

GENERAL DESCRIPTION

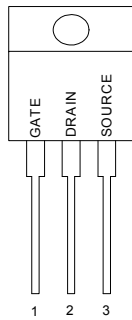
This high voltage MOSFET uses an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. In addition, this advanced MOSFET is designed to withstand high energy in avalanche and commutation modes. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power supplies, converters and PWM motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional and safety margin against unexpected voltage transients.

FEATURES

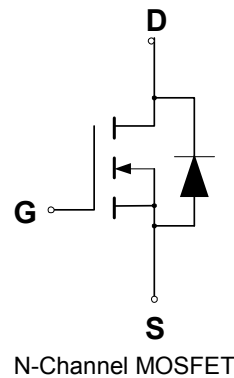
- ◆ Reduced Gate Charge
- ◆ Ultra Low On-Resistance Provides Higher Efficiency
- ◆ Avalanche Energy Specified
- ◆ Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- ◆ Diode is Characterized for Use in Bridge Circuits
- ◆ I_{BSS} and $V_{DS(on)}$ Specified at Elevated Temperature

PIN CONFIGURATION

TO-220/TO-220FP
Front View



SYMBOL



ABSOLUTE MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|------------|------|
| Drain to Current – Continuous | I_D | 10.5 | A |
| – Pulsed | I_{DM} | 31.5 | |
| Gate-to-Source Voltage – Continue | V_{GS} | ±30 | V |
| Total Power Dissipation – TO220 | P_D | 193 | W |
| – TO220FP | | 38 | |
| Derate above 25°C – TO220 | | 1.5 | W/°C |
| – TO220FP | | 0.36 | |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | °C |
| Single Pulse Drain-to-Source Avalanche Energy – $T_J = 25^\circ\text{C}$ ($V_{DD} = 100\text{V}, V_{GS} = 10\text{V}, I_L = 9\text{A}, L = 10\text{mH}, R_G = 25\Omega$) | E_{AS} | 405 | mJ |
| Thermal Resistance – Junction to Case -TO220 | θ_{JC} | 0.63 | °C/W |
| – Junction to Case -TO220FP | | 3.3 | |
| – Junction to Ambient -TO220, TO220FP | θ_{JA} | 62.5 | |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds | T_L | 260 | °C |

ORDERING INFORMATION

| Part Number | Package |
|------------------|---------------------|
| GPT11N65GN220 | TO-220 |
| GPT11N65DGN220FP | TO-220 Full Package |

*Note: G : Suffix for Pb Free Product

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25^\circ\text{C}$.

| Characteristic | Symbol | GPT11N65 | | | Units |
|---|---|--------------|------|-------|---------------|
| | | Min | Typ | Max | |
| Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$) | $V_{(BR)DSS}$ | 650 | | | V |
| Drain-Source Leakage Current ($V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$) | I_{DSS} | | | 1 | μA |
| Gate-Source Leakage Current-Forward ($V_{gsf} = 30\text{ V}, V_{DS} = 0\text{ V}$) | I_{GSSF} | | | 100 | nA |
| Gate-Source Leakage Current-Reverse ($V_{gsr} = 30\text{ V}, V_{DS} = 0\text{ V}$) | I_{GSSR} | | | 100 | nA |
| Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$) | $V_{GS(th)}$ | 3 | | 5 | V |
| Static Drain-Source On-Resistance ($V_{GS} = 10\text{ V}, I_D = 5.5\text{A}$) * | $R_{DS(on)}$ | | | 0.82 | Ω |
| Forward Transconductance ($V_{DS} = 15\text{ V}, I_D = 5.5\text{A}$) * | g_{FS} | | 10 | | S |
| Input Capacitance | $(V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz})$ | C_{iss} | 1715 | | pF |
| Output Capacitance | | C_{oss} | 154 | | pF |
| Reverse Transfer Capacitance | | C_{rss} | 10 | | pF |
| Turn-On Delay Time | $(V_{DD} = 325\text{ V}, I_D = 11\text{ A}, V_{GS} = 10\text{ V}, R_G = 9.1\Omega) *$ | $t_{d(on)}$ | 30.9 | | ns |
| Rise Time | | t_r | 26.4 | | ns |
| Turn-Off Delay Time | | $t_{d(off)}$ | 52.7 | | ns |
| Fall Time | | t_f | 32.1 | | ns |
| Total Gate Charge | $(V_{DS} = 520\text{ V}, I_D = 11\text{ A}, V_{GS} = 10\text{ V}) *$ | Q_g | 34.8 | | nC |
| Gate-Source Charge | | Q_{gs} | 10.5 | | nC |
| Gate-Drain Charge | | Q_{gd} | 15 | | nC |
| SOURCE-DRAIN DIODE CHARACTERISTICS | | | | | |
| Forward On-Voltage(1) | $(I_S = 11\text{A}, V_{GS} = 0\text{ V}, d_{is}/d_t = 100\text{A}/\mu\text{s})$ | V_{SD} | | 1.5 | V |
| Forward Turn-On Time | | t_{on} | | ** | ns |
| Reverse Recovery Time | | t_{rr} | | 445.3 | ns |

* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

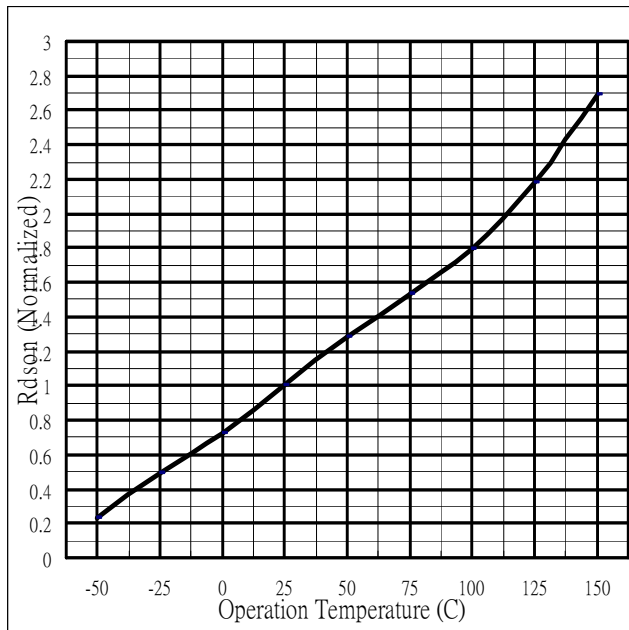


Fig 1. On-Resistance Vs. Temperature

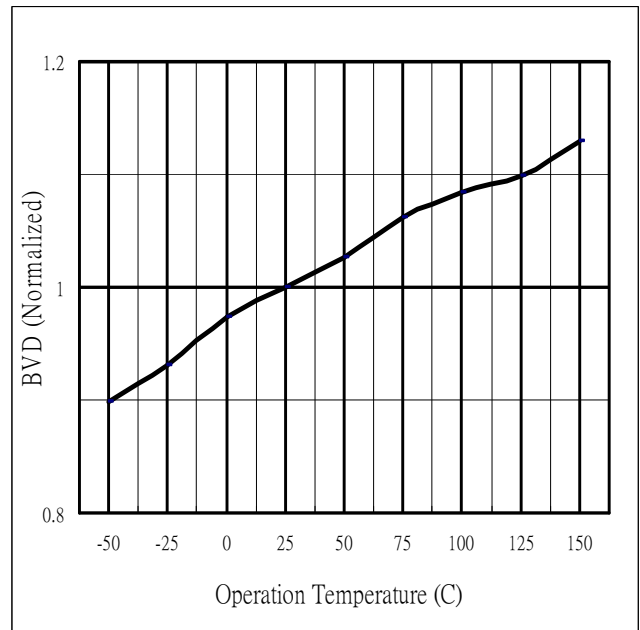


