

Vishay Siliconix

BoHS

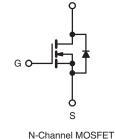
COMPLIANT

Power MOSFET

| PRODUCT SUMMARY | | | | | |
|----------------------------|-----------------|------|--|--|--|
| V _{DS} (V) | 250 | | | | |
| R _{DS(on)} (Ω) | $V_{GS} = 10 V$ | 0.14 | | | |
| Q _g (Max.) (nC) | 140 | | | | |
| Q _{gs} (nC) | 24 | | | | |
| Q _{gd} (nC) | 71 | | | | |
| Configuration | Single | | | | |

TO-247AC





FEATURES

- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- · Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC

DESCRIPTION

Third generation Power MOSFETs from Vishay provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

TO-247AC preferred The package for is commercial-industrial applications where higher power levels preclude the use of TO-220AB devices. The TO-247AC is similar but superior to the earlier TO-218 package because of its isolated mouting hole. It also provides greater creepage distance between pins to meet the requirements of most safety specifications.

| ORDERING INFORMATION | |
|----------------------|-------------|
| Package | TO-247AC |
| Lead (Pb)-free | IRFP254PbF |
| Leau (FD)-fiee | SiHFP254-E3 |
| SnPb | IRFP254 |
| | SiHFP254 |

| PARAMETER | | | SYMBOL | LIMIT | UNIT | |
|--|-------------------------|---|-----------------------------------|------------------|----------|--|
| Drain-Source Voltage | | | V _{DS} | 250 | v | |
| Gate-Source Voltage | | | V _{GS} | ± 20 | | |
| Continuous Drain Current | V _{GS} at 10 V | $T_C = 25 \degree C$ $T_C = 100 \degree C$ | 1- | 23 | 1 | |
| | VGS at 10 V | T _C = 100 °C | I _D | 15 | A | |
| Pulsed Drain Current ^a | | | I _{DM} | 92 | 1 | |
| Linear Derating Factor | | | | 1.5 | W/°C | |
| Single Pulse Avalanche Energy ^b | | | E _{AS} | 410 | mJ | |
| Repetitive Avalanche Current ^a | | | I _{AR} | 23 | А | |
| Repetitive Avalanche Energy ^a | | | E _{AR} | 19 | mJ | |
| Maximum Power Dissipation | $T_{\rm C} = 2$ | 25 °C | PD | 190 | W | |
| Peak Diode Recovery dV/dt ^c | | | dV/dt | 4.8 | V/ns | |
| Operating Junction and Storage Temperature Range | | | T _J , T _{stg} | - 55 to + 150 | °C | |
| Soldering Recommendations (Peak Temperature) | for 1 | 0 s | | 300 ^d | | |
| Mounting Torque | 6-32 or M3 screw | | | 10 | lbf ∙ in | |
| | | | | 1.1 | N · m | |

Notes

a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. $V_{DD} = 50$ V, starting $T_J = 25$ °C, L = 1.2 mH, $R_q = 25 \Omega$, $I_{AS} = 23$ A (see fig. 12).

c. $I_{SD} \le 23$ A, dl/dt ≤ 180 A/µs, $V_{DD} \le V_{DS}$, $T_J \le 150$ °C.

d. 1.6 mm from case.

