GP02N65TC

650V-2A Enhancement Mode N-Channel Power MOSFET

Product Summary
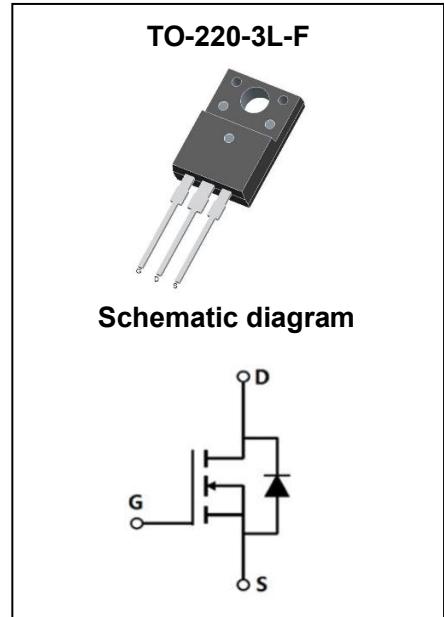
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	4.4Ω@10V	2A

Feature
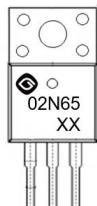
- Low RDS(on)
- Low FOM
- Extremely low switching loss
- Good stability and uniformity

Application

- Consumer electronics power supply
- LED Lighting
- Standby Power
- Charger

TO-220-3L-F

Schematic diagram

MARKING:

