

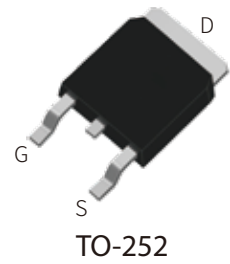
FEATURES

- | 100% EAS Guaranteed

- | Green Device Available

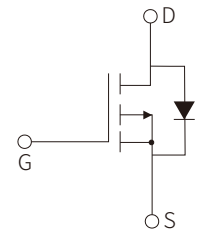
- | Excellent CdV/dt effect decline

- | Advanced high cell density Trench technology



APPROVALS

| | |
|-------------|------------------------------------|
| RoHS | Compliance with 2011/65/EU |
| HF | Compliance with IEC61249-2-21:2003 |



Schematic Symbol

ABSOLUTE MAXIMUM RATINGS

| Parameter | | Symbol | Value | Unit |
|--|-------------------------|-----------------|------------|---------------------------|
| Drain-Source Voltage | | V_{DS} | -40 | V |
| Gate-Source Voltage | | V_{GS} | ± 20 | V |
| Continuous Drain Current | $T_c=25^\circ\text{C}$ | I_D | -50 | A |
| | $T_c=100^\circ\text{C}$ | | -31 | |
| Pulsed Drain Current ¹ | | I_{DM} | -200 | A |
| Single Pulse Avalanche Energy ² | | EAS | 80 | mJ |
| Total Power Dissipation $T_c=25^\circ\text{C}$ | | P_D | 55 | W |
| Thermal Resistance from Junction-to-Ambient ³ | | $R_{\theta JA}$ | 61 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance from Junction-to-Case | | $R_{\theta JC}$ | 2.27 | $^\circ\text{C}/\text{W}$ |
| Operating Junction and Storage Temperature Range | | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

ELECTRICAL CHARACTERISTICS (T_A=25°C)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|----------------------|--|------|------|------|------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _D =-250μA | -40 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =-40V, V _{GS} =0V, T _J = 25°C | | | -1 | μA |
| | | V _{DS} =-40V, V _{GS} =0V, T _J = 100°C | | | -5 | |
| Gate-body Leakage current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | | | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =-250μA | -1.0 | -1.6 | -2.5 | V |
| Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =-10V, I _D =-16A | | 7.8 | 10.8 | mΩ |
| | | V _{GS} =-4.5V, I _D =-12A | | 12 | 17.8 | mΩ |
| Forward Transconductance | g _{fs} | V _{DS} =-10V, I _D =-16A | | 44 | | S |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =-20V, V _{GS} =0V f = 1 MHz | | 3050 | | pF |
| Output Capacitance | C _{oss} | | | 282 | | pF |
| Reverse Transfer Capacitance | C _{riss} | | | 230 | | pF |
| Gate Resistance | R _g | f = 1MHz | | 9 | | Ω |
| Switching Characteristics | | | | | | |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = -15V, V _{GS} =-10V, R _g =3Ω, I _D =-16A | | 38 | | nS |
| Turn-On Rise Time | t _r | | | 31 | | nS |
| Turn-Off Delay Time | t _{d(off)} | | | 90 | | nS |
| Turn-Off Fall Time | t _f | | | 9.2 | | nS |
| Total Gate Charge | Q _g | V _{DS} =-20V, V _{GS} =-10V, I _D =-16A | | 28 | | nC |
| Gate- Source Charge | Q _{gs} | | | 8 | | nC |
| Gate- Drain Charge | Q _{gd} | | | 8.5 | | nC |
| Drain-Source Body Diode Characteristics | | | | | | |
| Diode Forward Voltage | V _{SD} | I _S = -1A, V _{GS} =0V | | | -1.2 | V |
| Continuous Source Current T _c = 25°C | I _S | | | | -50 | A |