* Pb containing terminations are not RoHS compliant, exemptions may apply

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Vishay Siliconix



| Maximum Junction-to-Ambient Ren_JA - 40 Case-to-Sink, Flat, Greased Surface R _{BCS} 0.24 - 0.65 SPECIFICATIONS (T_j = 25 °C, unless otherwise noted) Maximum Junction-to-Case (Drain) Renuc - 0.65 SPECIFICATIONS (T_j = 25 °C, unless otherwise noted) Min. TYP. MAX. Vin. Static Drain-Source Breakdown Voltage V _{OS} V _{SS} = 0 V, I _b = 250 µA 2.50 - - V/C Gate-Source Treshold Voltage V _{SS} V _{SS} = 20 V - - 4.0 V Zero Gate Voltage Drain Current Ibss V _{SS} = 20 V - - 2.50 µ Drain-Source On-State Resistance R _{DS600} V _{OS} = 10 V I _b = 14 A ^b - 0.14 Ω Drain-Source Charpe Q _{Gg} V _{OS} = 50 V, I _b = 125 V, I _b = 23 A, V _{OS} = 20 V, I _c = 120 V, I _c = 270, I _c = 100 V, I _c = 270, I _c = 100 V, I _c = 270, I _c = 100 V, I _c = 270, I _c = 100 V, I _c = 270, I _c = 100 V, I _c = 270, I _c = 270, I _c = 270, I _c = 100 V, I _c = 270, I _c = 270, I _c = 270, I _c = 100 V, I _c = 270, I _c = 270, I _c = 270, I _c = 100 V, I _c = 270, I _c = 270, I _c = 100 V, I _c = 270, I _c = 270, | THERMAL RESISTANCE RATI | NGS | | | | | | | |
|--|--|--|--|--------------------------------------|-----------------------|-------------|-----------|-----------------------|------------------|
| Case-to-Sink, Flat, Greased Surface R_{HCS} 0.24 \cdot $^{\circ}$ C/W Maximum Junction-to-Case (Drain) R_{HJC} $ 0.65$ $^{\circ}$ C/W SPECIFICATIONS (T _J = 25 °C, unless otherwise noted) TEST CONDITIONS MIN. TYP. MAX. UN Static Drain-Source Breakdown Voltage V_{DS} $V_{SS} = 0$ V, $I_D = 250 \ \mu A$ 2.0 $ V_{VD}$ Gate-Source Intreshold Voltage V_{DS} $V_{CS} = 20 \ V$ $ 2.0$ $ 4.0$ V_{VD} Gate-Source Leakage Lass $V_{CS} = 200 \ V$, $V_{CS} = 0 \ V$ $ 2.0$ $ 4.0$ V_{VD} Gate-Source Leakage Lass $V_{CS} = 200 \ V$, $V_{CS} = 0 \ V$ $ 2.50 \ \mu^{\mu}$ $V_{CS} = 20 \ V$ $ 2.50 \ \mu^{\mu}$ Zaro Gate Voltage Drain Current Loss $V_{OS} = 200 \ V, V_{OS} = 0 \ V, \ I_{0} = 14 \ A^{h}$ $ 0.14 \ \Omega$ Drain-Source On-State Resistance R_{DSim} $V_{CS} = 20 \ V, \ V_{CS} = 20 \ V, \ V_{C$ | PARAMETER | SYMBOL | TYP. | | MAX. | | UNIT | | |
| Maximum Junction-to-Case (Drain) $R_{h,vC}$ - 0.65 SPECIFICATIONS (T _J = 25 °C, unless otherwise noted) PARAMETER SYMBOL TEST CONDITIONS Min. TYP. MAX. UN SPECIFICATIONS (T _J = 25 °C, lp = 1 mA Colspan="4">Colspan="4" | Maximum Junction-to-Ambient | R _{thJA} | | | | | | | |
| SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)SPECIFICATIONS (T _J = 25 °C, log = 1 mATest CONDITIONSMIN.TYP.MAX.UNSpecific ConditionsMIN.TYP.MAX.UNSpecific ConditionsMIN.TYP.MAX.UNSpecific ConditionsMIN.TYP.MAX.UNSpecific ConditionsType ConditionsMIN.TYP.MAX.UNSpecific ConditionsMIN.TYP.MAX.UNSpecific ConditionsConditionsTYP.MAX.UNSpecific ConditionsConditionsType Max.UNConditionsVoid ConditionsType Max.Void ConditionsConditionsVoid ConditionsConditionsType Max.Void ConditionsConditionsVoid ConditionsType Max.Void ConditionsConditionsVoid ConditionsConditionsType Max.Void ConditionsConditionsVoid Conditi | Case-to-Sink, Flat, Greased Surface | R _{thCS} | | | | °C/W | | | |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | Maximum Junction-to-Case (Drain) | R _{thJC} | - 0.65 | | | | | | |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | | • | | | | | | | |
