



SPC6606

N & P Pair Enhancement Mode MOSFET

DESCRIPTION

The SPC6606 is the N-Channel and P-Channel enhancement mode power field effect transistors which are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where high-side switching, low in-line power loss, and resistance to transients are needed.

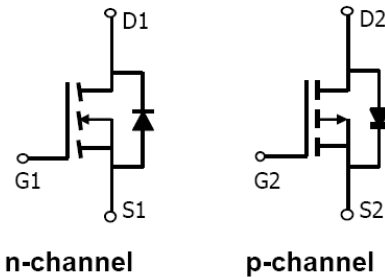
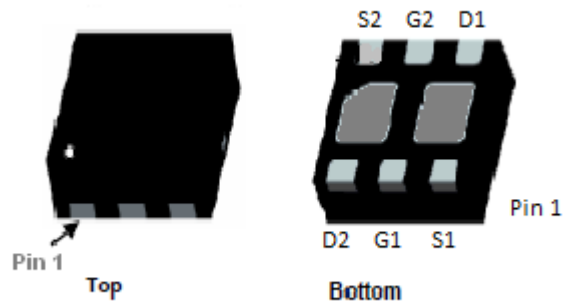
FEATURES

- N-Channel
 - 12V/4.0A, $R_{DS(ON)}=26m\Omega @ V_{GS}=4.5V$
 - 12V/3.0A, $R_{DS(ON)}=35m\Omega @ V_{GS}=2.5V$
 - 12V/2.0A, $R_{DS(ON)}=50m\Omega @ V_{GS}=1.8V$
- P-Channel
 - 12V/-3.3A, $R_{DS(ON)}=70m\Omega @ V_{GS}=-4.5V$
 - 12V/-2.8A, $R_{DS(ON)}=85m\Omega @ V_{GS}=-2.5V$
 - 12V/-2.3A, $R_{DS(ON)}=110m\Omega @ V_{GS}=-1.8V$
- Super high density cell design for extremely low RDS (ON)
- Exceptional on-resistance and maximum DC current capability
- TDFN2X2-6L package design

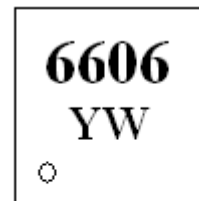
APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

PIN CONFIGURATION(TDFN2X2-6L)



PART MARKING



Y : Year Code
W : Week Code



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PIN DESCRIPTION

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1 | S1 | Source 1 |
| 2 | G1 | Gate 1 |
| 3 | D2 | Drain 2 |
| 4 | S2 | Source 2 |
| 5 | G2 | Gate 2 |
| 6 | D1 | Drain1 |

ORDERING INFORMATION

| Part Number | Package | Part Marking |
|----------------|-----------|--------------|
| SPC6606TDN6RGB | TDFN6-2x2 | 6606YW |

※ Week Code : A ~ Z(1 ~ 26) ; a ~ z(27 ~ 52)

※ SPC6606TDN6RGB : Tape Reel ; Pb – Free ; Halogen -Free

ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

| Parameter | Symbol | Typical | | Unit | |
|--|------------------|------------------|-----------|------|------|
| | | N-Channel | P-Channel | | |
| Drain-Source Voltage | V _{DSS} | 12 | -12 | V | |
| Gate –Source Voltage | V _{GSS} | ±8 | ±8 | V | |
| Continuous Drain Current(T _J =150°C) ^{a, b} | I _D | TA=25°C | 4.5 | -4.3 | A |
| | | TA=70°C | 4.5 | -3.8 | |
| Pulsed Drain Current | I _{DM} | 20 | -15 | A | |
| Continuous Source Current(Diode Conduction) ^b TA=25°C | I _S | 1.6 | -1.6 | A | |
| Power Dissipation ^b | P _D | TA=25°C | 1.9 | | W |
| | | TA=70°C | 1.2 | | |
| Operating Junction Temperature | T _J | -55/150 | | °C | |
| Storage Temperature Range | T _{STG} | -55/150 | | °C | |
| Thermal Resistance-Junction to Ambient | T ≤ 5sec | R _{θJA} | 65 | 65 | °C/W |
| Thermal Resistance-Junction to Case | Steady State | R _{θJC} | 16 | 16 | |

