

Rev.C Jul.-2026

TO-252                      N                      MOS

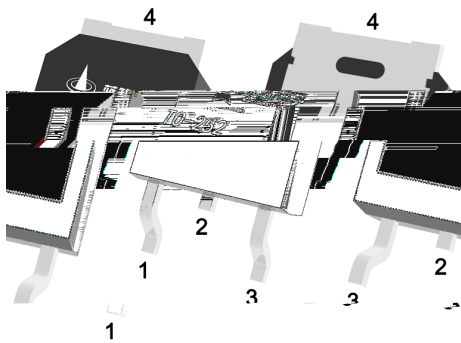
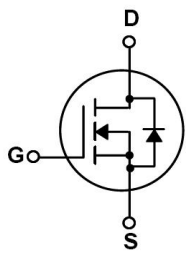
SiC N-CHANNEL MOSFET in a TO-252 Plastic Package.

$V_{DS}=650V$     $I_D=10A$

$R_{DS(on)}@15V \leq 390m\Omega$  (Type.300m $\Omega$ )

$R_{DS(on)}@18V \leq 380m\Omega$  (Type.222m $\Omega$ )

LED driver, PD charger, PC adapter, Air-conditioning, E-bike charger.



PIN1   G

PIN 2   D

PIN 3   S

PIN 4   D

See Marking Instructions.

| Parameter                                                                     | Symbol                 | Rating     | Unit |
|-------------------------------------------------------------------------------|------------------------|------------|------|
| Drain-Source Voltage                                                          | $V_{DS}$               | 650        | V    |
| Continuous DC Drain Current for $R_{th(j-c,typ.)}$ , Limited by $T_{VJ(max)}$ | $I_D(T_c=25^\circ C)$  | 10         | A    |
|                                                                               | $I_D(T_c=100^\circ C)$ | 8.5        | A    |
| Peak Drain Current, tp Limited by $T_{VJ(max)}$                               | $I_{DM}$               | 18         | A    |
| Gate-Source Max Voltage                                                       | $V_{GS,max}$           | -10/+22    | V    |
| Gate-Source Operate Voltage                                                   | $V_{GS,op}$            | 0/+15      | V    |
| Single Pulse Avalanche Energy                                                 | $E_{AS}$               | 17         | mJ   |
| Power Dissipation or $R_{th(j-c,typ.)}$                                       | $P_D(T_c=25^\circ C)$  | 57         | W    |
| Operating and Storage Temperature Range                                       | $T_{VJ}, T_{STG}$      | -55 to 175 |      |
| MOSFET/Body Diode Junction-Case Thermal Resistance                            | $R_{th(j-c)}$          | 2.63       | /W   |

| Parameter                        | Symbol       | Test Conditions                                    | Min | Typ  | Max | Unit       |
|----------------------------------|--------------|----------------------------------------------------|-----|------|-----|------------|
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS}=0V$ $I_D=100\mu A$                         | 650 |      |     | V          |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $V_{DS}=V_{GS}$ $I_D=3.5mA$                        | 2   |      | 4   | V          |
| Drain-Source Leakage Current     | $I_{DSS}$    | $V_{DS}=650V$ $V_{GS}=0V$                          |     | 0.1  | 20  | $\mu A$    |
| Gate-Source Leakage Current      | $I_{GSS}$    | $V_{GS}=22V$ $V_{DS}=0V$                           |     |      | 250 | nA         |
| Source-Gate Leakage Current      | $I_{SGS}$    | $V_{GS}=-10V$ $V_{DS}=0V$                          |     |      | 250 | nA         |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=15V$ $I_D=5A$                              |     | 300  | 390 | m $\Omega$ |
|                                  |              | $V_{GS}=15V$ $I_D=5A$ $T_{VJ}=175$                 |     | 321  |     |            |
|                                  |              | $V_{GS}=18V$ $I_D=5A$                              |     | 222  | 380 |            |
|                                  |              | $V_{GS}=18V$ $I_D=5A$ $T_{VJ}=175$                 |     | 266  |     |            |
| Body Diode Forward Voltage       | $V_{SD}$     | $V_{GS}=0V$ $I_S=2.5A$                             |     | 3.6  |     | V          |
| Continuous DC Source Current     | $I_S$        |                                                    |     | 9.7  |     | A          |
| Peak Reverse Drain Current,      | $I_{SM}$     |                                                    |     | 17   |     | A          |
| Reverse Recovery Time            | $t_{rr}$     | $V_{GS} = 0V, I_{SD}=5A, V_R=400V, di/dt=1.1kA/us$ |     | 10.9 |     | ns         |
| Reverse Recovery Charge          | $Q_{rr}$     |                                                    |     | 28   |     | nC         |
| Peak Reverse Recovery Current    | $I_{rrm}$    |                                                    |     | 3.9  |     | A          |
| Reverse Recovery Energy          | $E_{rr}$     |                                                    |     | 0.22 |     | $\mu J$    |