| Static VDS VGS = 0 V, I_0 = 250 µA 250 - - V Orain-Source Breakdown Voltage $\Delta V_{DS}/T_J$ Reference to 25 °C, I_0 = 1 mA - 0.39 - - V/P Gate-Source Threshold Voltage V_{OS} (Sigm) $V_{DS} = V_{GS}$, I_D = 250 µA 2.0 - 4.0 V Gate-Source Leakage Ideas $V_{OS} = 200$, V, Vos = 0 V - - ± 100 n/V Zero Gate Voltage Drain Current IDES $V_{DS} = 200$, V, Vos = 0 V - - 250 µV Forward Transconductance P_{IS} $V_{DS} = 10$ V I_D = 14 A ^D - 0.14 Q_D Dynamic Ippl Capacitance C_{GSS} $V_{DS} = 20$ V, Vos = 0 V, $V_{DS} = 25$ V, I_D = 14 A ^D 11 - - 8 Output Capacitance C_{GSS} $V_{DS} = 20$ V, Vos = 0 V, $V_{DS} = 20$ V, $V_{SS} = 0$ V, $V_{DS} = 20$ V, $V_{SS} = 0$ V, $V_{SS} $ | SPECIFICATIONS (T _J = 25 $^{\circ}$ C, t | unless otherw | vise noted) | | | | | | |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | PARAMETER | SYMBOL | TEST | CONDITI | ONS | MIN. | TYP. | MAX. | UNIT |
| | Static | | | | | | | | • |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | Drain-Source Breakdown Voltage | V _{DS} | $V_{GS} = 0$ | V, I _D = 28 | 50 µA | 250 | - | - | V |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | V _{DS} Temperature Coefficient | $\Delta V_{DS}/T_{J}$ | Reference | to 25 °C, I | _D = 1 mA | - | 0.39 | - | V/°C |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | Gate-Source Threshold Voltage | V _{GS(th)} | $V_{DS} = V$ | ′ _{GS} , I _D = 2 | 50 µA | 2.0 | - | 4.0 | V |
| Zero Gate Voltage Drain Current Ibss VDS = 200 V, VGS = 0 V, TJ = 125 °C - - 250 μ^{μ} Drain-Source On-State Resistance RDS(on) VGS = 10 V Ib = 14 Ab - - 0.14 Q Forward Transconductance gfs VDS = 50 V, Ib = 14 Ab 11 - - 0.14 Q Dynamic Input Capacitance Ciss VDS = 20 V, VGS = 0 V, VDS = 25 V, ff = 1.0 MHz, see fig. 5 - 620 - - 620 - - 620 - pf Output Capacitance Crss VGS = 0 V, VDS = 25 V, ff = 1.0 MHz, see fig. 5 - 180 - - 620 - pf Gate-Source Charge Qg VGS = 10 V Ib = 23 A, VDS = 200 V, See fig. 6 and 13b - - 140 - - - 140 - - - 15 - - 633 - - - 15 - - 633 - - - 15 - - - 50< | Gate-Source Leakage | I _{GSS} | VG | _{is} = ± 20 \ | 1 | - | - | ± 100 | nA |
| $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | Zara Cata Valtaga Drain Current | 1 | V _{DS} = 2 | 50 V, V _{GS} | = 0 V | - | - | 25 | |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | Zero Gate voltage Drain Current | $V_{DS} = 200 \text{ V}, \text{ V}_{GS} = 0 \text{ V}, \text{ T}_{J} = 125 \text{ °C}$ | | T _J = 125 °C | - | - | 250 | μA | |
| DynamicInput Capacitance C_{iss} $V_{GS} = 0 V$, $V_{DS} = 25 V$, $f = 1.0 MHz$, see fig. 5 $ 2700$ $-$ Output Capacitance C_{rss} $f = 1.0 MHz$, see fig. 5 $ 620$ $ pf$ Reverse Transfer Capacitance C_{rss} r r 620 $ r$ r Total Gate Charge Q_{gg} Q_{gg} $V_{GS} = 10 V$ $I_{D} = 23 A, V_{DS} = 200 V,$ see fig. 6 and 13^{D} $ 140$ Gate-Drain Charge Q_{gd} $V_{GS} = 10 V$ $I_{D} = 23 A, V_{DS} = 200 V,$ see fig. 6 and 13^{D} $ 140$ Gate-Drain Charge Q_{gd} $V_{GS} = 10 V$ $I_{D} = 23 A, V_{DS} = 200 V,$ see fig. 6 and 13^{D} $ 140$ Gate-Drain Charge Q_{gd} $V_{GS} = 10 V$ $I_{D} = 23 A, V_{DS} = 200 V,$ see fig. 6 and 13^{D} $ 140$ Gate-Drain Charge Q_{gd} $V_{GS} = 10 V$ $I_{D} = 23 A, V_{DS} = 200 V,$ see fig. 6 and 13^{D} $ 71$ Turn-On Delay Time $t_{d(onf)}$ $V_{DD} = 125 V, I_{D} = 23 A,$ $R_{g} = 6.2 \Omega, R_{D} = 5.4 \Omega,$ see fig. 10^{D} $ 74$ $-$ Fall Time t_{f} I_{D} I_{D} I_{D} $ 