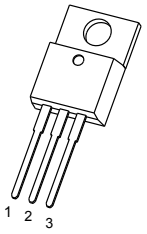
TO-220-3L Plastic-Encapsulate MOSFETS

CJP10N65M1E N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$TYP	I_D
650V	0.82Ω@10V	10A

TO-220-3L



1. GATE
2. DRAIN
3. SOURCE

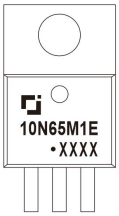
GENERAL DESCRIPTION

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

FEATURE

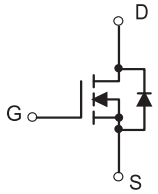
- High Current Rating
- Low Gate Charge
- Lower $R_{DS(on)}$
- Low Reverse Transfer Capacitance
- Fast Switching Capability
- Tighter V_{SD} Specifications
- Avalanche Energy Specified

MARKING



10N65M1E= Device code.
Solid dot = Green molding compound device, if none, the normal device
XXXX = Code

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current	I_D ①	10	A
Pulsed Drain Current	I_{DM} ①②	40	A
Single Pulsed Avalanche Energy	E_{AS} ③	500	mJ
Power Dissipation	P_D ①	125	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$ ⑥	62.5	℃/W
Thermal Resistance from Junction to Case	$R_{\theta JC}$ ①	1.0	℃/W
Operating Junction and Storage Temperature Range	T_J ,T_{stg}	-55~+150	℃

MOSFET ELECTRICAL CHARACTERISTICS

T_J=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	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			1.0	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±30V			±100	nA
On characteristics④						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2.0	3.0	4.0	V
Static drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =5A		0.82	1	Ω
Dynamic characteristics ⑤						
Input capacitance	C_{iss}	V_{DS} =50V,V_{GS} =0V,f =1MHz		1340		pF
Output capacitance	C_{oss}			81		
Reverse transfer capacitance	C_{rss}			10		
Switching characteristics ⑤						
Total gate charge	Q_g	V_{DS} =50V,V_{GS} =10V,I_D =10A		30.2		nC
Gate-source charge	Q_{gs}			10.4		
Gate-drain charge	Q_{gd}			6.3		
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, V_{GS}=10V, R_G=10Ω, I_D =10A		14.8		ns
Turn-on rise time	t_r			3.9		
Turn-off delay time	$t_{d(off)}$			37.1		
Turn-off fall time	t_f			22.9		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ④	V_{GS} = 0V, I_S =10A			1.2	V
Maximum continuous drain-source diode forward current	I_S ①				10	A
Maximum pulsed drain-source diode forward current	I_{SM} ①②				40	A

Notes :

1.T_C=25℃ Limited only by maximum temperature allowed.

2.P_W≤10μs, Duty cycle≤1%.

3.EAS condition: VDD=50V,VGS=10V, L=10mH, Rg=25Ω Starting T_J = 25℃.

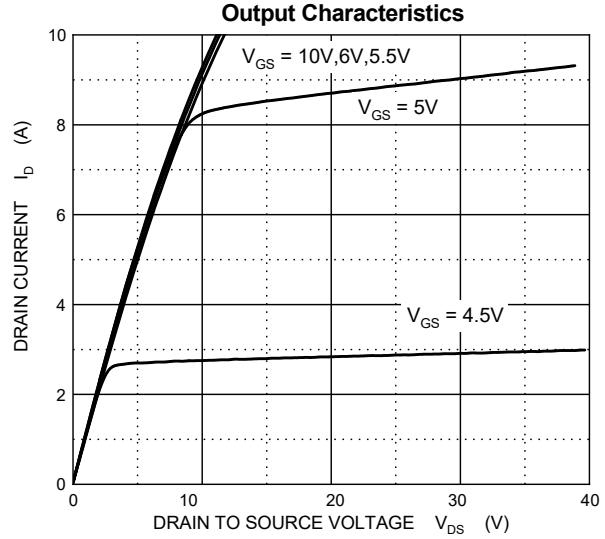
4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

5.Guaranteed by design, not subject to production.

