



Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	0.8Ω@10V	10A

Feature

- Low $R_{DS(on)}$
- Low FOM
- Extremely low switching loss
- Good stability and uniformity

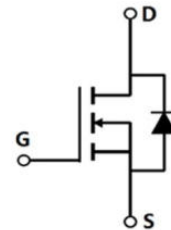
Application

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

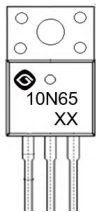
TO-220-3L-F



Schematic diagram



MARKING:



10N65= Device Code
XX = Date Code

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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}	I_D	10	A
Pulsed Drain Current ²	I_{DM}	40	A
Single Pulsed Avalanche Current ³	I_{AS}	20.5	A
Single Pulsed Avalanche Energy ³	E_{AS}	105	mJ
Power Dissipation ^{5,6}	P_D	50	W
Thermal Resistance from Junction to Ambient ⁶	$R_{\theta JC}$	2.5	°C/W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55~ +150	°C

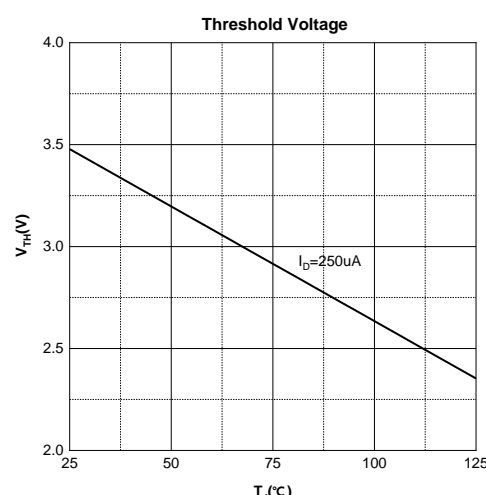
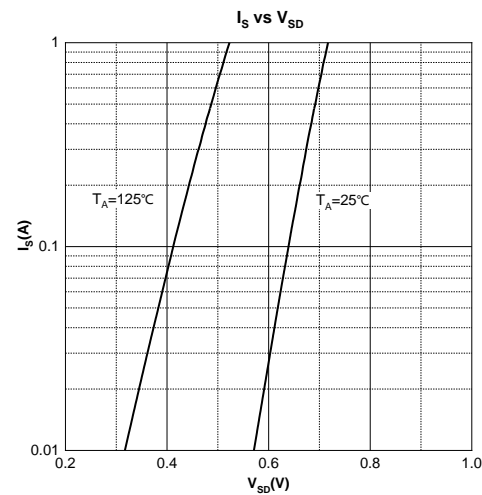
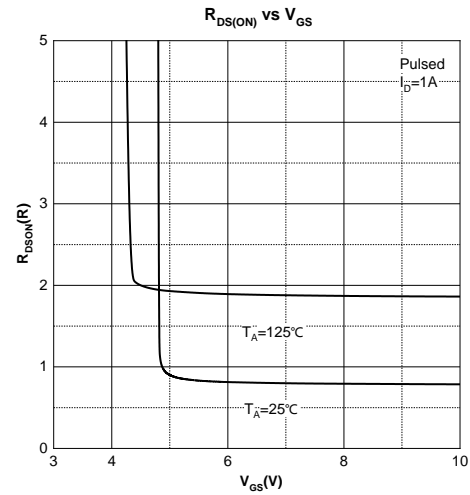
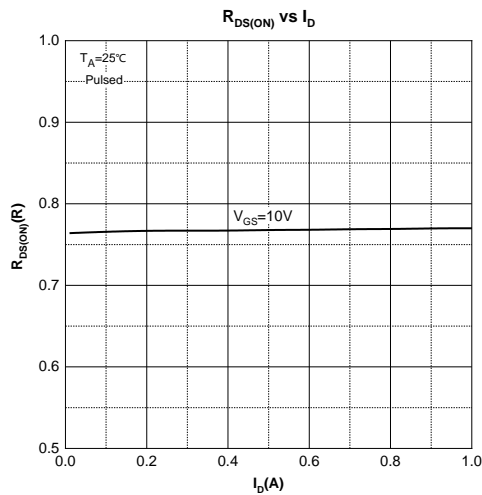
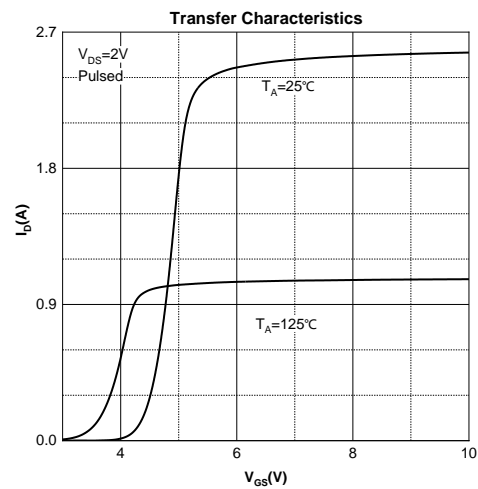
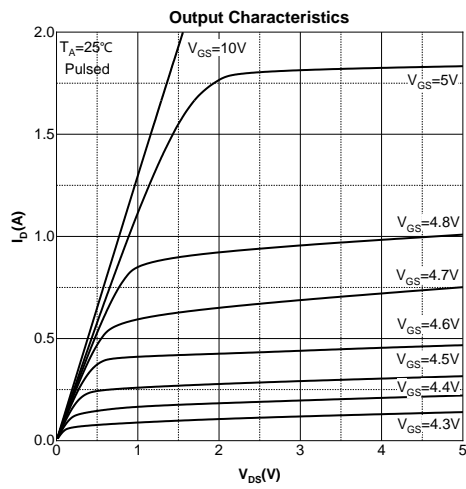
MOSFET ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate - Body Leakage Current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA
On Characteristics⁴						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.4	4.0	V
Drain-source On-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 1A$		0.8	1.2	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$		1667		pF
Output Capacitance	C_{oss}			87		
Reverse Transfer Capacitance	C_{rss}			1.5		
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		2.2		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 300V, V_{GS} = 10V, I_D = 1A$		28		nC
Gate-source Charge	Q_{gs}			7.4		
Gate-drain Charge	Q_{gd}			11		
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 300V, V_{GS} = 10V, I_D = 2A, R_G = 3\Omega$		28		ns
Turn-on Rise Time	t_r			57		
Turn-off Delay Time	$t_{d(off)}$			70		
Turn-off Fall Time	t_f			52		
Source - Drain Diode Characteristics						
Diode Forward Voltage ⁴	V_{SD}	$V_{GS} = 0V, I_S = 2A$			1.2	V