5.0$ $-$ Internal Drain Inductance L_{D} I_{D} I_{D} I_{D} $ 13$ $-$ Pulsed Diode Forward Current I_{S} MOSFET symbol showing the I_{D} - I_{D} $ 23$ $ -$ <td< td=""><td>Drain-Source On-State Resistance</td><td>R_{DS(on)}</td><td>V_{GS} = 10 V</td><td>١_D</td><td>) = 14 A^b</td><td>-</td><td>-</td><td>0.14</td><td>Ω</td></td<> | Drain-Source On-State Resistance | R _{DS(on)} | V _{GS} = 10 V | ١ _D |) = 14 A ^b | - | - | 0.14 | Ω |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | Forward Transconductance | 9 _{fs} | $V_{DS} = 5$ | 50 V, I _D = ⁻ | 14 A ^b | 11 | - | - | S |
| Output Capacitance Coss Vocs = 25 V, yos = 25 V, f = 1.0 MHz, see fig. 5 - 620 - pf Reverse Transfer Capacitance Crss $\Gamma_{DS} = 25 V,$ f = 1.0 MHz, see fig. 5 - 180 - - 140 - - 140 - - 140 - - - 140 - - - 140 - - - 140 - - - 140 - - - 140 - - - 140 - - - 140 - - - 140 - - - 15 - - 15 - - 15 - - 63 - - 15 - - 63 - - 16 - 50 - - 50 - - 50 - - 16 mm (0.25") from package and center of die contact - 13 - - 13 - - | Dynamic | | • | | | | • | • | |
| Output Capacitance C_{oss} $V_{DS} = 25 \text{ V}$, f = 1.0 MHz, see fig. 5-620-pfReverse Transfer Capacitance C_{rss} $f = 1.0 \text{ MHz}$, see fig. 5-620-pfReverse Transfer Capacitance C_{rss} $f = 1.0 \text{ MHz}$, see fig. 5-620-pfTotal Gate Charge Q_g $V_{GS} = 10 \text{ V}$ $I_D = 23 \text{ A}, V_{DS} = 200 \text{ V},$ see fig. 6 and 13b24ndGate-Drain Charge Q_{gd} $V_{GS} = 10 \text{ V}$ $I_D = 23 \text{ A}, V_{DS} = 200 \text{ V},$ see fig. 6 and 13b71-Turn-On Delay Time $t_{d(off)}$ $V_{GS} = 10 \text{ V}$ $I_D = 23 \text{ A}, V_{DS} = 200 \text{ V},$ see fig. 6 and 13b71-Turn-Off Delay Time $t_{d(off)}$ $V_{DD} = 125 \text{ V}, I_D = 23 \text{ A},$ $R_g = 6.2 \Omega, R_D = 5.4 \Omega, see fig. 10^{b}$ -63Fall Time t_f V_{DD} -5.0140Internal Drain Inductance L_D Between lead, 6 mm (0.25") from package and center of die contact-5.013-Drain-Source Body Diode Characteristics-IsMOSFET symbol showing the | Input Capacitance | C _{iss} | $V_{DS} = 25 V$, | | - | 2700 | - | pF | |
| Reverse Iranster Capacitance C_{rss} -180-Total Gate Charge Q_g Gate-Source Charge Q_{gs} Gate-Drain Charge Q_{gd} Gate-Drain Charge Q_{gd} Turn-On Delay Time $t_{d(on)}$ Rise Time t_r Turn-Off Delay Time $t_{d(off)}$ Fall Time t_r Fall Time t_r Internal Drain Inductance L_D Internal Source Inductance L_S Drain-Source Body Diode CharacteristicsContinuous Source-Drain Diode Current I_S Pulsed Diode Forward Currenta I_S MOSFET symbol showing the integral reverse $p - n$ junction diode $r_J = 25 ^\circ C, I_F = 23 A, dl/dt = 100 A/\mus^b$ 1.8Vost Source Porse Recovery Charge Q_{rr} Total Contract $T_J = 25 ^\circ C, I_F = 23 A, dl/dt = 100 A/\mus^b$ <td>Output Capacitance</td> <td>C_{oss}</td> <td>-</td> <td>620</td> <td>-</td> | Output Capacitance | C _{oss} | | | - | 620 | - | | |
| Gate-Source Charge Q_{gs} $V_{GS} = 10 V$ $I_D = 23 A, V_{DS} = 200 V,$ see fig. 6 and 13b24ndGate-Drain Charge Q_{gd} Q_{gd} $V_{GS} = 10 V$ $I_D = 23 A, V_{DS} = 200 V,$ see fig. 6 and 13b24ndTurn-On Delay Time $t_{d(on)}$ t_r $V_{DD} = 125 V, I_D = 23 A,$ $R_g = 6.2 \Omega, R_D = 5.4 \Omega, see fig. 10b-15-Fall Timet_rV_{DD} = 125 V, I_D = 23 A,R_g = 6.2 \Omega, R_D = 5.4 \Omega, see fig. 10b-63-Internal Drain InductanceL_DBetween lead,6 mm (0.25") frompackage and center ofdie contact-5.0-Internal Source InductanceL_SMOSFET symbolshowing theintegral reversep - n junction diode23Pulsed Diode Forward Current*I_SMOSFET symbolshowing theintegral reversep - n junction diode23Body Diode Reverse Recovery Timet_{rr}t_{rr}T_J = 25 °C, I_S = 23 A, V_{GS} = 0 V^b1.8VBody Diode Reverse Recovery ChargeQ_{rr}T_J = 25 °C, I_F = 23 A, dI/dt = 100 A/\mu S^b1.8V$ | Reverse Transfer Capacitance | C _{rss} | | | - | 180 | - | | |