Notes:

A. Package limited.

B. Surface mounted on 1" x 1" FR4 board. t = 5s



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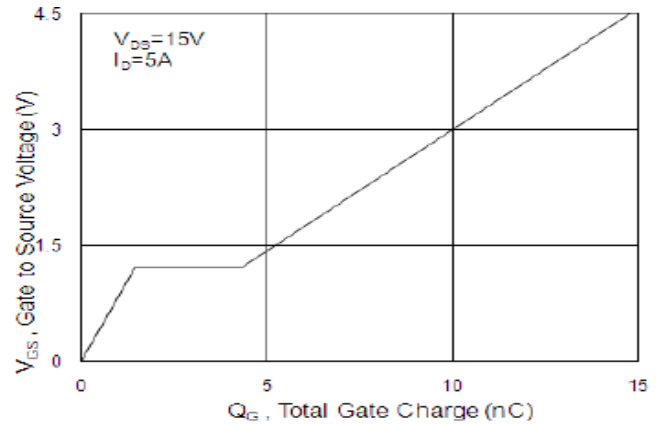
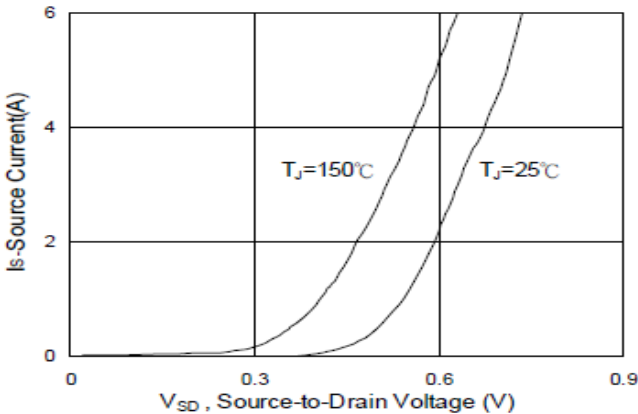
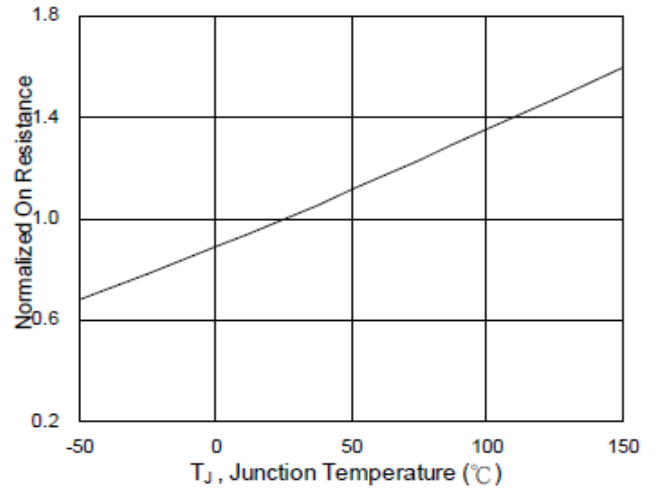
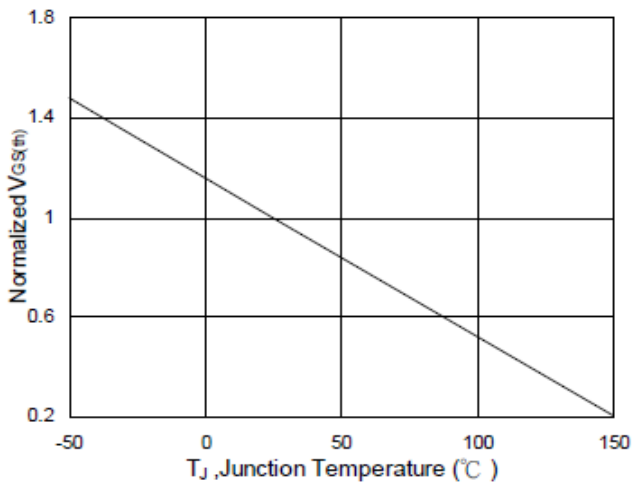
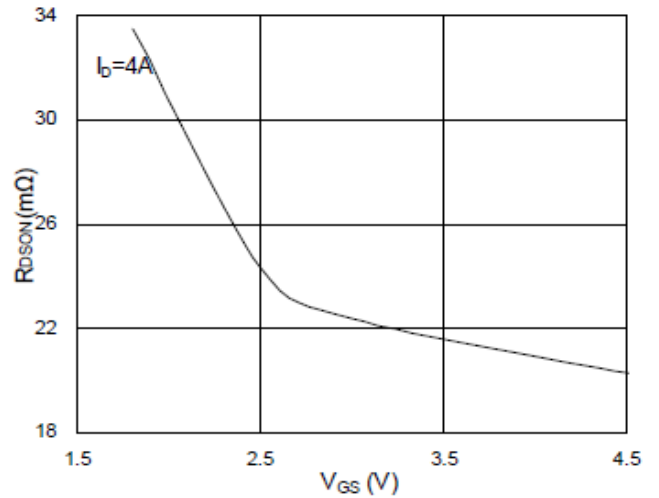
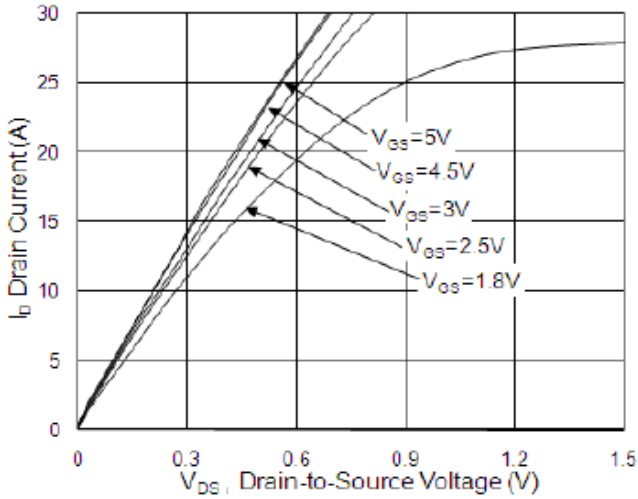
ELECTRICAL CHARACTERISTICS (TA=25°C Unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Unit |
|---------------------------------|----------------------|---|------|------|------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} =0V, I _D =250uA | N-Ch | 12 | | V |
| | | V _{GS} =0V, I _D =-250uA | P-Ch | -12 | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250uA | N-Ch | 0.4 | 1.0 | |
| | | V _{DS} =V _{GS} , I _D =-250uA | P-Ch | -0.4 | -1.0 | |
| Gate Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±8V | N-Ch | | 100 | nA |
| | | V _{DS} =0V, V _{GS} =±8V | P-Ch | | -100 | |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =12V, V _{GS} =0V | N-Ch | | 1 | uA |
| | | V _{DS} =-12V, V _{GS} =0V | P-Ch | | -1 | |
| | | V _{DS} =12V, V _{GS} =0V T _J =55°C | N-Ch | | 10 | |
| | | V _{DS} =-12V, V _{GS} =0V T _J =55°C | P-Ch | | -10 | |
| On-State Drain Current | I _{D(on)} | V _{DS} ≤4.5V, V _{GS} =5V | N-Ch | 15 | | A |
| | | V _{DS} ≤-4.5V, V _{GS} =-5V | P-Ch | -10 | | |
| Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =4.5V, I _D =4.0A | N-Ch | | 26 | mΩ |