| Parameter               | Symbol       | Test Conditions                                                          | Min | Typ  | Max | Unit     |
|-------------------------|--------------|--------------------------------------------------------------------------|-----|------|-----|----------|
| Turn-On Delay Time      | $t_{d(on)}$  | $V_{GS}=0/15V$ $L=600\mu H$<br>$V_{DD}=400V$ $I_D=5A$<br>$R_g=4.3\Omega$ |     | 16.5 |     | ns       |
| Turn-On Rise Time       | $t_r$        |                                                                          |     | 11.3 |     |          |
| Turn-Off Delay Time     | $t_{d(off)}$ |                                                                          |     | 21.2 |     |          |
| Turn-Off Fall Time      | $t_f$        |                                                                          |     | 12.7 |     |          |
| Turn-On Switching Loss  | $E_{on}$     |                                                                          |     | 47.6 |     | $\mu J$  |
| Turn-Off Switching Loss | $E_{off}$    |                                                                          |     | 4.0  |     |          |
| Total Switching Energy  | $E_{tot}$    |                                                                          |     | 51.6 |     |          |
| Gate resistance         | $R_g$        | $V_{AC}=25mV$ $f=1MHz$                                                   |     | 26   |     | $\Omega$ |
| Input Capacitance       | $C_{iss}$    | $V_{DS}=400V$ $V_{GS}=0V$<br>$f=1MHz$                                    |     | 228  |     | pF       |
| Output Capacitance      | $C_{oss}$    |                                                                          |     | 17   |     |          |

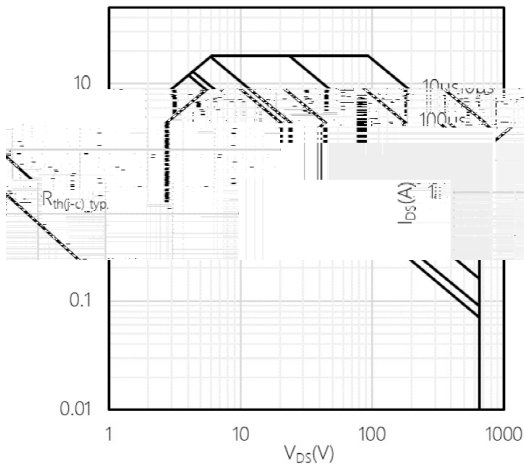


Fig1. Safe operating area (SOA)

