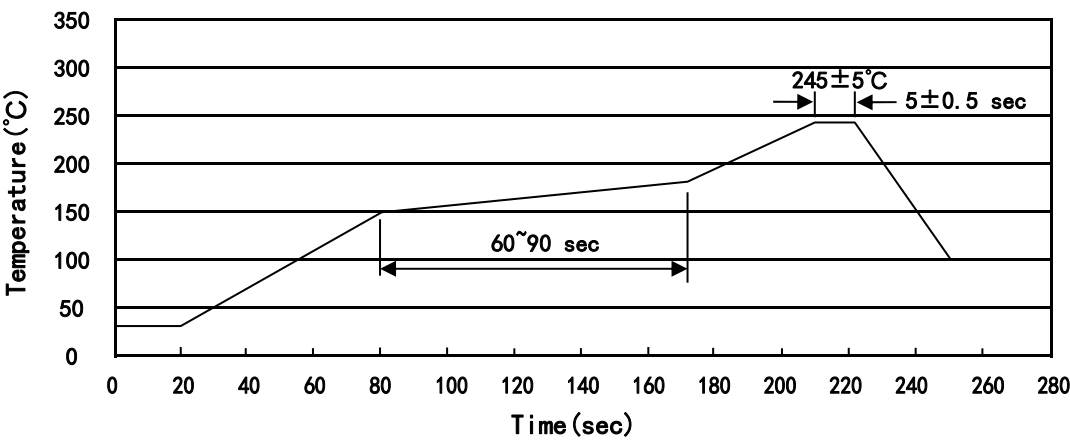
Note:

BR: Company Code

4435: Product Type Code

\*\*\*\*: Lot No. Code, code change with Lot No

(     ) / Temperature Profile for IR Reflow Soldering(Pb-Free)



Note:

- 1

150 180

60 90sec;

1.Preheating:150~180 , Time:60~90sec.
- 2

245±5

5±0.5sec;

2.Peak Temp.:245±5 , Duration:5±0.5sec.
- 3

2 10

/sec.

3. Cooling Speed: 2~10 /sec.

/ Resistance to Soldering Heat Test Conditions

260±5                      10±1 sec.                      Temp.:260±5                      Time:10±1 sec

/ Packaging SPEC.

/ REEL

| Package Type | Units      |                 |                 |                       |                 | Dimension (unit mm <sup>3</sup> ) |            |             |
|--------------|------------|-----------------|-----------------|-----------------------|-----------------|-----------------------------------|------------|-------------|
|              | Units/Reel | Reels/Inner Box | Units/Inner Box | Inner Boxes/Outer Box | Units/Outer Box | Reel                              | Inner Box  | Outer Box   |
| SOP/ESOP-8   | 4,000      | 2               | 8,000           | 6                     | 48,000          | 13 ×12                            | 360×360×50 | 380×335×366 |

/ Notices