| | | V _{GS} =-4.5V, I _D =-3.3A | P-Ch | | 70 | |
| | | V _{GS} =2.5V, I _D =3.0A | N-Ch | | 35 | |
| | | V _{GS} =-2.5V, I _D =-2.8A | P-Ch | | 85 | |
| | | V _{GS} =1.8V, I _D =2A | N-Ch | | 50 | |
| | | V _{GS} =-1.8V, I _D =-2.3A | P-Ch | | 110 | |
| Forward Transconductance | g _{fs} | V _{DS} =5V, I _D =3.5A | N-Ch | | 10 | S |
| | | V _{DS} =-5V, I _D =-3.5A | P-Ch | | 8.5 | |
| Diode Forward Voltage | V _{SD} | I _S =1A, V _{GS} =0V | N-Ch | | 1 | V |
| | | I _S =-1.5A, V _{GS} =0V | P-Ch | | -1.2 | |
| Dynamic | | | | | | |
| Total Gate Charge | Q _g | N-Channel V _{DS} =6V, V _{GS} =4.5V, I _D =4.0A P-Channel V _{DS} =-6V, V _{GS} =-4.5V, I _D =-3A | N-Ch | | 8.6 | nC |
| Gate-Source Charge | Q _{gs} | | P-Ch | | 10.1 | |
| Gate-Drain Charge | Q _{gd} | | N-Ch | | 1.37 | |
| | | | P-Ch | | 1.21 | |
| Input Capacitance | C _{iss} | N-Channel V _{DS} =6V, V _{GS} =0V, f=1MHz P-Channel V _{DS} =-6V, V _{GS} =0V, f=1MHz | N-Ch | | 2.3 | pF |
| | | | P-Ch | | 2.5 | |
| Output Capacitance | C _{oss} | | N-Ch | | 510 | |
| | | | P-Ch | | 595 | |
| Reverse Transfer Capacitance | C _{rss} | | N-Ch | | 165 | |
| | | | P-Ch | | 290 | |
| Turn-On Time | td(on) | N-Channel V _{DD} =6V, I _D =3.0A V _{GEN} =4.5V, R _G =3.3Ω P-Channel V _{DD} =-6V, I _D =-4.0A V _{GEN} =-4.5V, R _G =3.3Ω | N-Ch | | 105 | nS |
| | tr | | P-Ch | | 255 | |
| Turn-Off Time | td(off) | | N-Ch | | 5.2 | |
| | | | P-Ch | | 5.6 | |
| | tf | | N-Ch | | 34 | |
| | | | P-Ch | | 32.2 | |