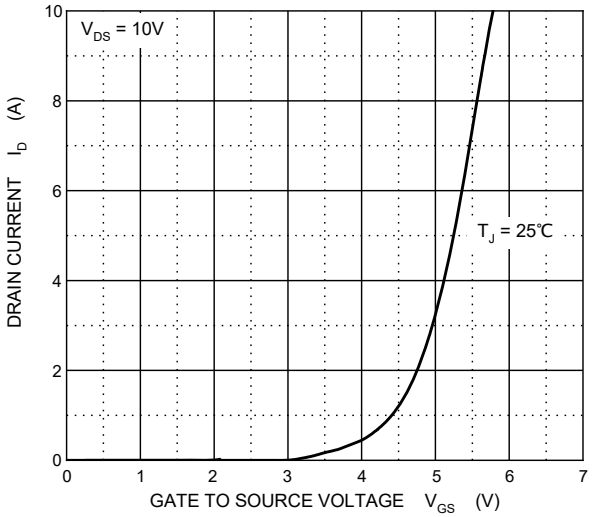
6.The value of $R_{\theta JA}$ is measured with the device in a still air environment with T_a=25℃.

Typical Characteristics (T_J = 25℃, unless otherwise specified)

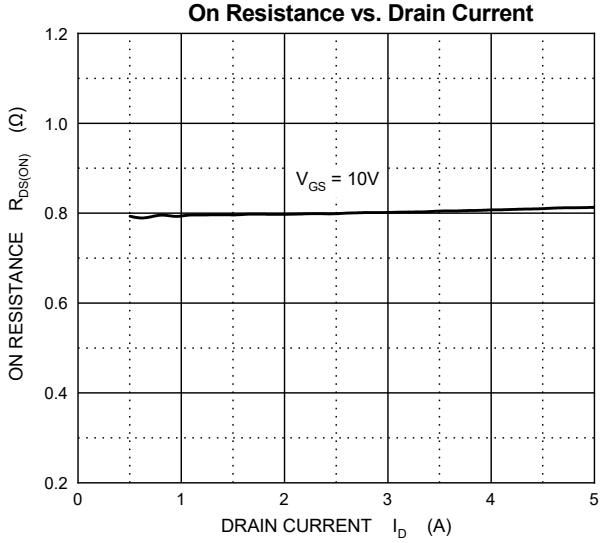
Output Characteristics



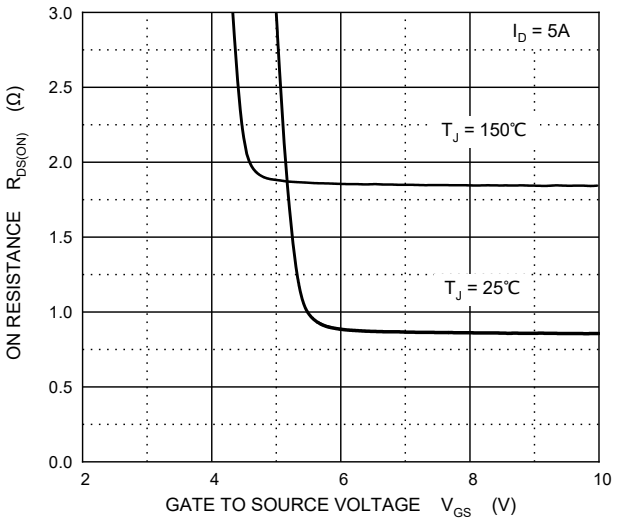
Transfer Characteristics



