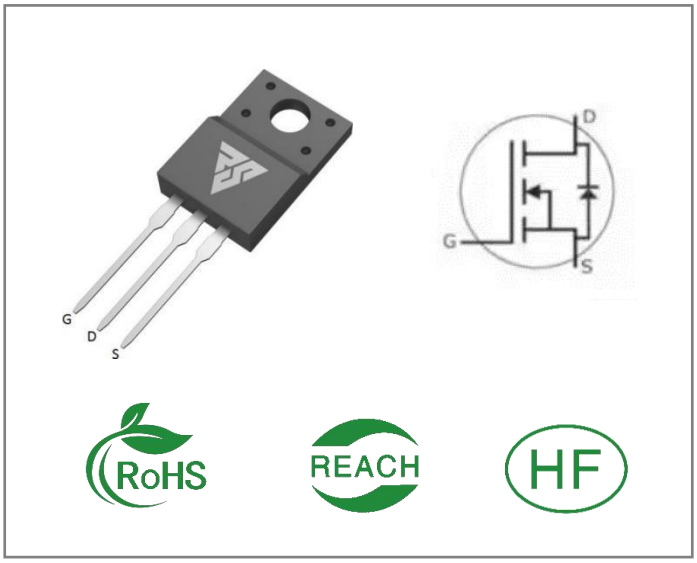
| $V_{DS}$ | $R_{DS(on)Typ}$ | $I_D$@25℃ |
|---|---|---|
| 800V | 160mΩ | 15.4A |




## Applications:

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

## Features:

- Revolutionary semiconductor material Silicon Carbide
- High blocking voltage with low on-resistance
- High-speed switching with very low switching losses
- High-speed and high robust intrinsic body diode

## Ordering Information

| Part Number | Package | Marking | Packing | Qty. |
|---|---|---|---|---|
| RSM080160BF | TO-220F | RSM080160BF | Tube | 50 PCS |

## Maximum Ratings （TJ= 25℃ unless otherwise specified）

| Symbol | Parameter | Value | Unit | Test Conditions |
|---|---|---|---|---|
| $V_{DS}$ | Drain - Source Voltage | 800 | V | $V_{GS}$=0V,$I_D$=250μA |
| $V_{GS}$ | Gate - Source Voltage | -10/+22 | V | Absolute maximum values |
| $V_{GSOP}$ | Recommended Operation Voltage of Gate to Source | 0/+18 | V | Recommended operational values |
| $I_D$ | Continuous Drain Current | 15.4<br>10.9 | A | $T_C$ =25℃<br>$T_C$ =100℃ |
| $I_{DM}$ | Pulsed Drain Current | 24.5 | A | $T_C$ =25℃ |
| $E_{AS}$ | Single Pulse Avalanche Energy<br>L=0.5mH,$I_{AS}$=9.5A,$V_{DD}$=50V,$V_{GS}$=15 V | 23 | mJ | |
| $P_D$ | Power Dissipation | 33 | W | $T_C$ =25℃ |
| $T_J$, $T_{stg}$ | Operating Junction and StorageTemperature | -55 to + 175 | ℃ | |


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## Electrical Characteristics (TJ= 25℃ unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | 800 | | | V | $V_{GS}$=0V,$I_D$=250μA | |
| $V_{GS(th)}$ | Gate Threshold Voltage | 2.7 | 3.4 | | V | $V_{GS}$= $V_{DS}$, $I_D$=3.5mA | |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | | | 20 | μA | $V_{DS}$=800V, $V_{GS}$=0V | |
| $I_{GSS}$ | Gate-Source Leakage Current | | | 250 | nA | $V_{GS}$=22V, $V_{DS}$=0V | |
| $R_{DS(on)}$ | Drain-Source on-state Resistance | | 220 | 280 | mΩ | $V_{GS}$=15V, $I_D$ =8A | |
| | | | 160 | 220 | | $V_{GS}$=18V, $I_D$ =8A | |
| $C_{iss}$ | Input Capacitance | | 289 | | pF | $V_{GS}$=0V, $V_{DS}$=400V f=1MHz,$T_j$=25℃ | |
| $C_{oss}$ | Output Capacitance | | 23 | | | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | 2.1 | | | | |
| gfs | Transconductance | | 5.7 | | S | $V_{DS}$=20V,$I_D$=8A | |
| $R_G$ | Internal Gate Resistance | | 26 | | Ω | f=1MHz,$V_{AC}$=25mV | |
| $Q_g$ | Total Gate Charge | | 12.5 | | nC | $V_{DS}$=400V $V_{GS}$=0/+15V $I_D$=5A | |
| $Q_{gs}$ | Gate to Source Charge | | 4.5 | | | | |
| $Q_{gd}$ | Gate to Drain Charge | | 1.5 | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | | 20.4<br>18.6 | | ns | $V_{DD}$=400V $V_{GS}$=0/15V L=600μH $I_D$=8A $R_{G(on)}$=4.3Ω $R_{Goff)}$=4.3Ω | $T_j$=25℃<br>$T_j$=175℃ |
| $t_r$ | Rise Time | | 11.9<br>10.2 | | | | $T_j$=25℃<br>$T_j$=175℃ |
| $t_{d(off)}$ | Turn-Off Delay Time | | 17.2<br>20.5 | | | | $T_j$=25℃<br>$T_j$=175℃ |
| $t_f$ | Fall Time | | 11.7<br>11.8 | | | | $T_j$=25℃<br>$T_j$=175℃ |
| $E_{on}$ | Turn−On Switching Loss | | 79.2<br>77.4 | | μJ | | $T_j$=25℃<br>$T_j$=175℃ |
| $E_{off}$ | Turn−Off Switching Loss | | 13.3<br>13.2 | | | | $T_j$=25℃<br>$T_j$=175℃ |
| $E_{tot}$ | Total Switching Energy | | 92.5<br>90.6 | | | | $T_j$=25℃<br>$T_j$=175℃ |