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TYPICAL CHARACTERISTICS (N-Channel)





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TYPICAL CHARACTERISTICS (N-Channel)

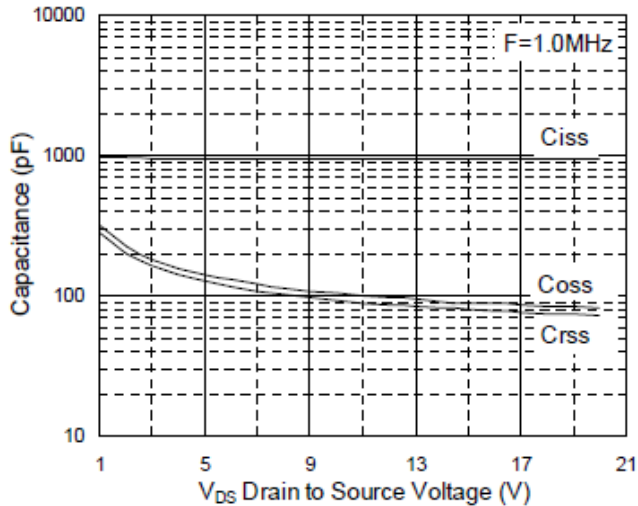


Fig 7 Capacitance vs. Drain Voltage

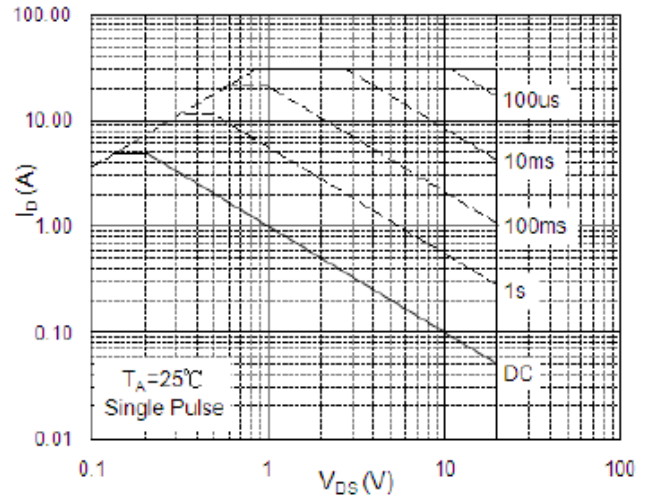


Fig. 8 Safe Operation Area

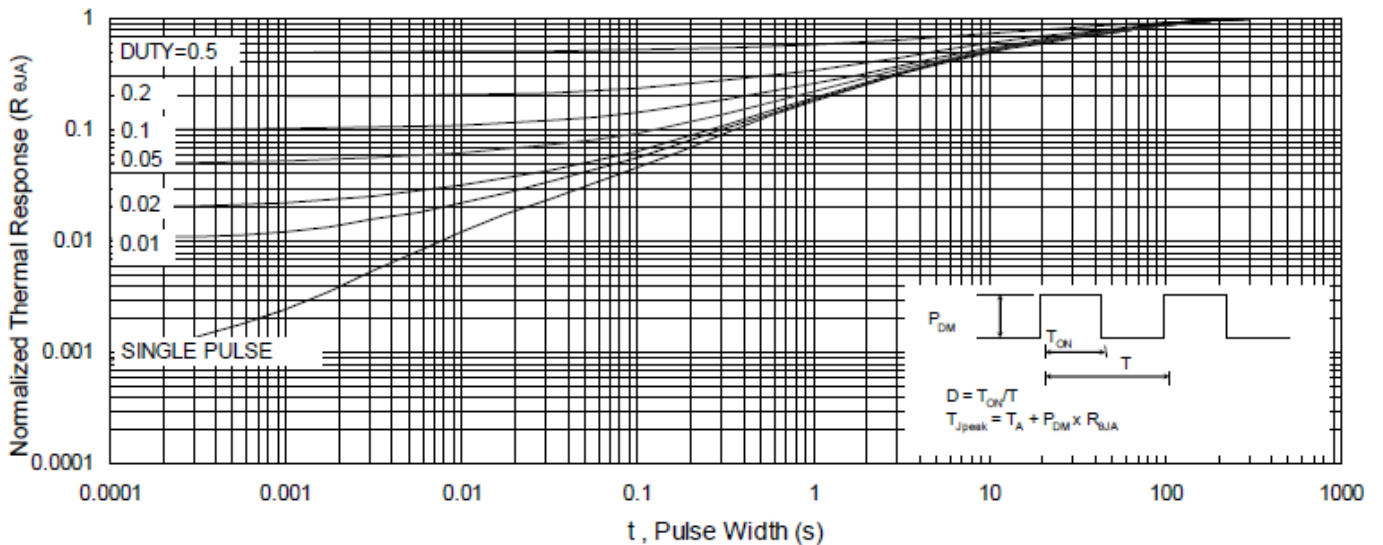


Fig. 9 Normalized Maximum Transient Thermal Impedance



SPC6606 N & P Pair Enhancement Mode MOSFET

TYPICAL CHARACTERISTICS (P-Channel)