Fig.2 Breakdown Voltage Variation vs. Temperature

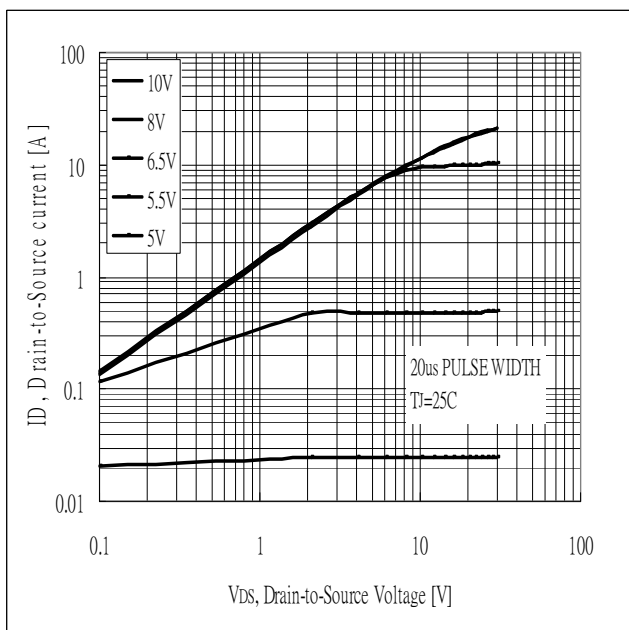


Fig 3. Typical Output Characteristics

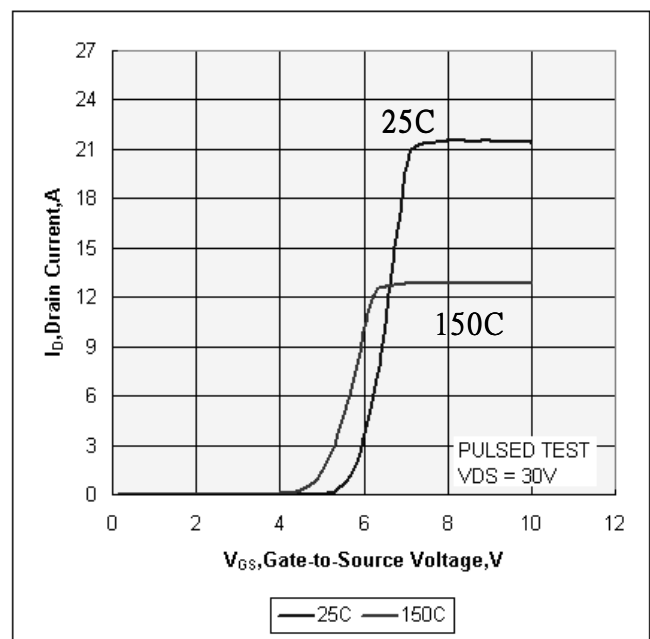


Fig 4. Typical Transfer Characteristics