| Gate-Solice Griage dg_{g} $V_{GS} = 10^{\circ}$ see fig. 6 and 13b I | Total Gate Charge | Qg | | | | - | - | 140 | |
| Gate-Drain Charge Q_{gd} 71Turn-On Delay Time $t_{d(on)}$ Rise Time t_r Turn-Off Delay Time $t_{d(off)}$ Fall Time t_r Fall Time t_f Internal Drain Inductance L_D Internal Source Inductance L_S Drain-Source Body Diode CharacteristicsContinuous Source-Drain Diode Current I_S Pulsed Diode Forward Current ^a I_{SM} Pulsed Diode Forward Current ^a I_{SM} Body Diode Reverse Recovery Time t_{rr} $T_J = 25 ^{\circ}C$, $I_F = 23 A$, $dI/dt = 100 A/\mus^b$ $T_J = 25 ^{\circ}C$, $I_F = 23 A$, $dI/dt = 100 A/\mus^b$ $ 370 560$ $ 4.6 6.9$ μ/Q | Gate-Source Charge | Q _{gs} | | | | - | - | 24 | nC |
| Rise Time t_r $V_{DD} = 125 \text{ V}, \text{ I}_D = 23 \text{ A},$ $ 63$ $ 63$ $ 74$ $ 74$ $ 74$ $ 74$ $ 74$ $ 50$ $ 50$ $ 50$ $ 50$ $ 74$ $ 50$ $ 13$ $ 50$ $ 13$ <t< td=""><td>Gate-Drain Charge</td><td>Q_{gd}</td><td></td><td>000 11</td><td>g. o ana ro</td><td>-</td><td>-</td><td>71</td><td>1</td></t<> | Gate-Drain Charge | Q _{gd} | | 000 11 | g. o ana ro | - | - | 71 | 1 |
| Rise Time t_r $V_{DD} = 125 \text{ V}, \text{ I}_D = 23 \text{ A},$ $ 63$ $ 63$ $ 74$ $ 74$ $ 74$ $ 74$ $ 74$ $ 50$ $ 50$ $ 50$ $ 50$ $ 74$ $ 50$ $ 13$ $ 50$ $ 13$ <t< td=""><td>Turn-On Delay Time</td><td>t_{d(on)}</td><td></td><td>•</td><td></td><td>-</td><td>15</td><td>-</td><td></td></t<> | Turn-On Delay Time | t _{d(on)} | | • | | - | 15 | - | |
| Turn-Off Delay Time $t_{d(off)}$ $R_g = 6.2 \ \Omega, R_D = 5.4 \ \Omega, see fig. 10^b$ -74-Fall Time t_f -50-Internal Drain Inductance L_D Between lead, 6 mm (0.25") from package and center of die contact-5.0-Internal Source Inductance L_S Between lead, 6 mm (0.25") from package and center of die contact-5.0-Drain-Source Body Diode Characteristics-13Continuous Source-Drain Diode CurrentIsMOSFET symbol showing the integral reverse p - n junction diode23Pulsed Diode Forward CurrentaIsMOSFET symbol showing the integral reverse p - n junction diode92Body Diode Reverse Recovery Time t_{rr} $T_J = 25 \ ^\circ C$, $I_F = 23 \ A$, $dI/dt = 100 \ A/\mu s^b$ -370560nsBody Diode Reverse Recovery Charge Q_{rr} T-23 \ A, dI/dt = 100 \ A/\mu s^b-4.66.9 μ | Rise Time | | | | - | 63 | - | - ns | |
| Internal Drain Inductance L_D Between lead, 6 mm (0.25") from package and center of die contact-5.0-nHInternal Source Inductance L_S L_S MOSFET symbol showing the integral reverse p - n junction diode-13-13-Pulsed Diode Forward Currenta I_S MOSFET symbol showing the integral reverse p - n junction diode23ABody Diode Voltage V_{SD} $T_J = 25 ^\circ C$, $I_F = 23 A$, $V_{GS} = 0 V^b$ 1.8VBody Diode Reverse Recovery Time t_{rr} $T_J = 25 ^\circ C$, $I_F = 23 A$, $dI/dt = 100 A/\mu s^b$ -370560nsBody Diode Reverse Recovery Charge Q_{rr} $T_J = 25 ^\circ C$, $I_F = 23 A$, $dI/dt = 100 A/\mu s^b$ -4.66.9 μC | Turn-Off Delay Time | t _{d(off)} | | | - | 74 | - | | |