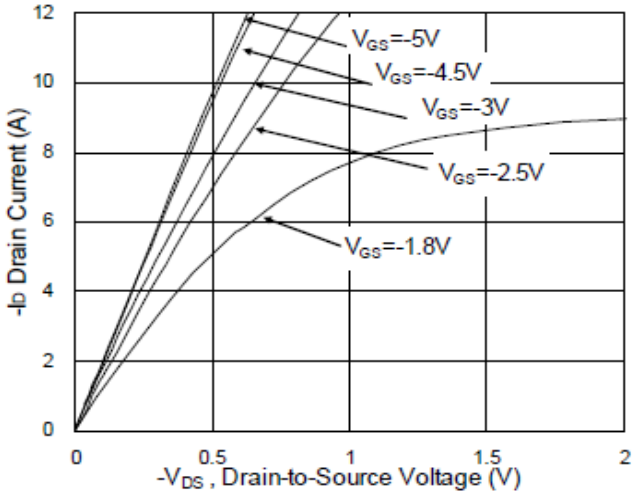


Fig. 10 Typical Output Characteristics

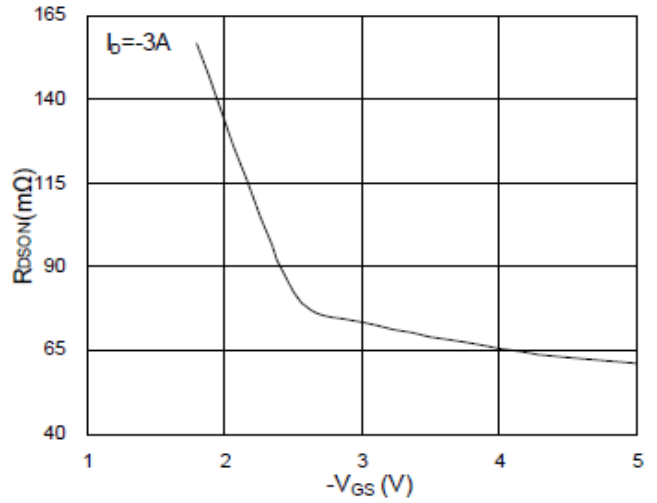


Fig. 11 On-Resistance vs. Gate Voltage

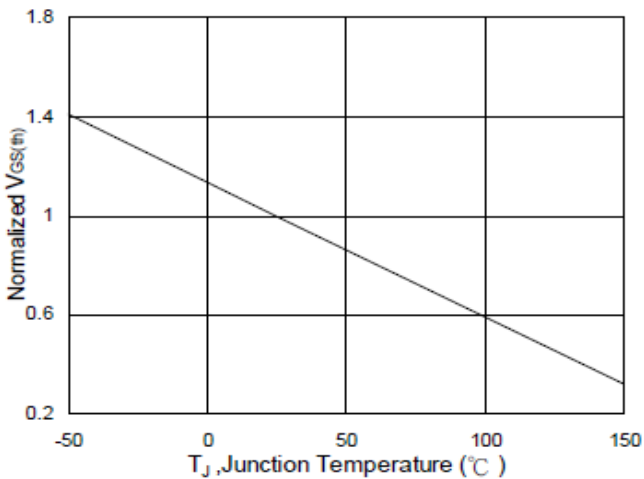


Fig. 12 Normalized $V_{GS(th)}$ vs. Temp

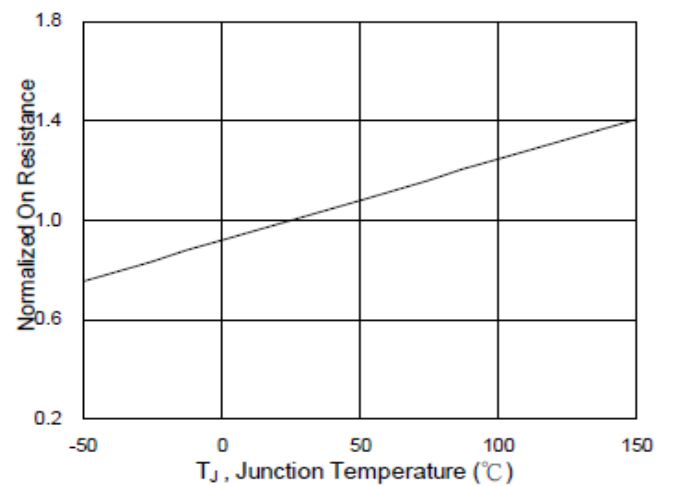