PARAMETER CHARACTERISTIC CURVE

Figure1 : Output Characteristics

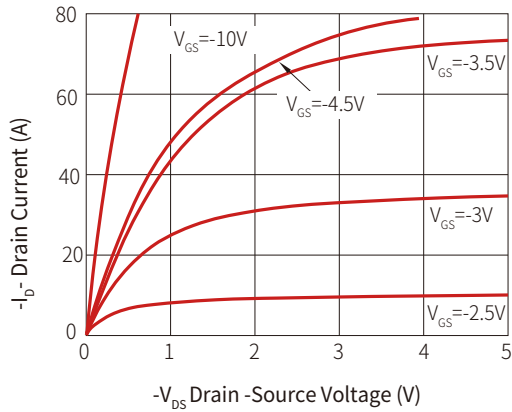


Figure2 : Transfer Characteristics

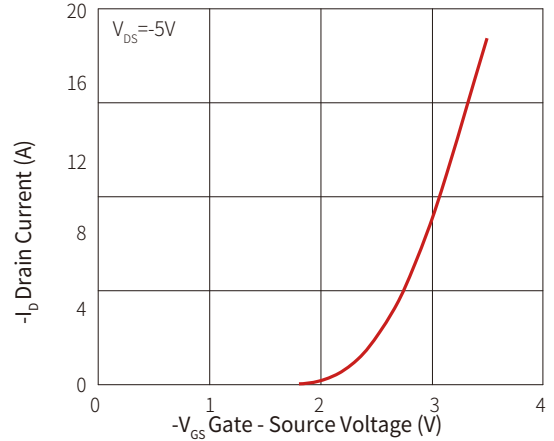


Figure3 : Forward Characteristics of Reverse

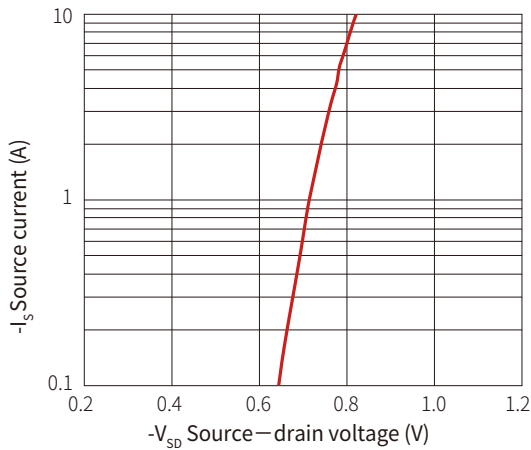


Figure4 : $R_{DS(on)}$ vs V_{GS}

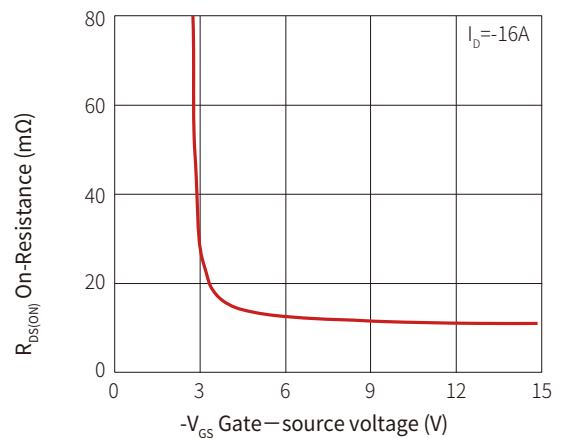


Figure5 : $R_{DS(on)}$ vs I_D

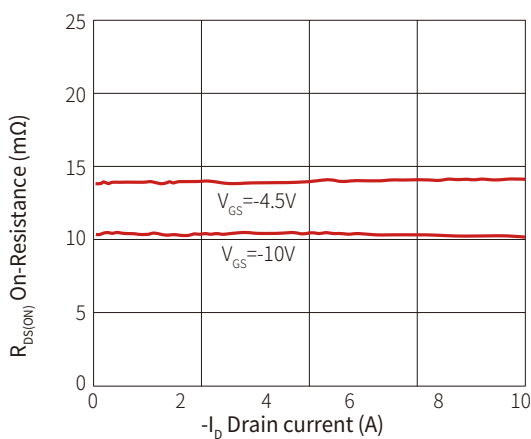


Figure6 : Normalized $R_{DS(on)}$ vs. Temperature

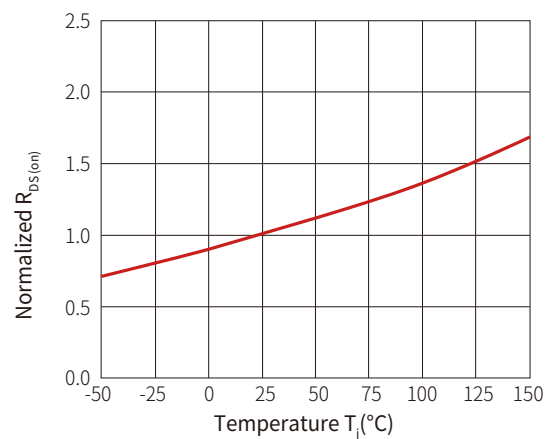


Figure7 : Capacitance Characteristics

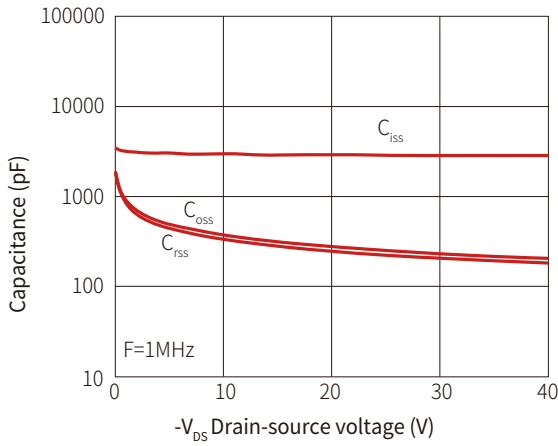