02N65= Device Code

XX = Date Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain - Source Voltage		V_{DS}	650	V
Gate - Source Voltage		V_{GS}	±30	V
Continuous Drain Current[1,6]	T_A = 25℃	I_D	2	A
Pulsed Drain Current[2]		I_{DM}	8	A
Single Pulsed Avalanche Current[3]		I_{AS}	7	A
Single Pulsed Avalanche Energy[3]		E_{AS}	12.5	mJ
Power Dissipation[5,6]	T_C = 25℃	P_D	39	W
Thermal Resistance from Junction to Case[6]		$R_{θJC}$	3.2	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃
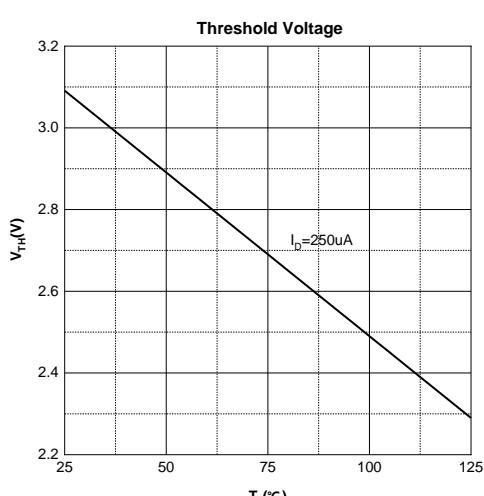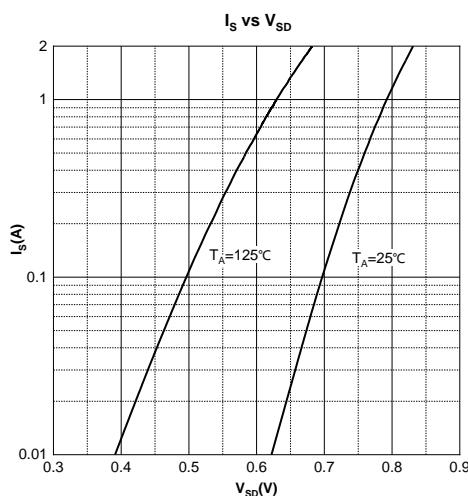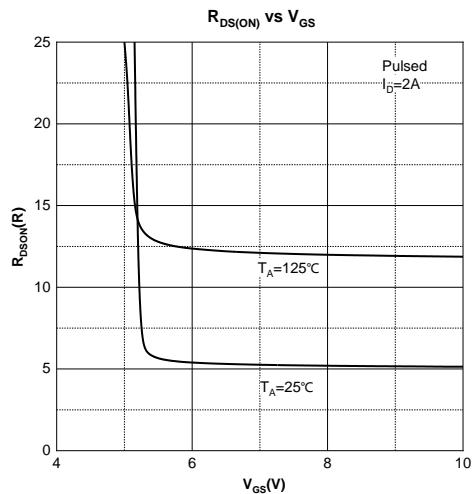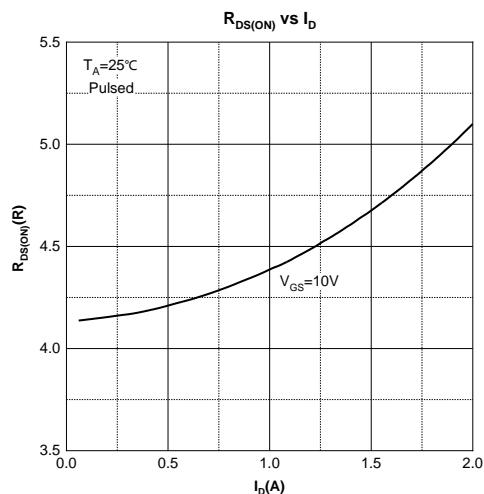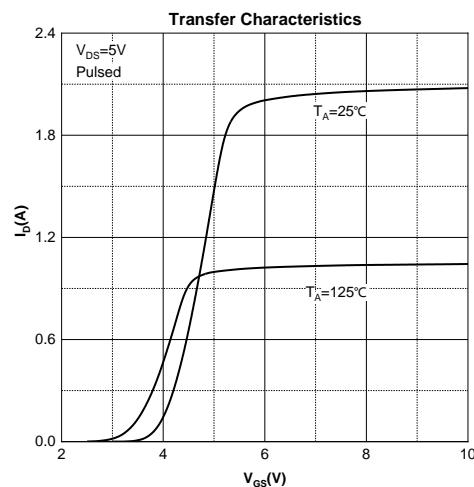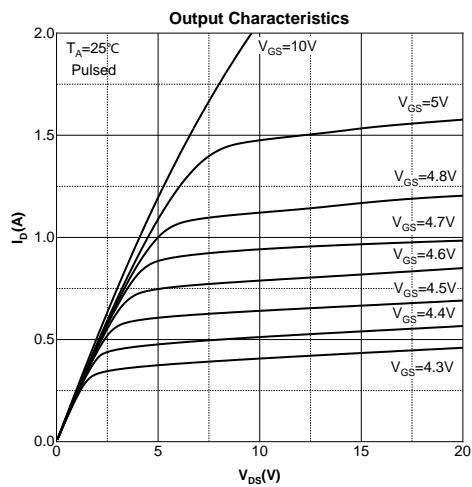
MOSFET ELECTRICAL CHARACTERISTICS (T$_J$ = 25℃ unless otherwise noted)
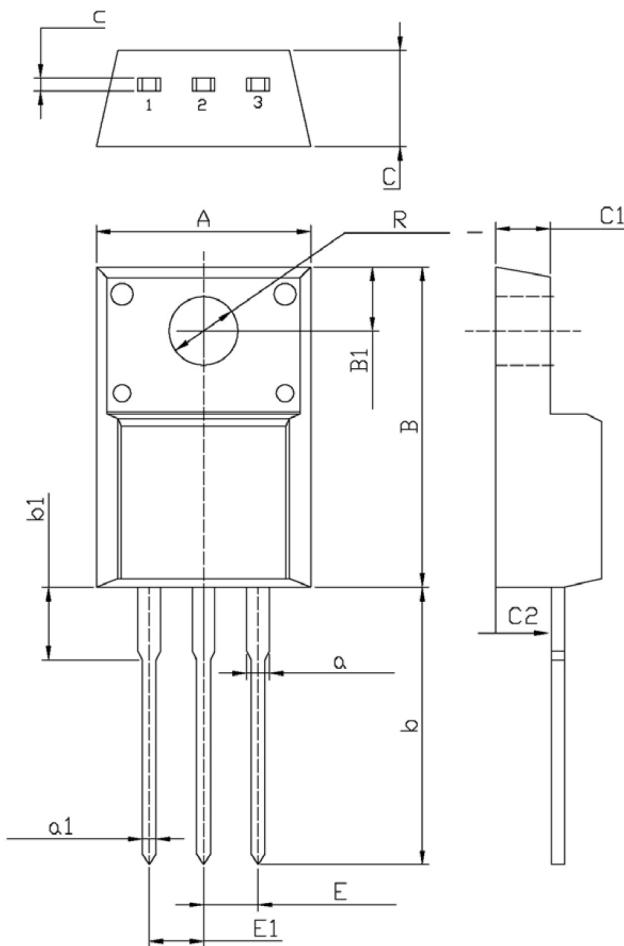
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	V$_{(BR)DSS}$	V$_{GS}$ = 0V, I$_D$ = 250μA	650			V
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{DS}$ = 650V, V$_{GS}$ = 0V			1	μA
Gate - Body Leakage Current	I$_{GSS}$	V$_{GS}$ = ±30V, V$_{DS}$ = 0V			±100	nA
On Characteristics[4]						
Gate Threshold Voltage	V$_{GS(th)}$	V$_{DS}$ = V$_{GS}$, I$_D$ = 250μA	2.0	3.1	4.0	V
Drain-source On-resistance	R$_{DS(on)}$	V$_{GS}$ = 10V, I$_D$ = 1A		4.4	6.0	Ω
Dynamic Characteristics						
Input Capacitance	C$_{iss}$	V$_{DS}$ = 50V, V$_{GS}$ = 0V, f = 1MHz		325		pF
Output Capacitance	C$_{oss}$			22		
Reverse Transfer Capacitance	C$_{rss}$			0.8		
Gate Resistance	R$_g$	V$_{DS}$ = 0V, V$_{GS}$ = 0V, f = 1MHz		3.0		Ω
Switching Characteristics						
Total Gate Charge	Q$_g$	V$_{DS}$ = 300V, V$_{GS}$ = 10V, I$_D$ = 1A		3.8		nC
Gate-source Charge	Q$_{gs}$			1.0		
Gate-drain Charge	Q$_{gd}$			1.7		
Turn-on Delay Time	t$_{d(on)}$	V$_{DD}$ = 300V, V$_{GS}$ = 10V, ID = 2A, R$_G$ = 3Ω		12		ns
Turn-on Rise Time	t$_r$			21		
Turn-off Delay Ttime	t$_{d(off)}$			30		
Turn-off Fall Time	t$_f$			24		
Source - Drain Diode Characteristics						
Diode Forward Voltage[4]	V$_{SD}$	V$_{GS}$ = 0V, I$_S$ = 2A			1.2	V