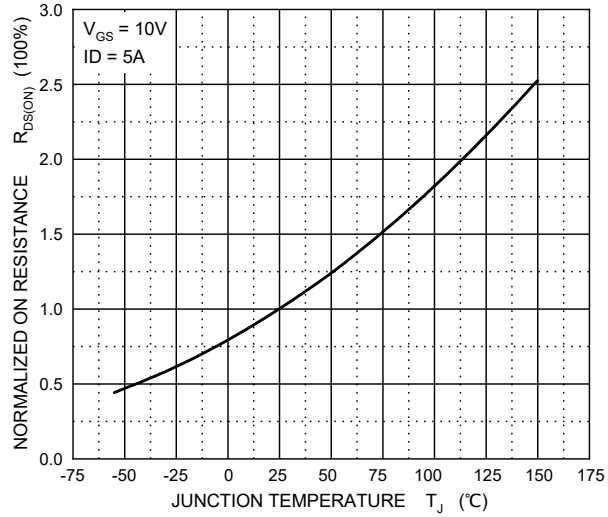
On Resistance vs. Drain Current



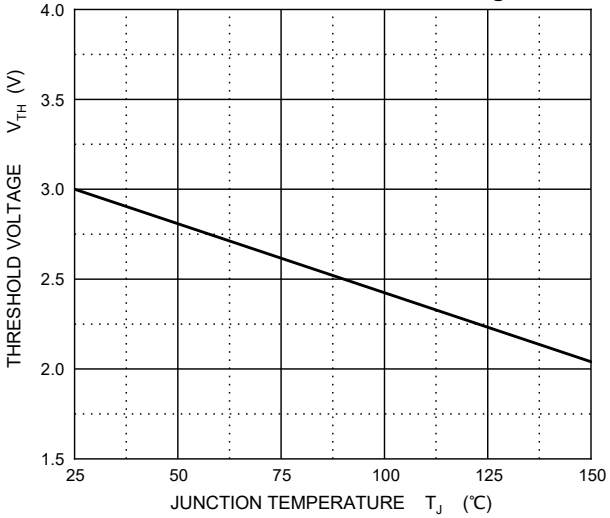
On Resistance vs. Gate-Source Bias



On Resistance vs. Junction Temperature

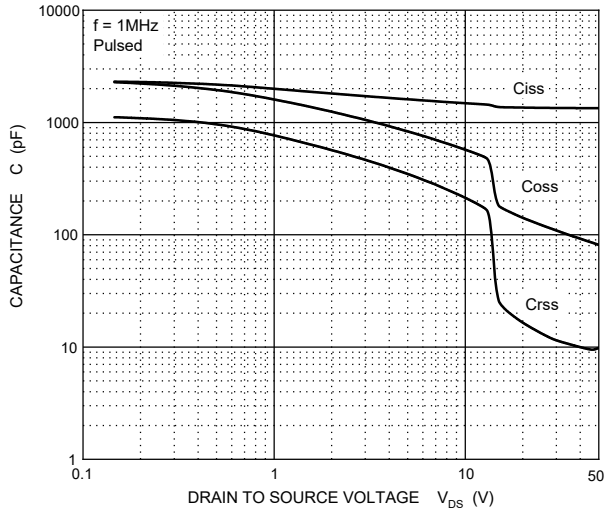


Gate-Source Threshold Voltage

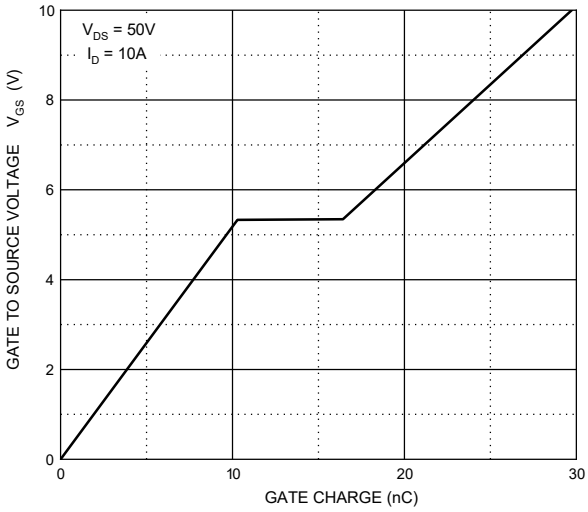


Typical Characteristics (T_J = 25℃, unless otherwise specified)