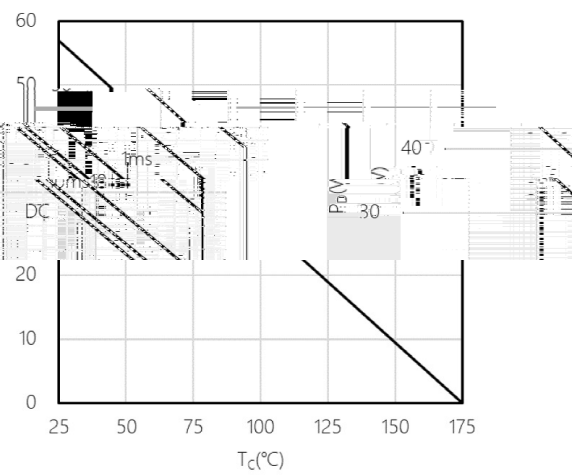


Fig2. Power dissipation

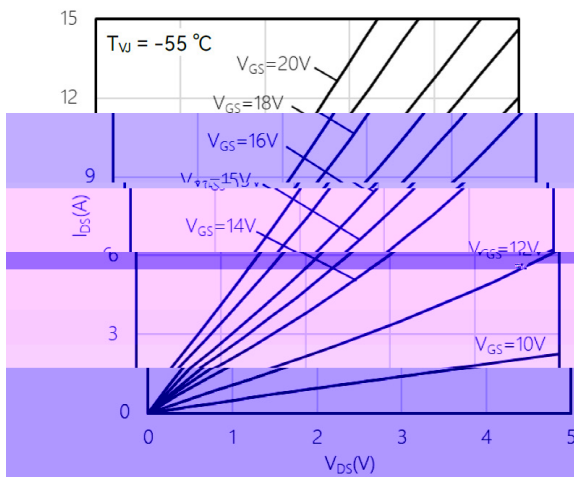


Fig3. Typical output characteristic

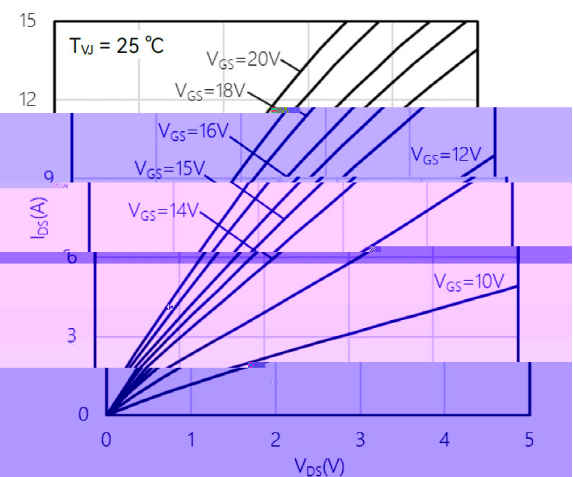


Fig4. Typical output characteristic

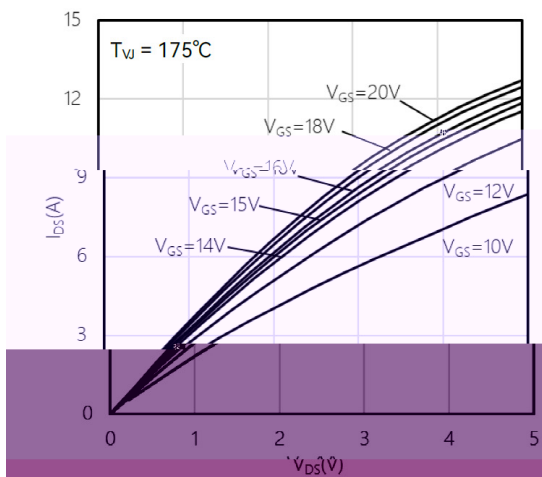


Fig5. Typical output characteristic

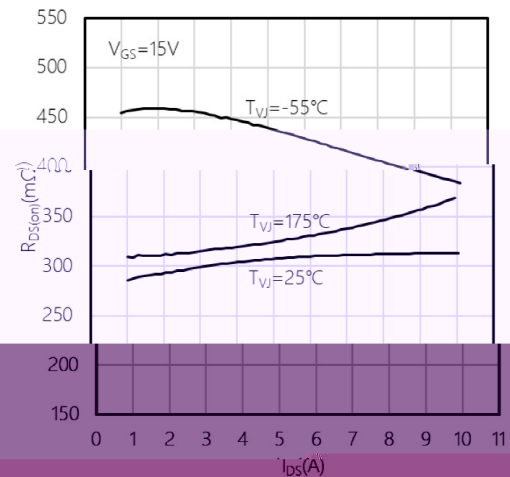


Fig6. Typical on-state resistance as a function of drain current

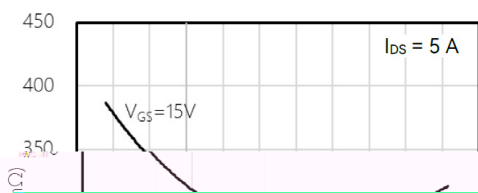


Fig.6. Typical on-state resistance as a function of temperature

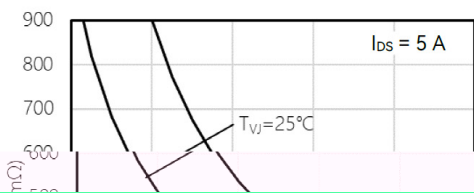
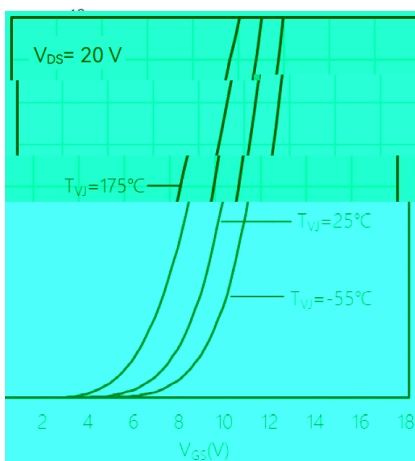