Fig. 13 Normalized On-Resistance vs. Temp

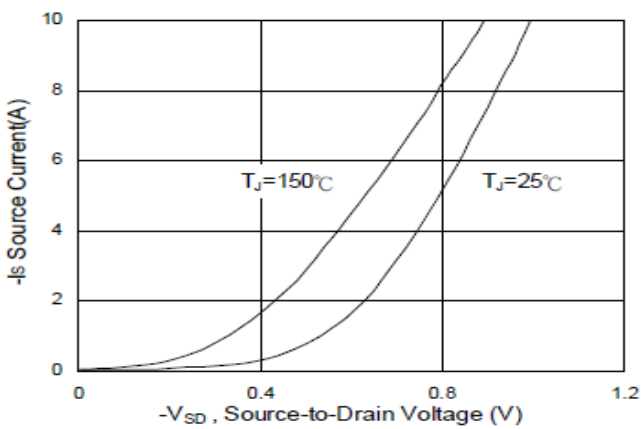


Fig. 14 Output Characteristics

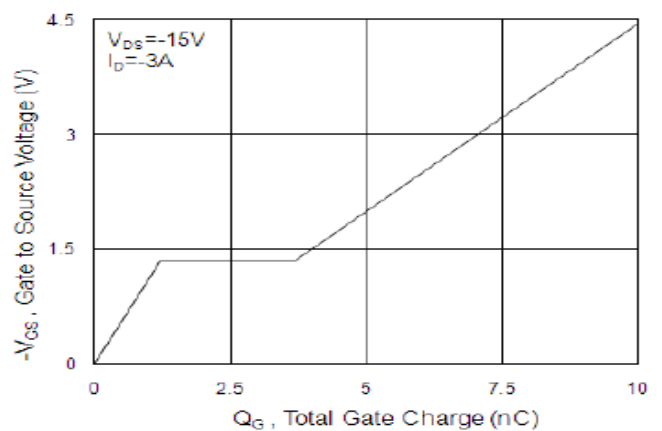


Fig. 15 Gate Charge Characteristics



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TYPICAL CHARACTERISTICS (P-Channel)