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## Reverse Diode Characteristics (TJ= 25℃ unless otherwise specified)

| Symbol | Parameter | Typ. | Max | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|
| $V_{SD}$ | Diode Forward Voltage | 3.6<br>3.2 | | V | $V_{GS}$=0V, $I_{SD}$ =4A | $T_j$=25℃<br>$T_j$=175℃ |
| $I_S$ | Continuous Diode Forward Current | 13.5<br>5.9 | | A | $T_C$= 25℃<br>$T_C$= 100℃ | |
| $t_{rr}$ | Reverse Recovery time | 12.1<br>11.6 | | ns | $V_{GS}$=0V,$I_{SD}$=8A<br>$V_{DS}$=400V,$T_j$=25℃<br>di/dt=1.6KA/us | $T_j$=25℃<br>$T_j$=175℃ |
| $Q_{rr}$ | Reverse Recovery Charge | 35.8<br>39.1 | | nC | | $T_j$=25℃<br>$T_j$=175℃ |
| $I_{rrm}$ | Peak Reverse Recovery Current | 5.3<br>5.8 | | A | | $T_j$=25℃<br>$T_j$=175℃ |
| $E_{rr}$ | Reverse Recovery Energy | 0.33<br>0.48 | | μJ | | $T_j$=25℃<br>$T_j$=175℃ |

## Thermal Characteristics (TJ= 25℃ unless otherwise specified)

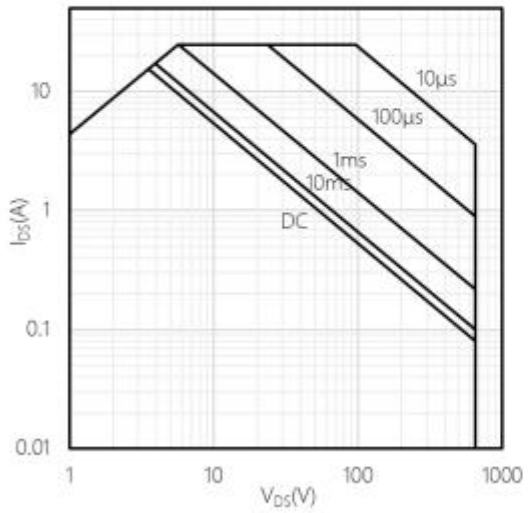
| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | 4.5 | | ℃/W | |