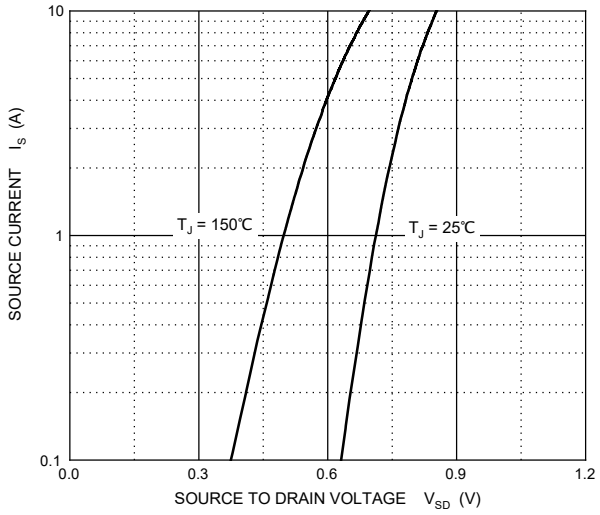
Typical Capacitances



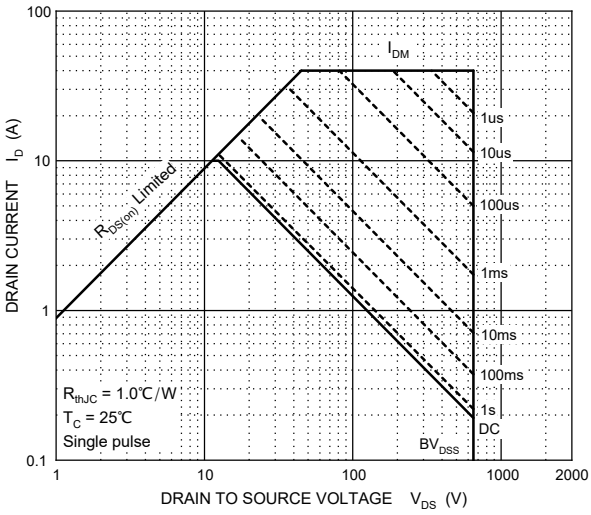
Gate Charge



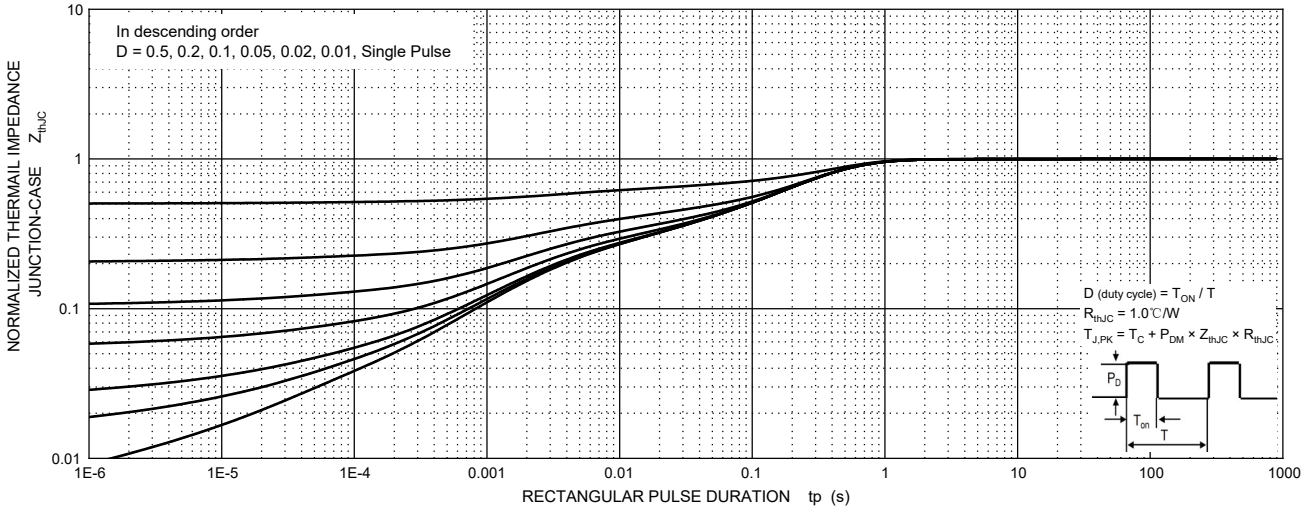
Source-Drain Diode Forward Characteristics