| Internal Drain Hubblah HubblahLD6 mm (0.25") from package and center of die contact-3.0Internal Source InductanceLS6 mm (0.25") from package and center of die contact-1313-Drain-Source Body Diode CharacteristicsContinuous Source-Drain Diode CurrentIsMOSFET symbol showing the integral reverse p - n junction diode23APulsed Diode Forward CurrentaIsMOSFET symbol showing the integral reverse p - n junction diode92ABody Diode VoltageVSDTJ = 25 °C, IS = 23 A, VGS = 0 Vb1.8VBody Diode Reverse Recovery Timetrr TJ = 25 °C, IF = 23 A, dl/dt = 100 A/µsb-370560ns-4.66.9µC-4.66.9µC | Fall Time | t _f | | | - | 50 | - | | |
| Internal Source InductanceLSpackage and center of die contact-13-Drain-Source Body Diode CharacteristicsContinuous Source-Drain Diode CurrentISMOSFET symbol showing the integral reverse $p - n$ junction diode23APulsed Diode Forward CurrentaISMISMTJ = 25 °C, IS = 23 A, VGS = 0 Vb92ABody Diode Reverse Recovery TimetrrtrrTJ = 25 °C, IF = 23 A, dI/dt = 100 A/µsb1.8VBody Diode Reverse Recovery ChargeQrrTJ = 25 °C, IF = 23 A, dI/dt = 100 A/µsb-370560ns | Internal Drain Inductance | L _D | 6 mm (0.25") from a center of a center of | | - | 5.0 | - | | |
| Continuous Source-Drain Diode CurrentISMOSFET symbol showing the integral reverse p - n junction diode23APulsed Diode Forward CurrentaISMISMT_J = 25 °C, I_S = 23 A, V_{GS} = 0 V^b92ABody Diode VoltageVSDT_J = 25 °C, I_S = 23 A, V_{GS} = 0 V^b1.8VBody Diode Reverse Recovery Time t_{rr} $T_J = 25 °C, I_F = 23 A, dI/dt = 100 A/\mu s^b$ -370560nsBody Diode Reverse Recovery Charge Q_{rr} Q_{rr} -4.66.9 μ C | Internal Source Inductance | Ls | | | - | 13 | - | | |
| Solution block outletIsshowing the integral reverse p - n junction diodeIs20APulsed Diode Forward CurrentaIsIs $reverse$ p - n junction diode92ABody Diode VoltageVsDTJ = 25 °C, Is = 23 A, VGS = 0 Vb1.8VBody Diode Reverse Recovery TimetrrTJ = 25 °C, IF = 23 A, dI/dt = 100 A/µsb-370560nsBody Diode Reverse Recovery ChargeQrrTJ = 25 °C, IF = 23 A, dI/dt = 100 A/µsb-4.66.9µC | Drain-Source Body Diode Characteristic | s | | | | | | | |
| Pulsed Diode Forward CurrentaISMIntegral reverse p - n junction diodeImage: Constraint of the second | Continuous Source-Drain Diode Current | I _S | | | - | - | 23 | Δ | |
| Body Diode Reverse Recovery Time t_{rr} $T_J = 25 \ ^{\circ}C, I_F = 23 \ A, dl/dt = 100 \ A/\mu s^b$ -370560nsBody Diode Reverse Recovery Charge Q_{rr} $T_J = 25 \ ^{\circ}C, I_F = 23 \ A, dl/dt = 100 \ A/\mu s^b$ -4.66.9 μC | Pulsed Diode Forward Current ^a | I _{SM} | integral reverse | | | - | - | 92 | |
| $T_{J} = 25 \text{ °C}, I_{F} = 23 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}^{b}$ Body Diode Reverse Recovery Charge Q_{rr} $- 4.6 6.9 \mu\text{C}$ | Body Diode Voltage | V _{SD} | $T_{J} = 25 \text{ °C}, I_{S} = 23 \text{ A}, V_{GS} = 0 \text{ V}^{b}$ | | | - | - | 1.8 | V |
| Body Diode Reverse Recovery Charge Q _{rr} - 4.6 6.9 μ0 | Body Diode Reverse Recovery Time | t _{rr} | $T_J = 25 \text{ °C}, I_F = 23 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}^b$ | | - | 370 | 560 | ns | |
| Forward Turn-On Time ton Intrinsic turn-on time is negligible (turn-on is dominated by L _S and L _D) | Body Diode Reverse Recovery Charge | Q _{rr} | | | - | 4.6 | 6.9 | μC | |
| | Forward Turn-On Time | t _{on} | Intrinsic turn-on time is negligible (turn | | | I-on is doi | minated b | by L _S and | L _D) |