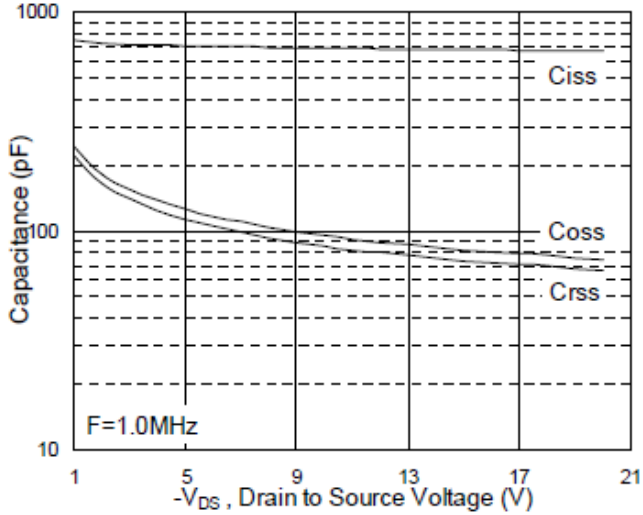


Fig. 16 Capacitance vs. Drain Voltage

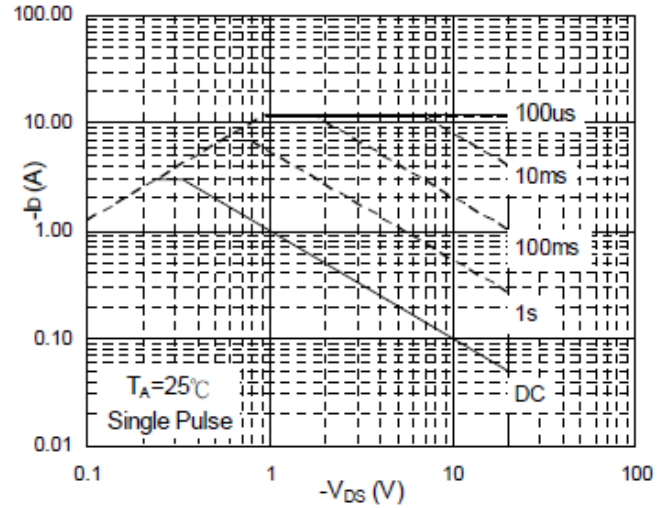


Fig. 17 Safe Operation Area

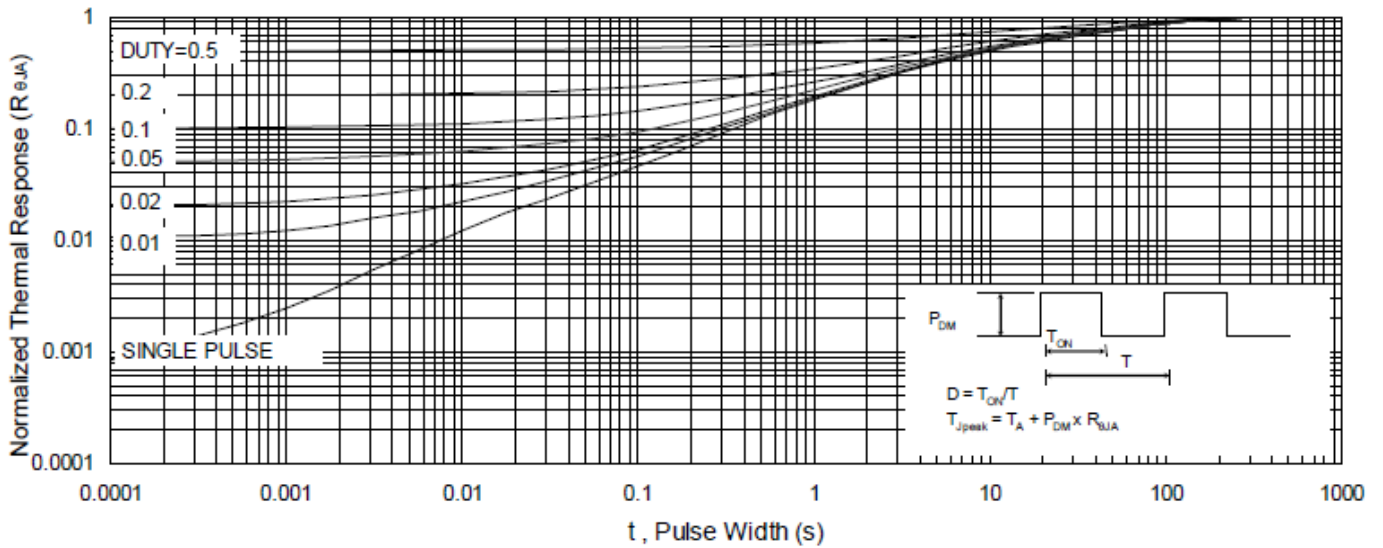
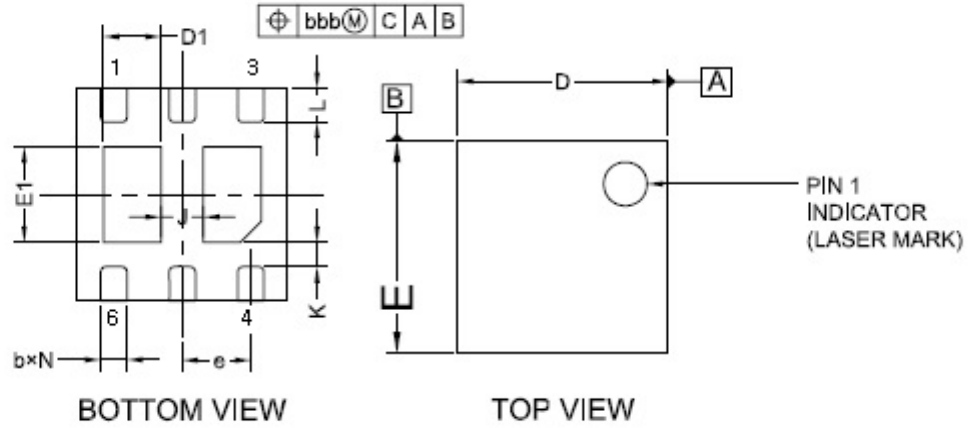


Fig. 18 Normalized Maximum Transient Thermal Impedance

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | TYP | MAX |
|--------|---------|------|------|
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | 0.02 | 0.05 |
| A2 | 0,203 | | |
| b | 0,20 | 0,25 | 0,30 |
| D | 1,95 | 2,00 | 2,05 |
| D1 | 0,50 | 0,55 | 0,60 |
| E | 1,95 | 2,00 | 2,05 |
| E1 | 0,85 | 0,90 | 0,95 |
| e | 0.65BSC | | |
| L | 0,27 | 0,32 | 0,37 |
| J | 0.40BSC | | |



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | TYP | MAX |
|--------|---------|------|------|
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | 0.02 | 0.05 |
| A2 | 0,203 | | |
| b | 0,20 | 0,25 | 0,30 |
| D | 1,95 | 2,00 | 2,05 |
| D1 | 0,50 | 0,55 | 0,60 |
| E | 1,95 | 2,00 | 2,05 |
| E1 | 0,85 | 0,90 | 0,95 |
| e | 0.65BSC | | |
| L | 0,27 | 0,32 | 0,37 |
| J | 0.40BSC | | |
| K | 0.20MIN | | |
| N | 6 | | |
| aaa | 0,08 | | |



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