 Fig.7. Typical on-state resistance as a function of  $V_{GS}$ 


Fig.9. Typical transfer characteristic

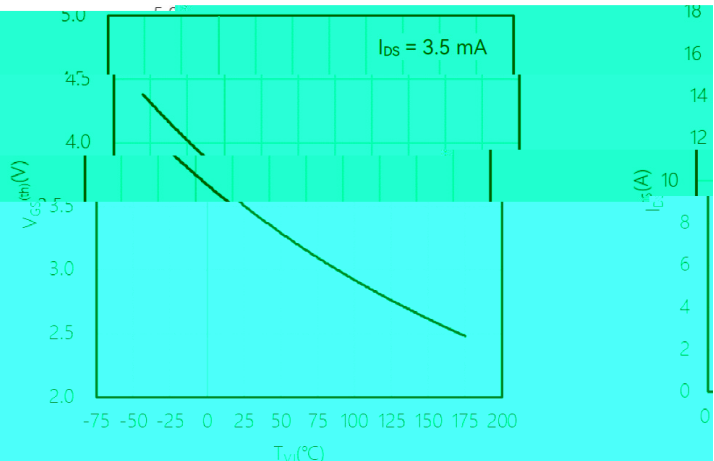


Fig.10. Typical reverse transfer characteristic

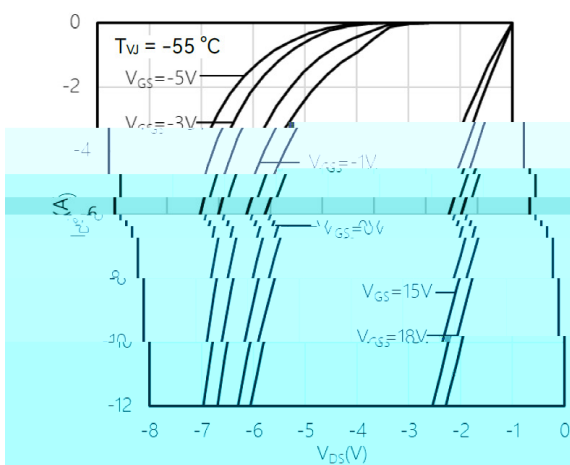


Fig.11. Typical reverse drain current as a function of reverse drain voltage

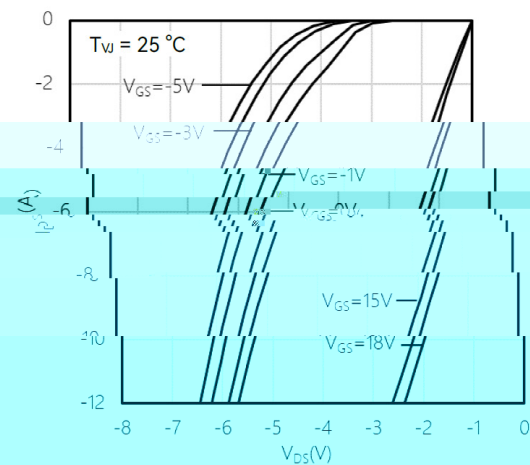