Notes

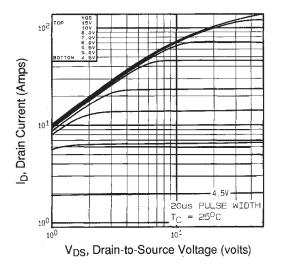
a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).

b. Pulse width $\leq 300~\mu s;$ duty cycle $\leq 2~\%.$

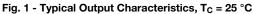
www.vishay.com 2 Document Number: 91214 S11-0487-Rev. B, 21-Mar-11



Vishay Siliconix



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



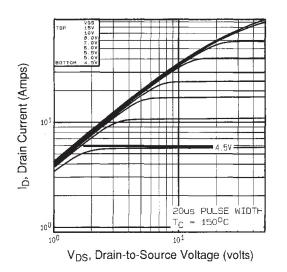


Fig. 2 - Typical Output Characteristics, T_C = 150 $^\circ C$

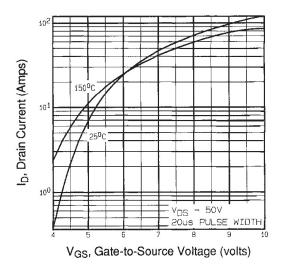


Fig. 3 - Typical Transfer Characteristics

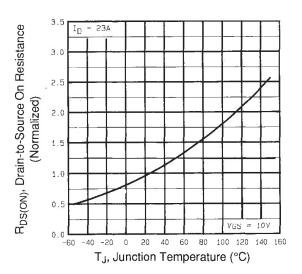


Fig. 4 - Normalized On-Resistance vs. Temperature

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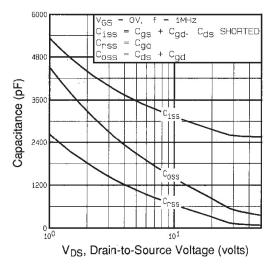
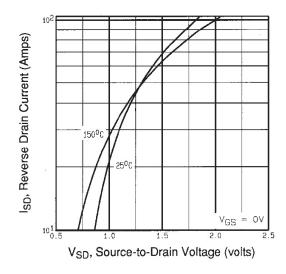