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## Typical Feature Curve

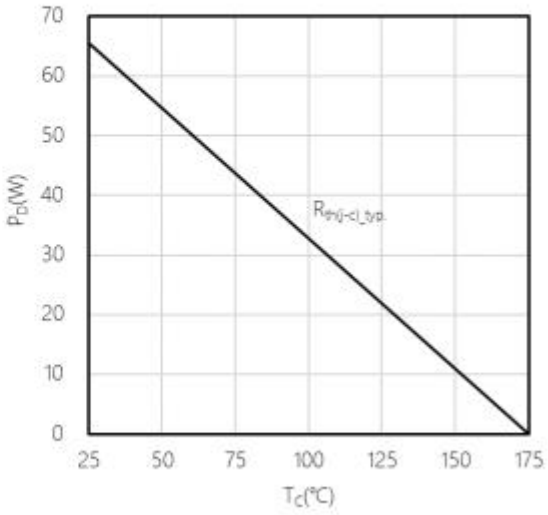
**Safe operating area (SOA)**

$R_{th(j-c)}$ =2.75 ℃/W, Single Pulse, $T_{VJ}$ = 25℃




**Power dissipation as a function of case temperature limited by bond wire**

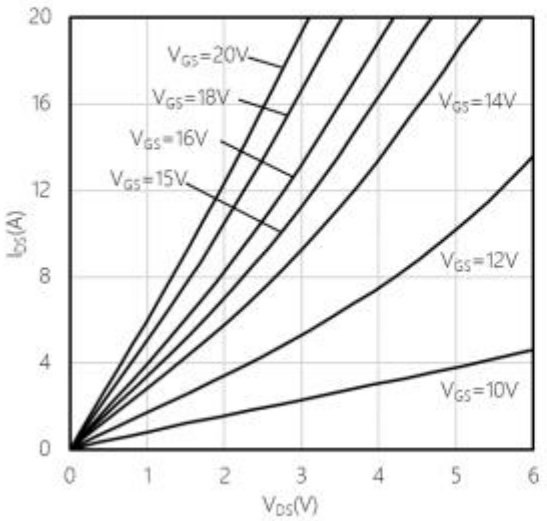
$P_D = f(T_C)$




**Typical output characteristic, $V_{GS}$ as parameter**

$I_{DS} = f(V_{DS})$

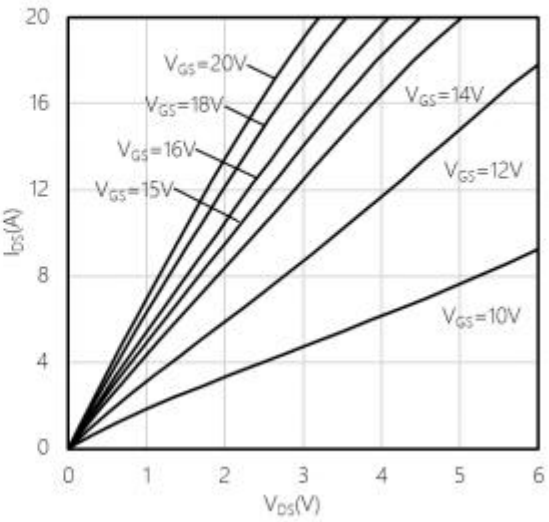
$T_{VJ}$ = -55 ℃




**Typical output characteristic, $V_{GS}$ as parameter**

$I_{DS} = f(V_{DS})$

$T_{VJ}$ = 25 ℃



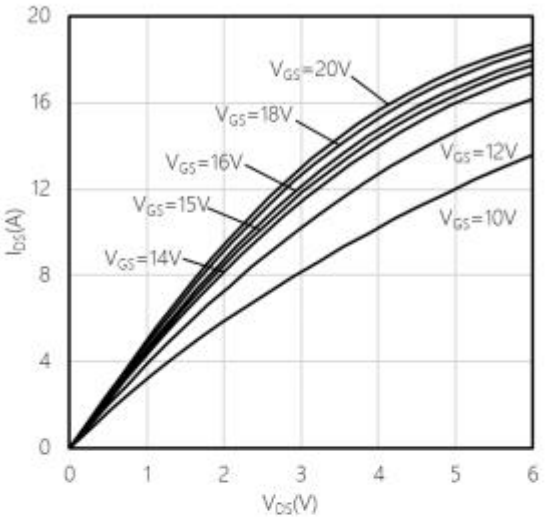


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**Typical output characteristic, $V_{GS}$ as parameter**