Fig.12. Typical reverse drain current as a function of reverse drain voltage

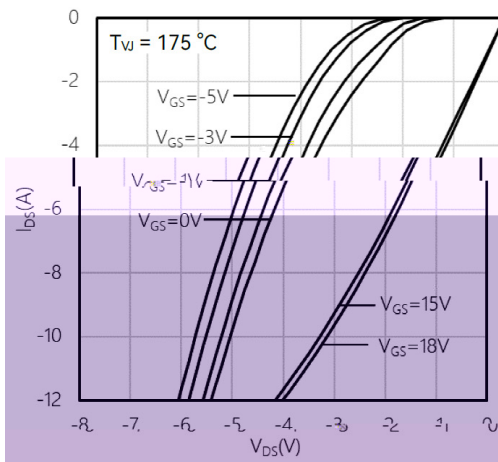


Fig13. Typical reverse drain current as a function of reverse drain voltage

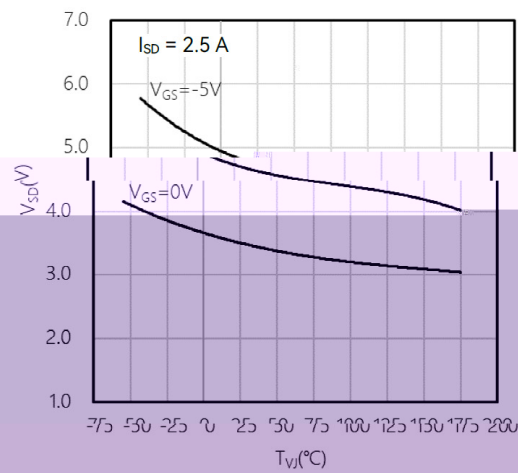


Fig14. Typical reverse drain current as a function of junction temperature

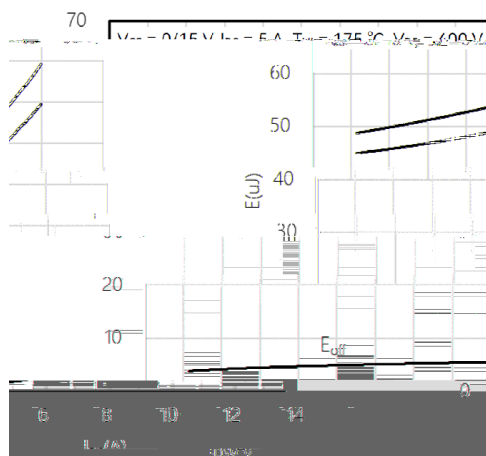
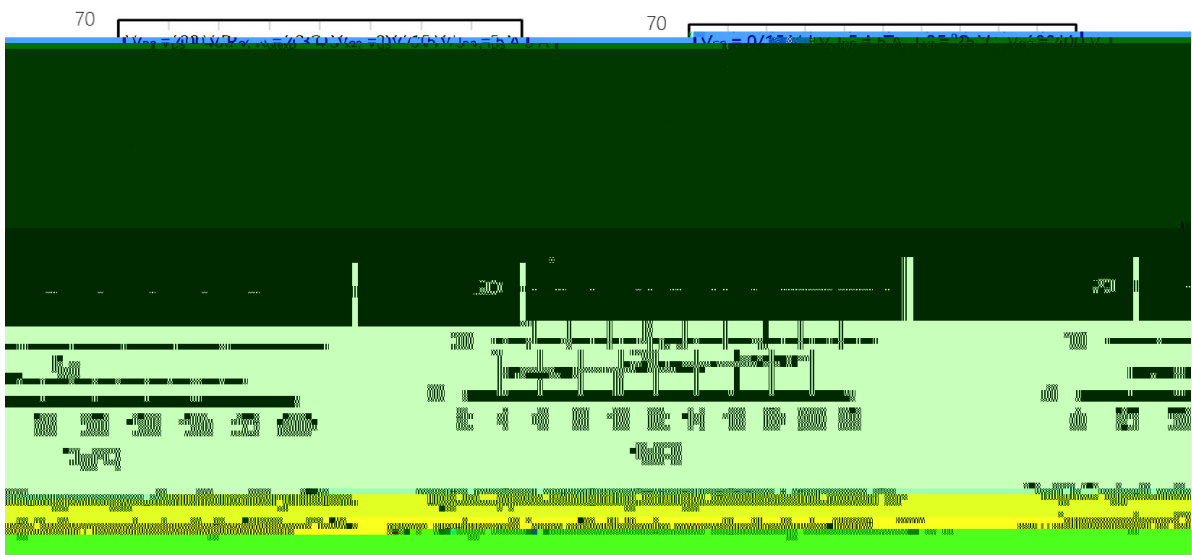