Figure8 : Gate Charge Characteristics

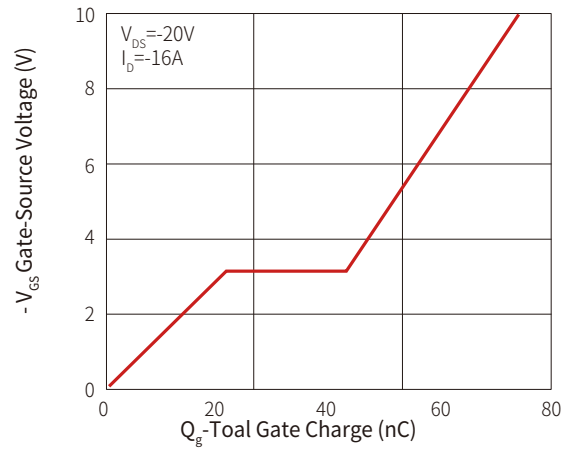


Figure9 : Power Dissipation

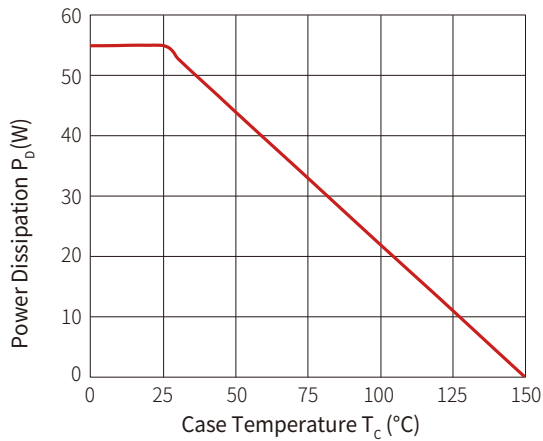


Figure10 : Safe Operating Area

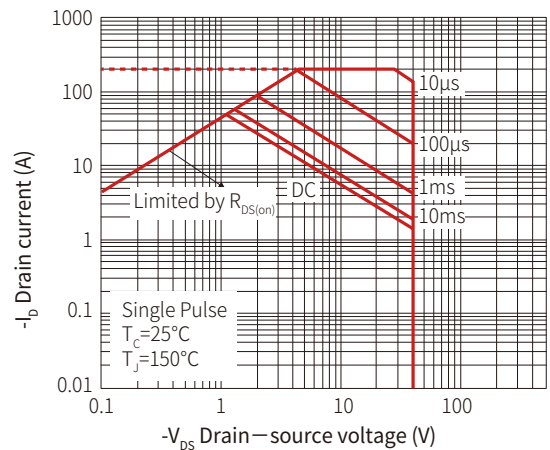
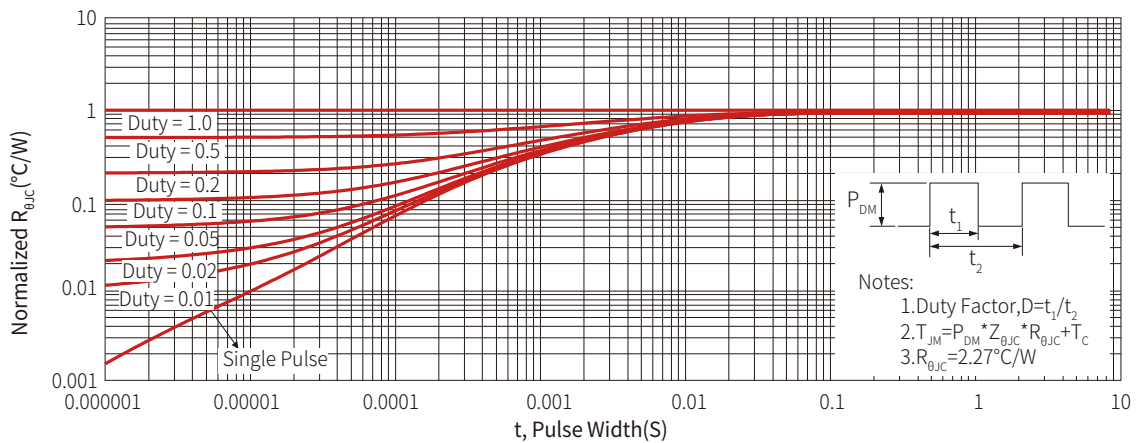
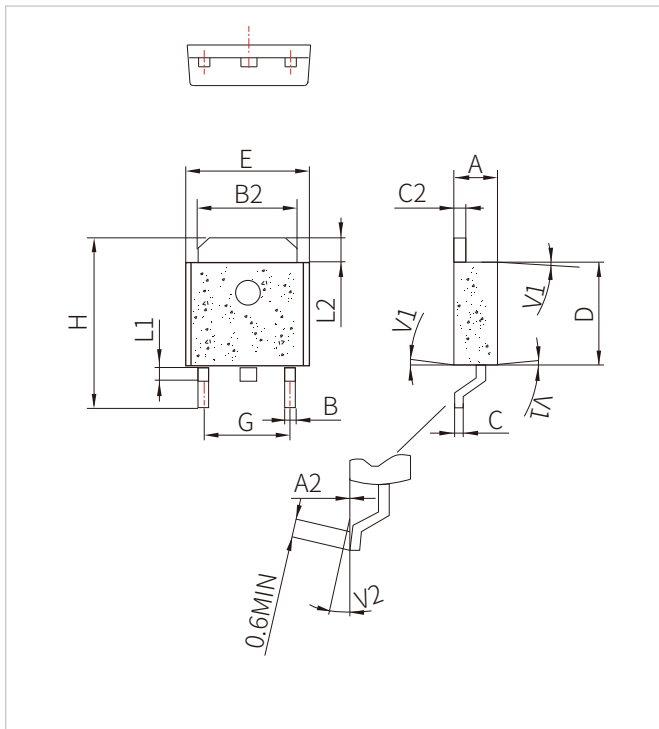


Figure11 : Normalized Maximum Transient Thermal Impedance



TO-252 PACKAGE MECHANICAL DATA



| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.50 | | 1.00 | 0.020 | | 0.039 |
| B2 | 5.10 | | 5.40 | 0.200 | | 0.213 |
| C | 0.45 | | 0.62 | 0.018 | | 0.024 |
| C2 | 0.48 | | 0.62 | 0.019 | | 0.024 |
| D | 5.30 | | 6.40 | 0.209 | | 0.252 |
| E | 6.10 | | 6.80 | 0.240 | | 0.268 |
| G | 4.40 | | 4.70 | 0.173 | 0.1 | 0.185 |
| H | 9.35 | | 10.7 | 0.368 | | 0.421 |
| L1 | 1.30 | | 1.70 | 0.051 | 0.143 | 0.067 |
| L2 | 1.37 | | 1.50 | 0.054 | | 0.059 |
| V1 | | 4° | | | 0.130 | |
| V2 | 0° | | 8° | 0° | | 8° |

ORDERING INFORMATION

| Part Number | Component Package | Marking | QTY/Reel | Reel Size |
|-------------|-------------------|--|----------|-----------|
| SPM50P04D | TO-252 |  50P04 XXXX | 2500PCS | 13" |

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