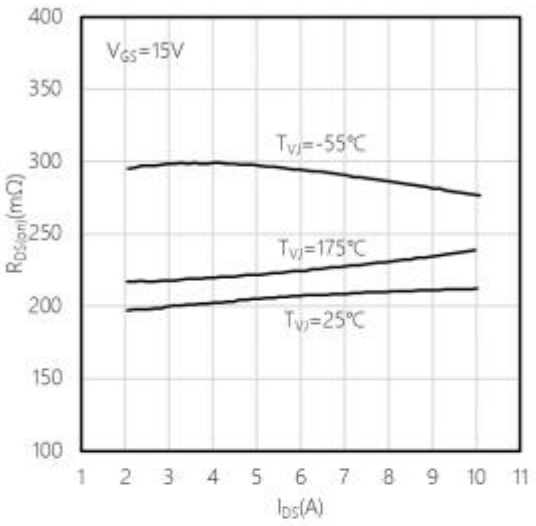
$I_{DS} = f(V_{DS})$

$T_{VJ} = 175℃$



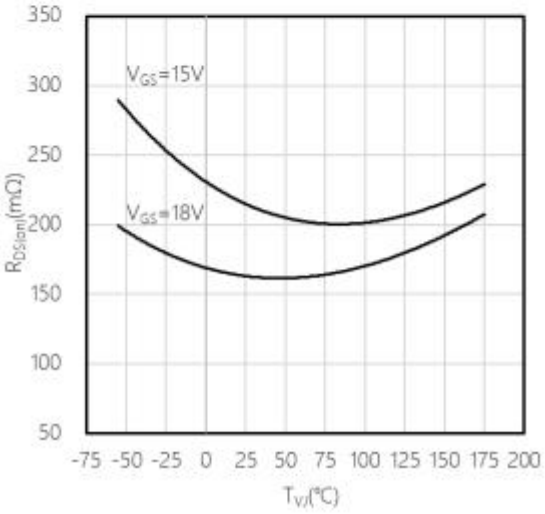

**Typical on-state resistance as a function of drain current**

$R_{DS(on)} = f(I_{DS})$, $V_{GS} = 15V$




**Typical on-state resistance as a function of temperature**

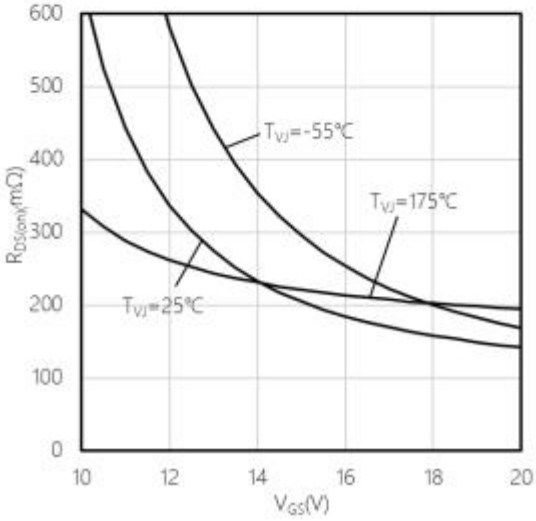
$R_{DS(on)} = f(T_{VJ})$, $I_{DS}$ =8 A




**Typical on-state resistance as a function of $V_{GS}$**

$R_{DS(on)} = f(V_{GS})$

$I_{DS}$ =8 A



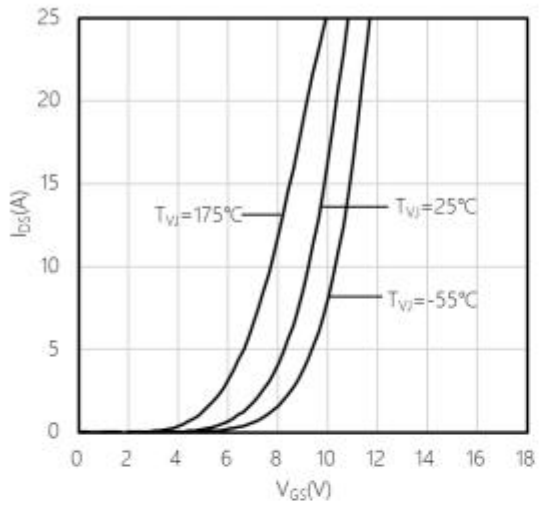


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**Typical transfer characteristic**