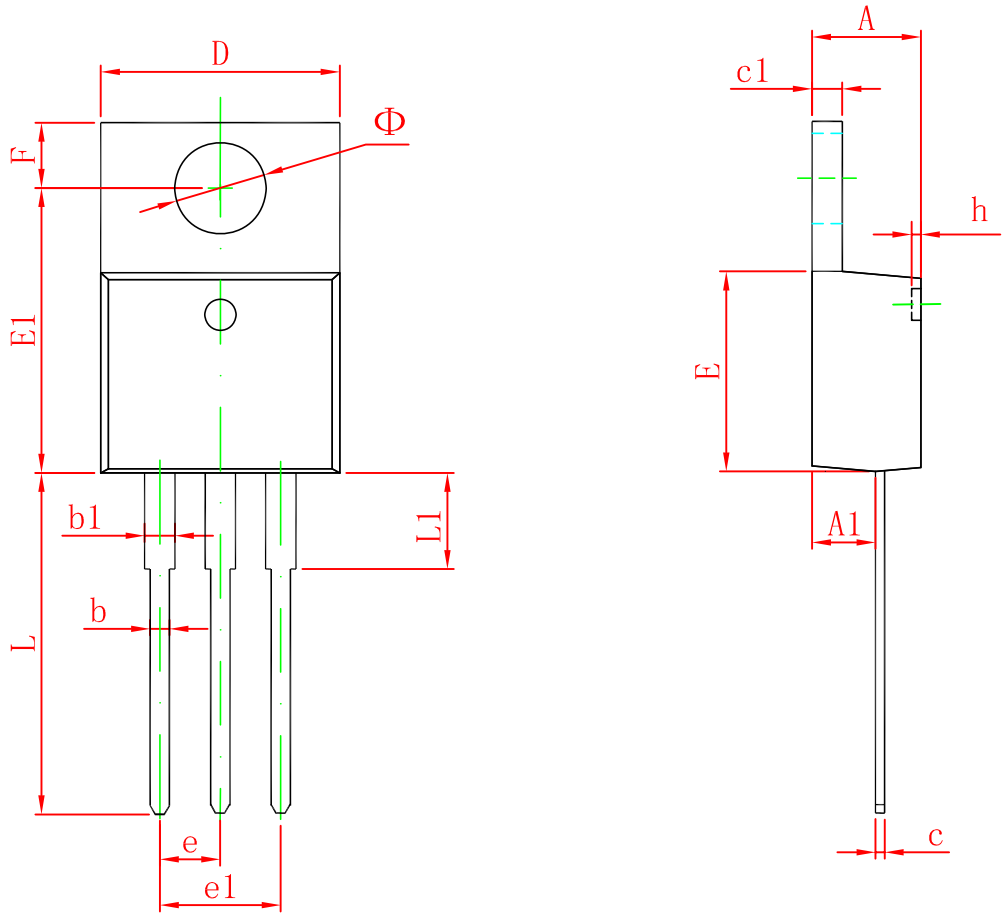
Maximum Safe Operating Area



Transient Thermal Impedance, Junction-Case



TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155