Fig18. Typical switching energy losses as a function of switching frequency

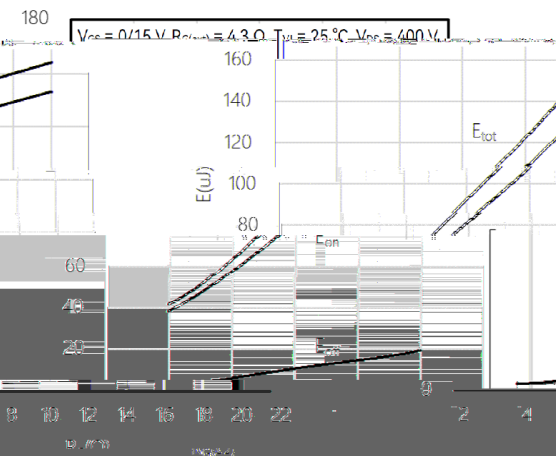


Fig17. Typical switching energy losses as a function of switching frequency

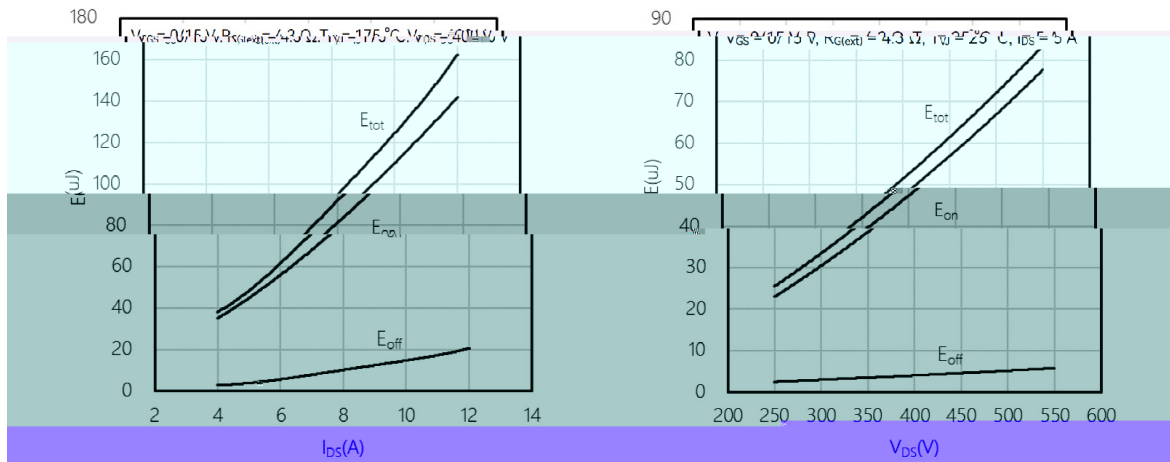


Fig20: Typical switching energy losses as a function