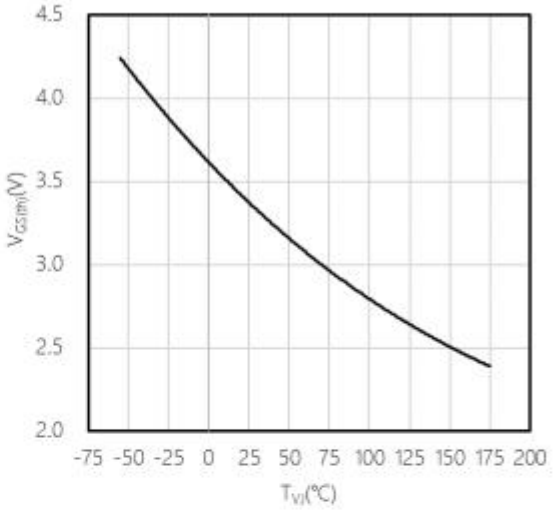
$I_{DS} = f(V_{GS})$

$V_{DS}$= 20 V



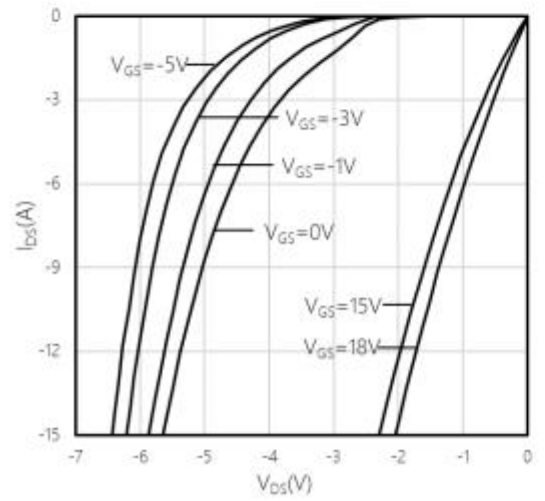

**Typical gate-source threshold voltage as a function of junction temperature**

$V_{GS(th)} = f(T_{VJ})$, $I_{DS}$ = 3.5 mA



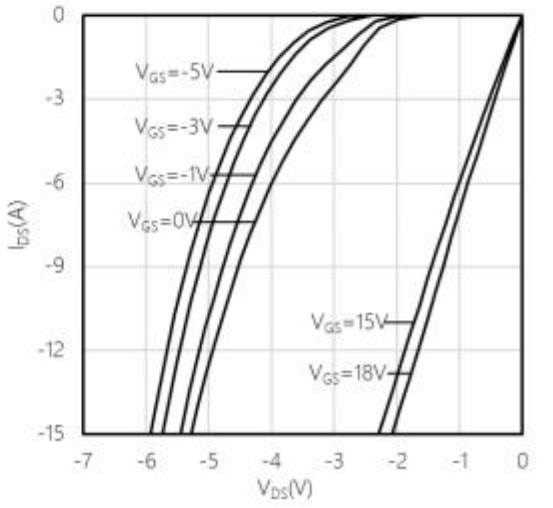

**Typical reverse drain current as function of reverse drain voltage, $V_{GS}$ as parameter**

$I_{DS} = f(V_{DS})$, $T_{VJ}$ = -55 ℃




**Typical reverse drain current as function of reverse drain voltage, $V_{GS}$ as parameter**

$I_{DS} = f(V_{DS})$, $T_{VJ}$ = 25 ℃

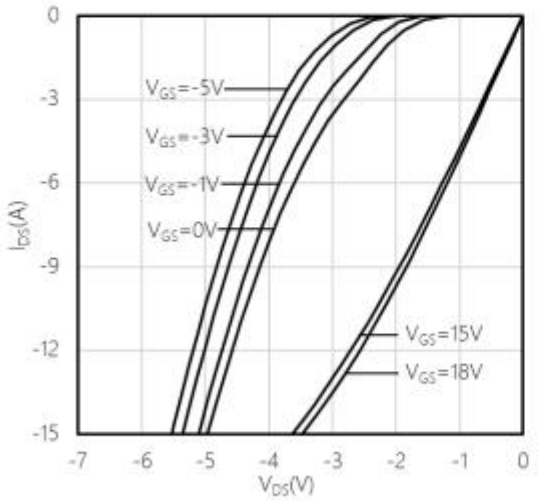




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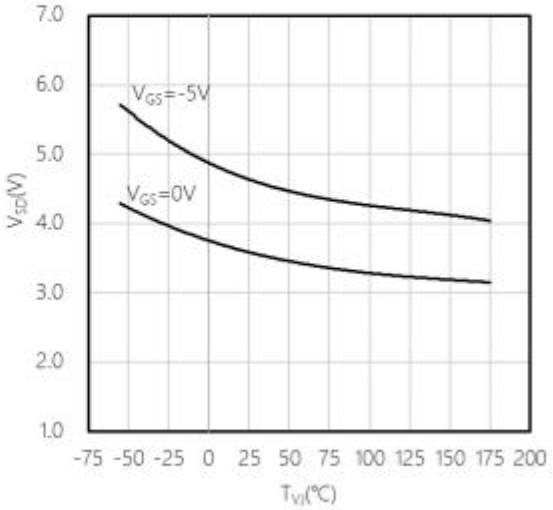
**Typical reverse drain current as function of reverse drain voltage, $V_{GS}$ as parameter**

$I_{DS} = f(V_{DS})$, $T_{VJ}$ = 175 °C




**Typical reverse drain voltage as function of junction temperature**

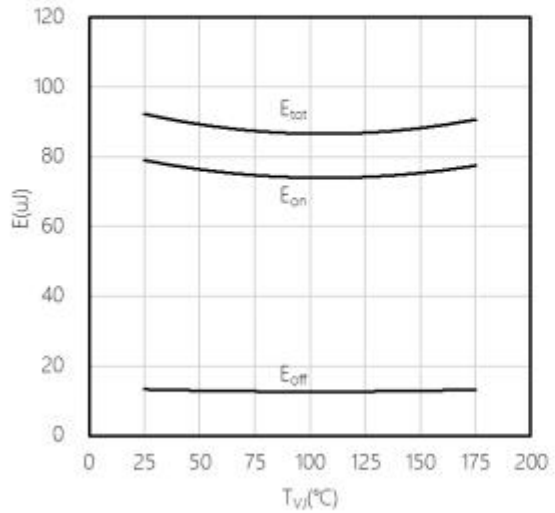
$V_{SD} = f(T_{VJ})$, $I_{SD}$ = 4 A




**Typical switching energy as a function of junction temperature, 2nd device own body diode: $V_{GS}$ = 0 V**

$E = f(T_{VJ})$

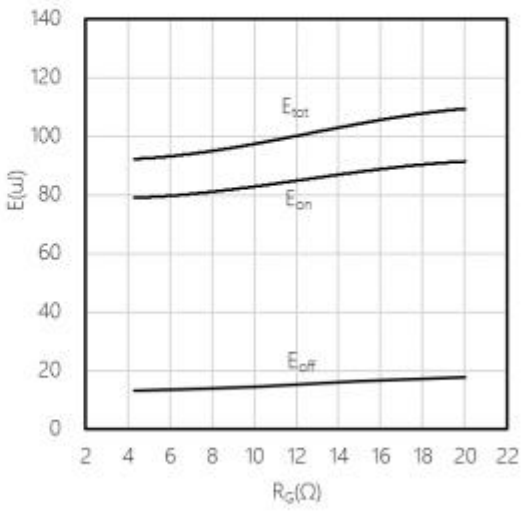
$V_{DS}$ = 400 V, $R_{G(ext)}$ = 4.3 Ω, $V_{GS}$ = 0/15 V, $I_{DS}$ = 8 A