Notes :

1.The maximum current rating is limited by package.

2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.

3.E$_{AS}$ condition: V$_{DD}$ = 100V,V$_{GS}$ = 10V, L = 0.5mH, R$_G$ = 25Ω Starting T$_J$ = 25°℃.

4.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

5.The power dissipeation P$_D$ is limited by T$_{J(MAX)}$ = 150°C.

6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T$_A$ =25°C.

Typical Characteristics

Output Characteristics

T_A=25℃
Pulsed
V_{GS}=10V
V_{GS}=5V
V_{GS}=4.8V
V_{GS}=4.7V
V_{GS}=4.6V
V_{GS}=4.5V
V_{GS}=4.4V
V_{GS}=4.3V

I_D(A) vs V_{DS}(V)

Transfer Characteristics

V_{DS}=5V
Pulsed
T_A=25℃
T_A=125℃

I_D(A) vs V_{GS}(V)

$R_{DS(ON)}$ vs I_D

T_A=25℃
Pulsed
V_{GS}=10V

$R_{DS(ON)}$(R) vs I_D(A)

$R_{DS(ON)}$ vs V_{GS}

Pulsed
I_D=2A
T_A=125℃
T_A=25℃

R_{DSON}(R) vs V_{GS}(V)

I_S vs V_{SD}

T_A=125℃
T_A=25℃

I_S(A) vs V_{SD}(V)

Threshold Voltage

I_D=250uA

V_{TH}(V) vs T_J(℃)

TO-220-3L-F Package Information

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
C	4.500	4.900	0.177	0.193
c	0.400	0.600	0.016	0.024
A	9.960	10.360	0.392	0.408
B	15.670	16.070	0.617	0.633
B1	3.300	3.500	0.130	0.138
R	3.080	3.280	0.121	0.129
b	12.480	13.480	0.491	0.531
b1	2.900	3.900	0.114	0.154
a	1.080	1.480	0.043	0.058
a1	0.700	0.900	0.028	0.035
E	2.340	2.740	0.092	0.108
E1	2.340	2.740	0.092	0.108
C1	2.340	2.740	0.092	0.108
C2	2.560	2.960	0.101	0.117