Fig20: Typical switching energy losses as a function

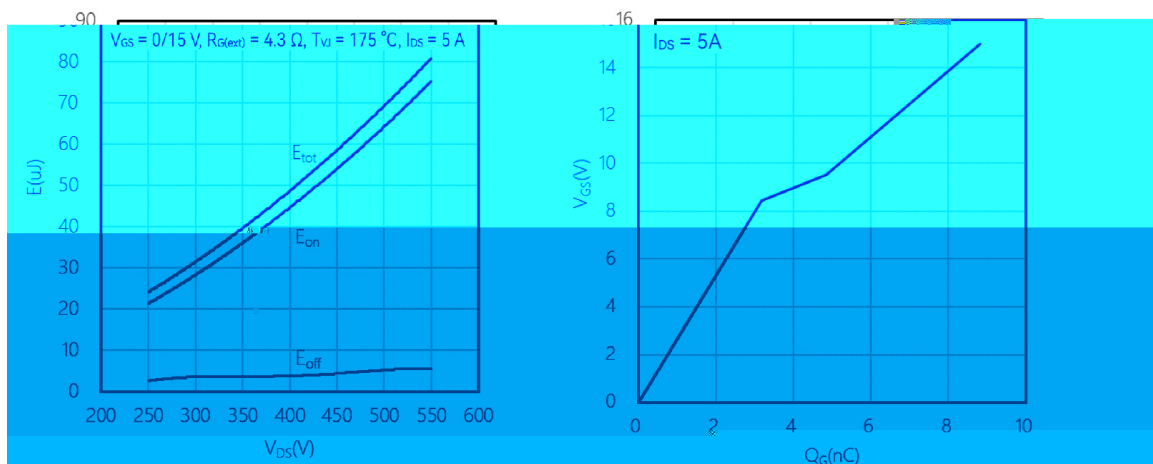


Fig21: Typical switching energy losses as a function

Fig22: Typical gate charge

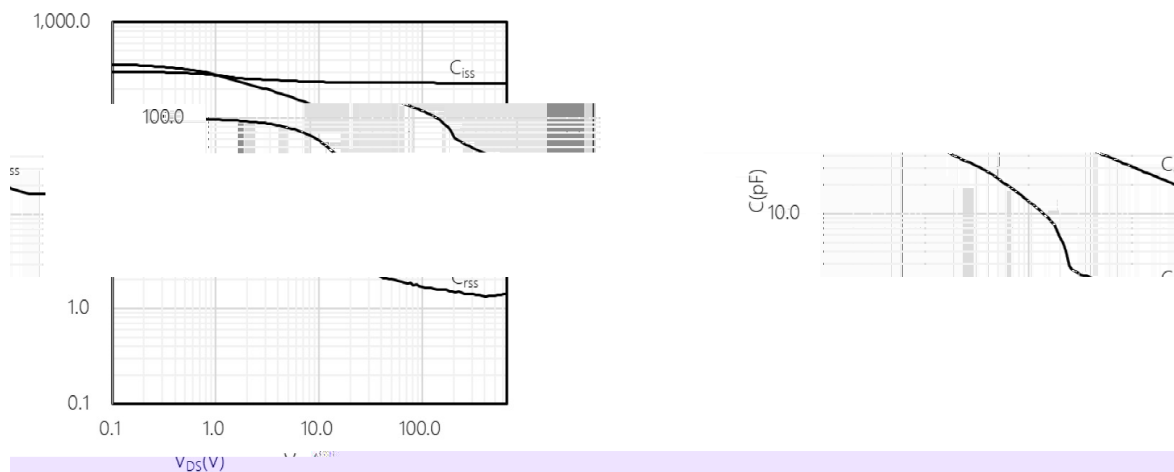
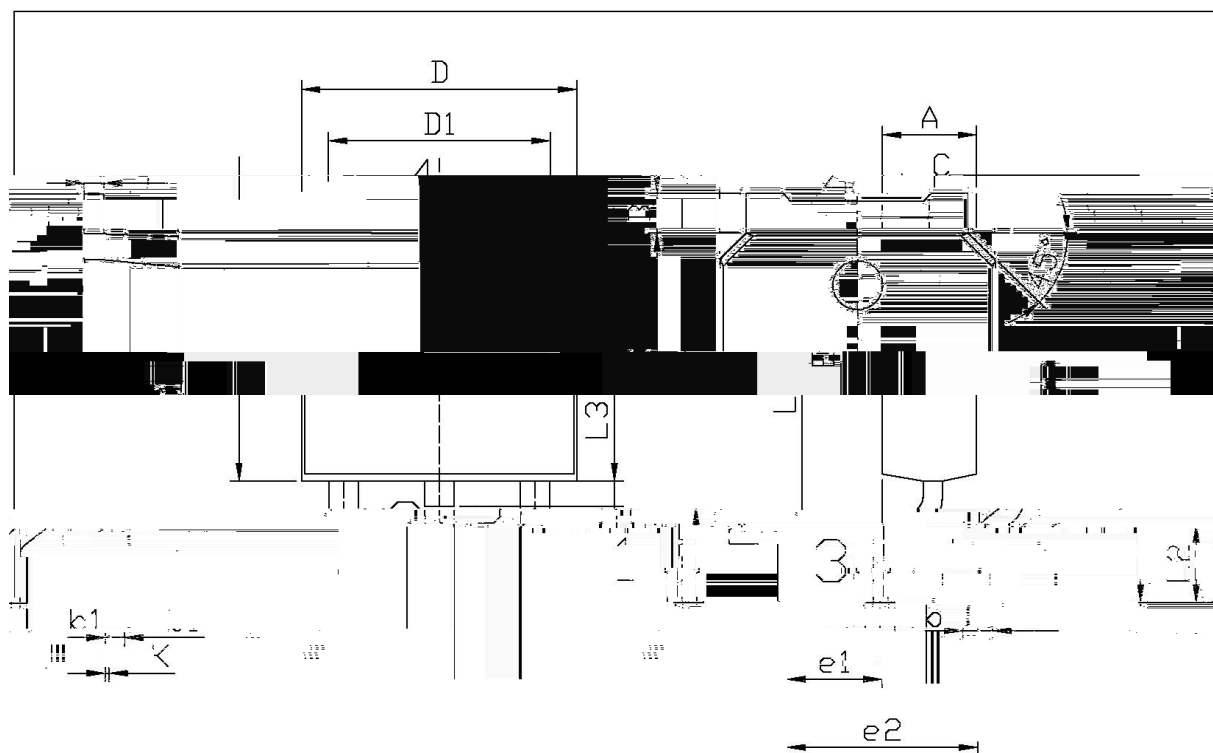
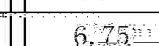