**Typical switching energy losses as a function of gate resistance, 2nd device own body diode: $V_{GS}$ = 0 V**

$E = f(R_{G(ext)})$

$V_{GS}$ = 0/15 V, $I_{DS}$ = 8 A, $T_{VJ}$ = 25 °C, $V_{DS}$ = 400 V



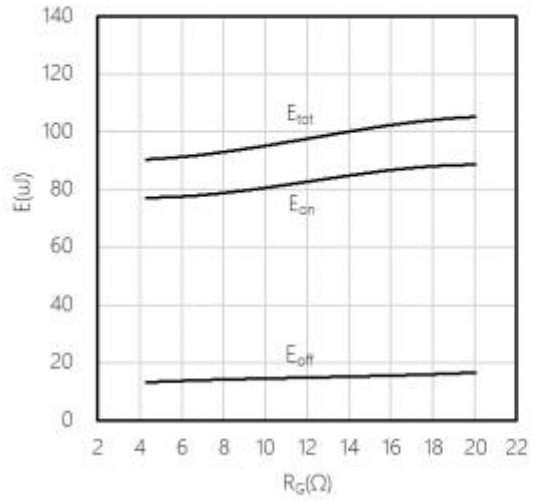


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**Typical switching energy losses as a function of gate resistance, 2nd device own body diode: $V_{GS}$ = 0 V**

E = f($R_{G(ext)}$)

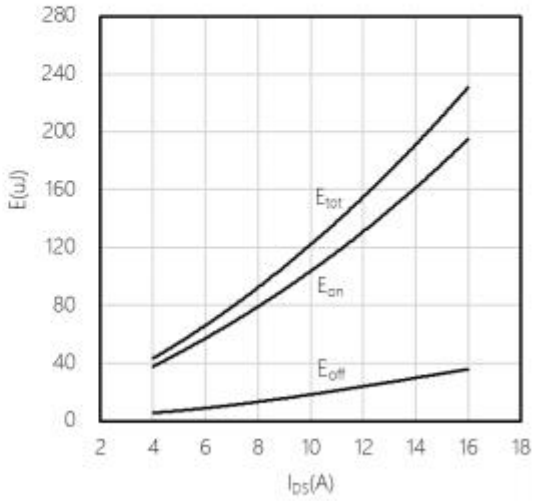
$V_{GS}$ = 0/15 V, $I_{DS}$ = 8 A, $T_{VJ}$ = 175 °C, $V_{DS}$ = 400 V




**Typical switching energy losses as a function of $I_{DS}$, 2nd device own body diode: $V_{GS}$ = 0 V**

E = f($I_{DS}$)

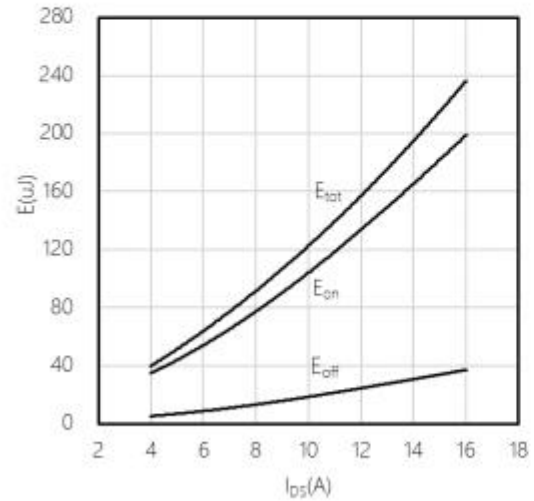
$V_{GS}$ = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, $T_{VJ}$ = 25 °C, $V_{DS}$ = 400 V




**Typical switching energy losses as a function of $I_{DS}$, 2nd device own body diode: $V_{GS}$ = 0 V**

E = f($I_{DS}$)

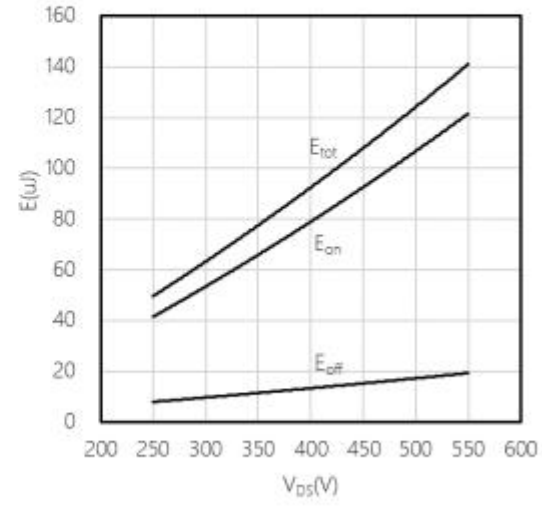
$V_{GS}$ = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, $T_{VJ}$ = 175 °C, $V_{DS}$ = 400 V




**Typical switching energy losses as a function of $V_{DS}$, 2nd device own body diode: $V_{GS}$ = 0 V**

E = f($V_{DS}$)

$V_{GS}$ = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, $T_{VJ}$ = 25 °C, $I_{DS}$ = 8 A