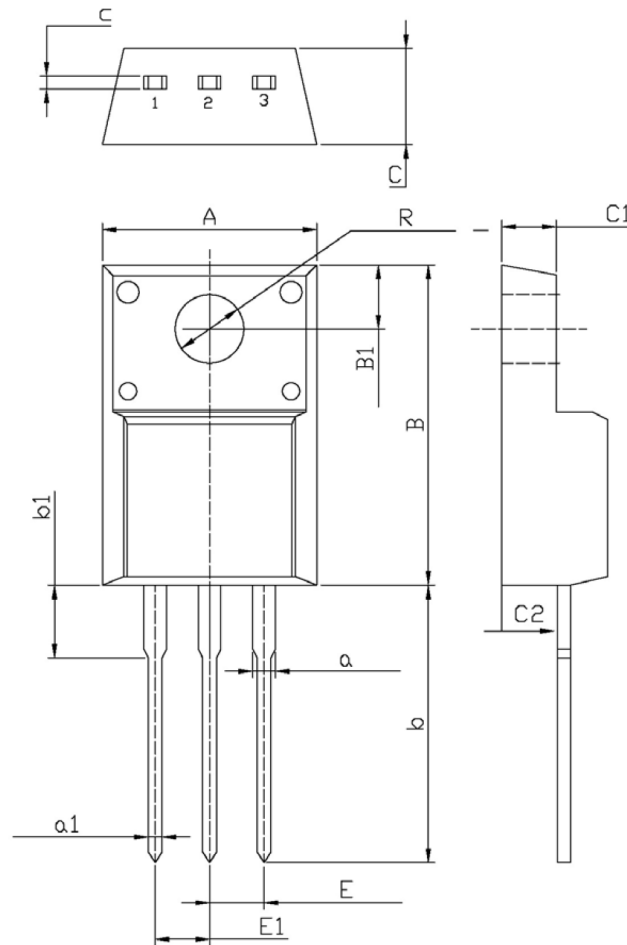
Notes :

- 1.The maximum current rating is limited by package.
- 2.Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD} = 100V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$ Starting $T_J = 25^\circ\text{C}$.
- 4.Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)} = 150^\circ\text{C}$.
- 6.Device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.

Typical Characteristics



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