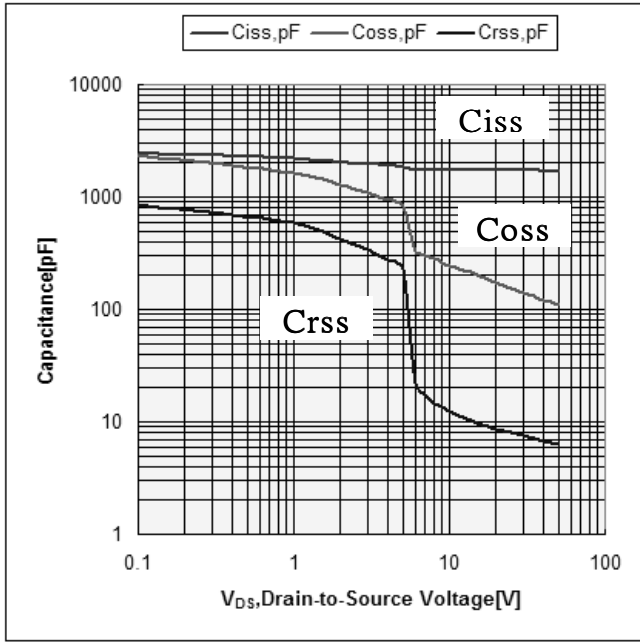


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

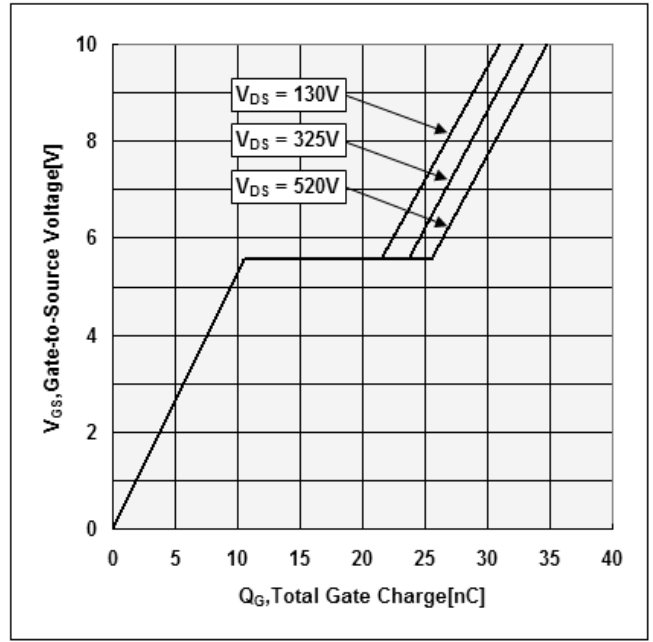
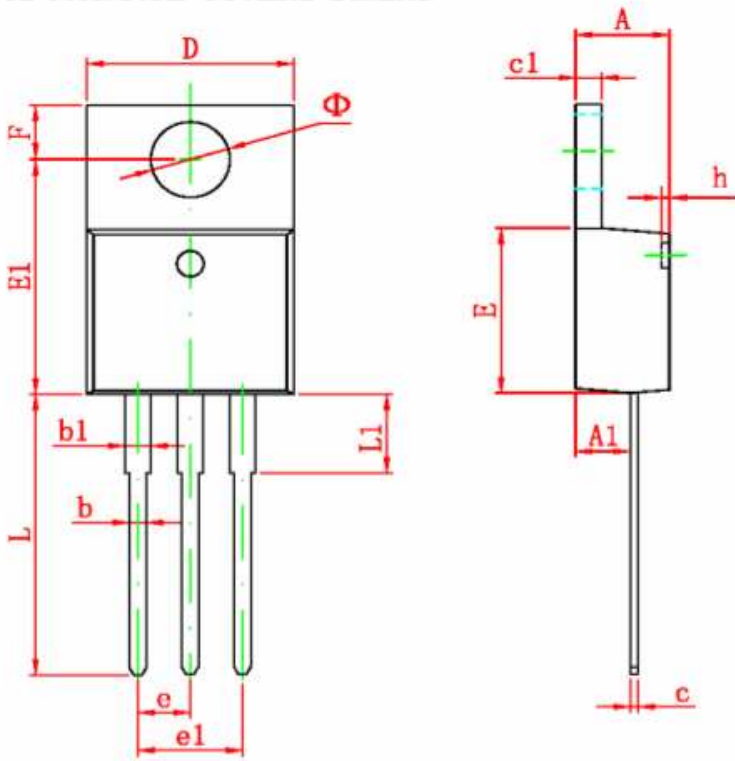