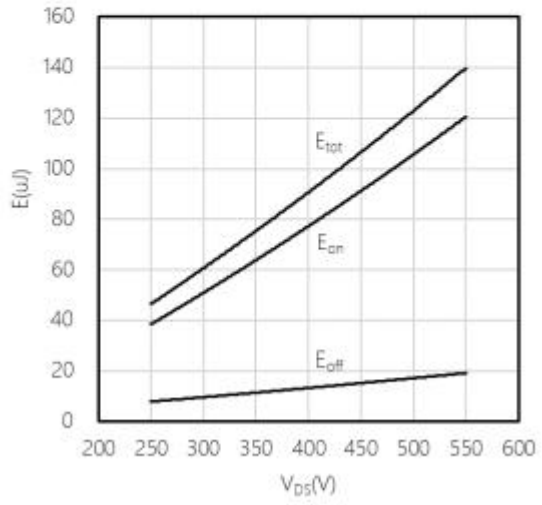


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**Typical switching energy losses as a function of $V_{DS}$, 2nd device own body diode: $V_{GS}$ = 0 V**

E = f($V_{DS}$)

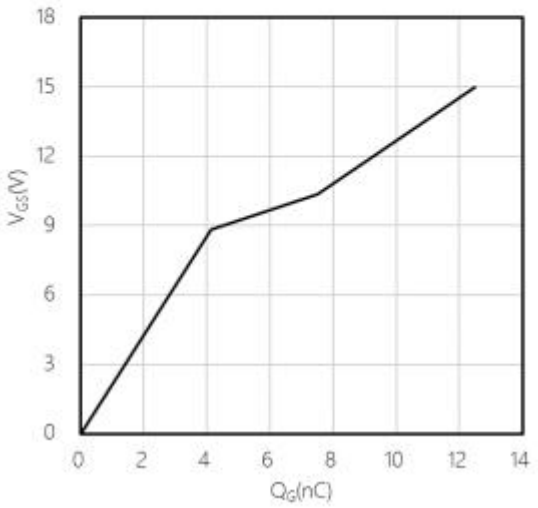
$V_{GS}$ = 0/15 V, $R_{G(ext)}$ = 4.3 Ω, $T_{VJ}$ = 175 °C, $I_{DS}$ = 8 A




**Typical gate charge**

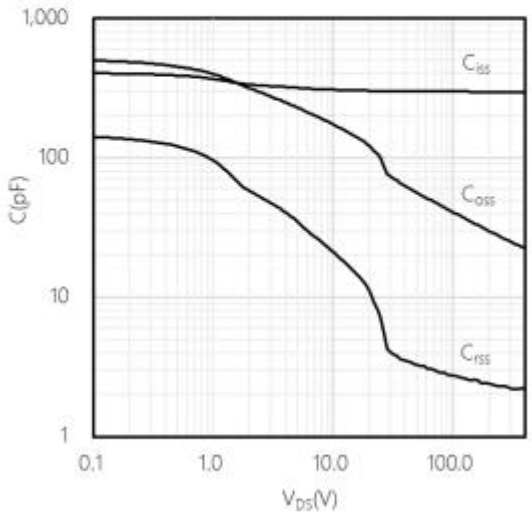
$V_{GS}$ =f($Q_G$), $I_{DS}$ = 8 A, $V_{DS}$ = 400V

turn-on pulse




**Typical capacitance as a function of drain-source voltage**

C = f($V_{DS}$), $V_{GS}$ = 0V, f = 1MHz

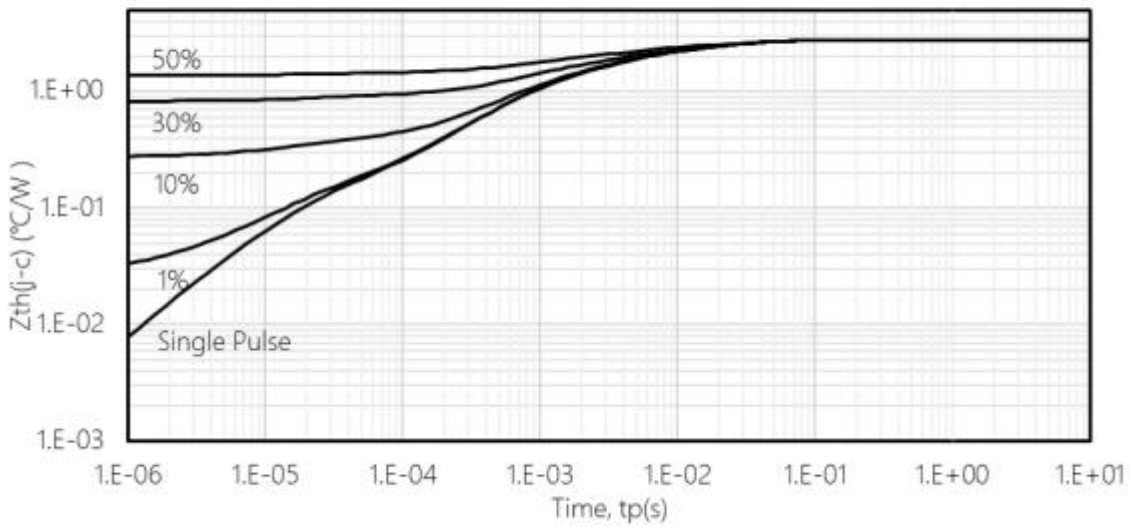




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**Transient thermal resistance (MOSFET)**