Fig23: Typical capacitance as a function

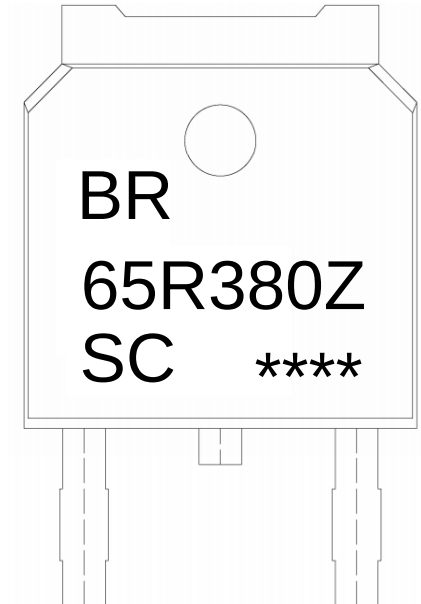




单位: mm

| Symbol                                                                              | Dimensions In Millimeters |       | Symbol                                                                              | Dimensions In Millimeters |      |
|-------------------------------------------------------------------------------------|---------------------------|-------|-------------------------------------------------------------------------------------|---------------------------|------|
|                                                                                     | Min                       | Max   |                                                                                     | Min                       | Max  |
|  | 5.95                      | 6.25  |  | 2.20                      | 2.40 |
|  | 2.22                      | 2.34  |  | 0.95                      | 1.25 |
|  | 9.85                      | 10.35 |  | 0.70                      | 0.85 |
|  | 0.45                      | 0.55  |  | 1.20                      | 2.00 |
|  | 6.45                      | 6.75  |  | 0.60                      | 0.90 |
|  | 5.10                      | 5.50  |  | 0.00                      | 0.10 |

TO-252



BR

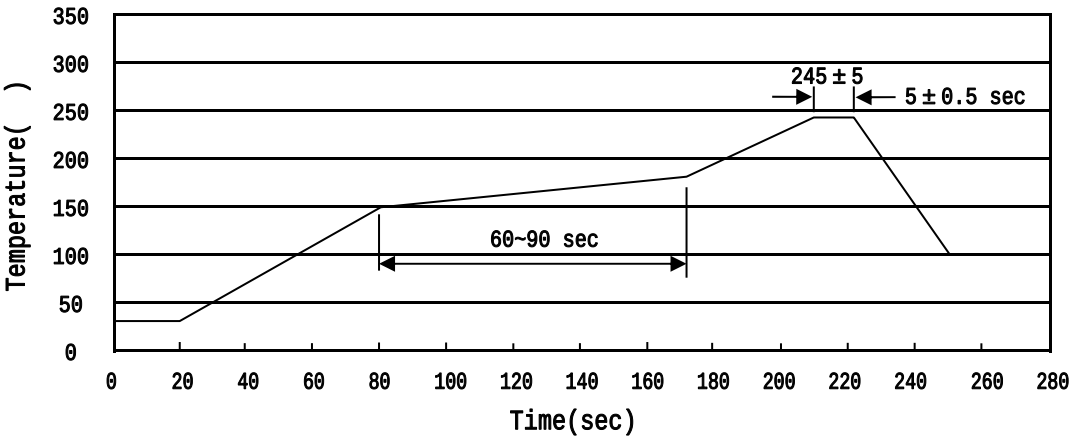
Note:

BR: Company Code

65R380Z: Product Type Code

SC: SiC

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



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.

260 5

10 1 sec.

Temp.:260±5

Time:10±1 sec

/ REEL

| Package Type | Units |   |       |   |        | Dimension (unit mm <sup>3</sup> ) |            |             |
|--------------|-------|---|-------|---|--------|-----------------------------------|------------|-------------|
|              |       |   |       |   |        |                                   |            |             |
| TO-252       | 2,500 | 2 | 5,000 | 6 | 30,000 | 13 ×16                            | 360×360×50 | 380×335×366 |

/ TUBE

| Package Type | Units |    |       |   |        | Dimension (unit mm <sup>3</sup> ) |            |             |
|--------------|-------|----|-------|---|--------|-----------------------------------|------------|-------------|
|              |       |    |       |   |        |                                   |            |             |
| TO-251/252   | 75    | 48 | 3,600 | 5 | 18,000 | 526×20.5×5.25                     | 555×164×50 | 575×290×180 |

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