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

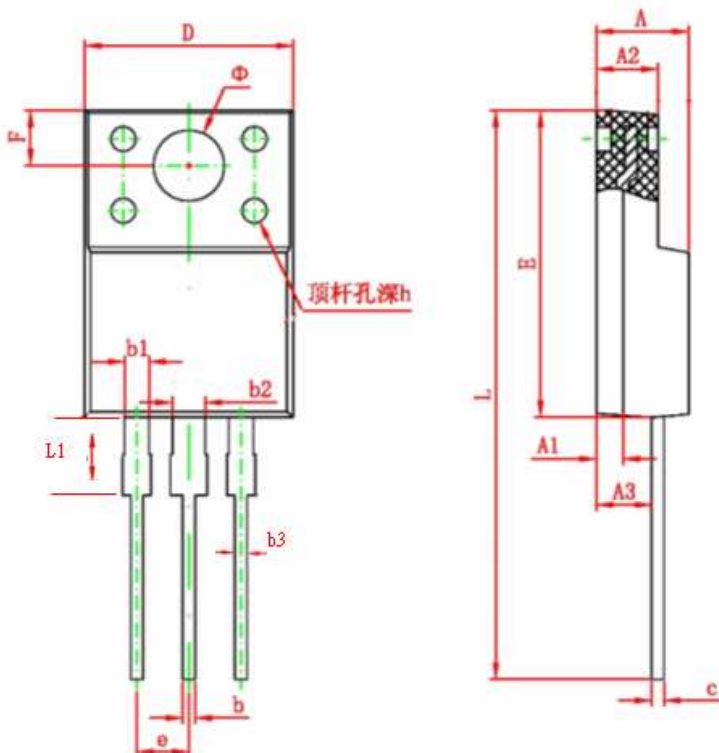
PACKAGE DIMENSION

TO-220



| Symbol | Dimensions In Millimeters | |
|--------|---------------------------|-------|
| | Min. | Max |
| A | 4.40 | 4.80 |
| A1 | 2.10 | 2.84 |
| b | 0.71 | 0.91 |
| b1 | 1.17 | 1.37 |
| c | 0.30 | 0.60 |
| c1 | 1.17 | 1.47 |
| D | 9.40 | 10.60 |
| E | 8.40 | 9.60 |
| e | 2.54 TYP. | |
| e1 | 4.90 | 5.60 |
| F | 3.00 REF. | |
| Φ | 3.50 REF. | |
| h | 0.00 | 0.30 |
| L | 12.50 | 14.00 |
| L1 | 3.50 | 4.00 |

TO-220F



| Symbol | Dimensions In Millimeters | |
|--------|---------------------------|-------|
| | Min. | Max |
| A | 3.80 | 4.70 |
| A1 | 1.3 REF. | |
| A2 | 2.20 | 3.20 |
| A3 | 2.10 | 3.20 |
| b | 0.30 | 0.95 |
| b1 | 1.00 | 1.75 |
| b2 | 1.00 | 1.75 |
| b3 | 0.50 | 0.80 |
| c | 0.30 | 0.90 |
| D | 9.90 | 10.40 |
| E | 14.60 | 16.20 |
| e | 2.54 TYP. | |
| F | 3.00 REF. | |
| Φ | 3.50 REF. | |
| h | 0.00 | 0.30 |
| L | 28.00 | 30.00 |
| L1 | 3.20 | 3.55 |

IMPORTANT NOTICE

Great Power Microelectronic Corporation (GP) reserves the right to make changes to its products or to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

A few applications using integrated circuit products may involve potential risks of death, personal injury, or severe property or environmental damage. GP integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life-support applications, devices or systems or other critical applications. Use of GP products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.



虹冠電子工業股份有限公司
Champion Microelectronic Corporation
Web:<http://www.champion-micro.com/>



深圳市冠順微電子股份有限公司
Shenzhen Great Power Co., Ltd
Web:[http:// www.grtpower.com](http://www.grtpower.com)

臺灣

新北市汐止區新台五路一段 96 號 21F
21F., No. 96, Sec. 1, Sintai 5th Rd.,
Sijhih City, Taipei County 22102,
Taiwan, R.O.C.
TEL: +886-2-2696 3558
FAX: +886-2-2696 3559

深圳

深圳市福田区深南大道 7002 号财富广场 A 座 4V,
4V, Tower A, Fortune Plaza, No. 7002, Shennan
Road, Futian District, Shenzhen City, China
PC : 518040
TEL: +86-755-83709176
FAX: +86-755-83709276