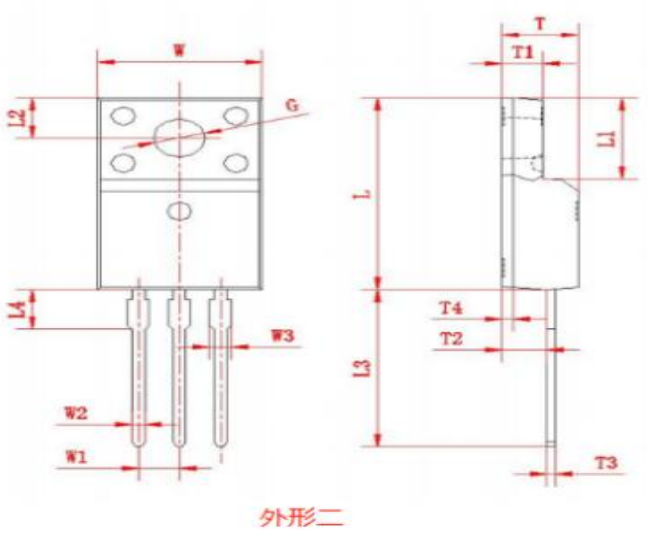
($Z_{th(j-c,max)}$ = f($t_p$), Parameter D = $t_p$/T





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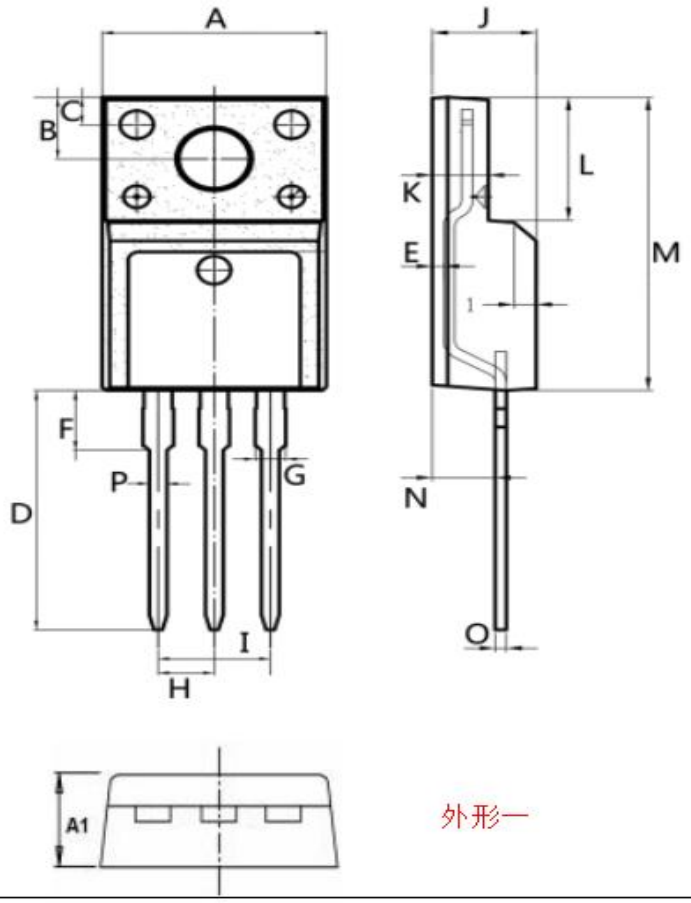
## Package outline drawing(TO-220F Unit: mm )




外形二

| Dim. | Min. | Max. |
|---|---|---|
| W | 9.95 | 10.36 |
| W1 | (2.54) | |
| W2 | 0.70 | 0.90 |
| W3 | 1.25 | 1.47 |
| L | 15.67 | 16.07 |
| L1 | 6.48 | 6.88 |
| L2 | 3.2 | 3.4 |
| L3 | 12.6 | 13.6 |
| L4 | (3.23) | |
| T | 4.50 | 4.90 |
| T1 | 2.34 | 2.74 |
| T2 | 2.25 | 2.95 |
| T3 | 0.45 | 0.60 |
| T4 | (0.70) | |
| G | 3.08 | 3.28 |

All Dimensions in millimeter




外形一

| Dim. | Min. | Max. |
|---|---|---|
| A | 9.95 | 10.36 |
| A1 | 4.5 | 5.0 |
| B | 2.95 | 3.25 |
| C | 1.25 | 1.45 |
| D | 12.60 | 13.60 |
| E | 0.40 | 0.60 |
| F | 2.8 | 3.5 |
| G | 1.30 | 1.45 |
| H | (2.54) | |
| I | (5.08) | |
| J | 4.60 | 4.75 |
| K | 2.45 | 2.65 |
| L | 6.5 | 6.8 |
| M | 15.4 | 16.0 |
| N | 2.25 | 3.05 |
| O | 0.45 | 0.55 |
| P | 0.70 | 0.90 |

All Dimensions in millimeter


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c.whose failuer to when properly used in accordance with instructions for used provided in the laeling,can be reasonably expected to result in significant injury to the user.

2.A critical component is any component of a life support device or system whose failure to system whose failure to perform can be reasonably expected to cause the failure of the life support device or system,or to affect its safety or effectiveness.


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