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage





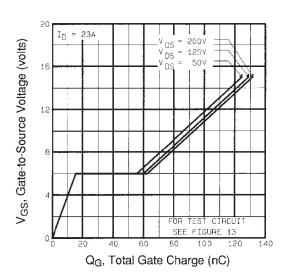


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

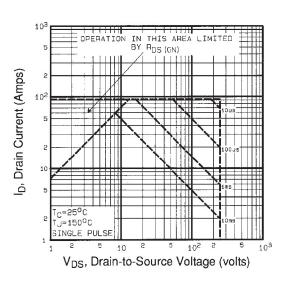


Fig. 8 - Maximum Safe Operating Area

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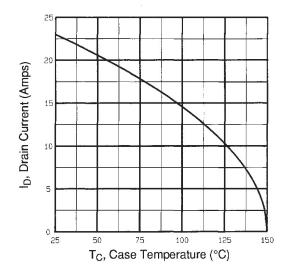


Fig. 9 - Maximum Drain Current vs. Case Temperature

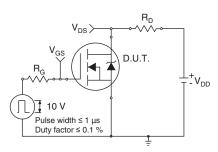


Fig. 10a - Switching Time Test Circuit

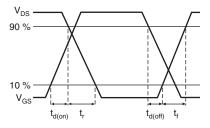


Fig. 10b - Switching Time Waveforms

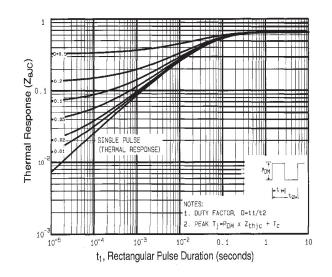


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

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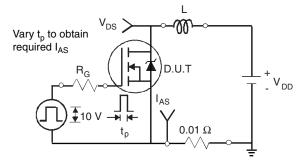


Fig. 12a - Unclamped Inductive Test Circuit

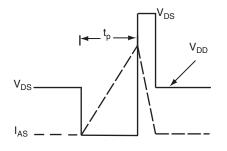


Fig. 12b - Unclamped Inductive Waveforms

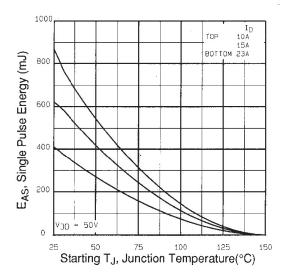
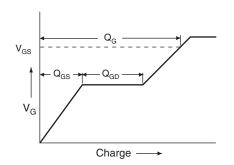


Fig. 12c - Maximum Avalanche Energy vs. Drain Current





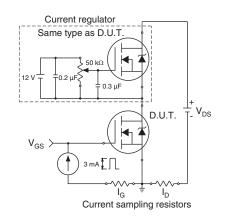


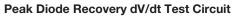
Fig. 13b - Gate Charge Test Circuit

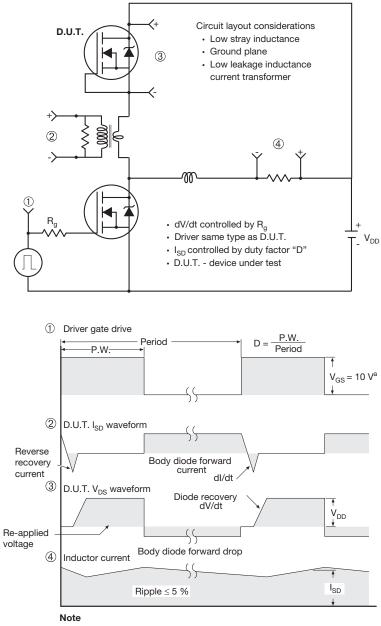
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a. $V_{GS} = 5$ V for logic level devices

Fig. 14 - For N-Channel

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?91214.

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TO-247AC (High Voltage)

ECN: X13-0103-Rev. D, 01-Jul-13 DWG: 5971

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.

2. Contour of slot optional.

 Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body.

4. Thermal pad contour optional with dimensions D1 and E1.

5. Lead finish uncontrolled in L1.

6. Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154").

7. Outline conforms to JEDEC outline TO-247 with exception of dimension c.

8. Xian and Mingxin actually photo.





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