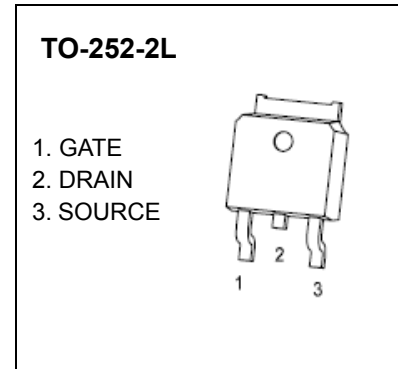




TO-252-2L Plastic-Encapsulate MOSFETS

04N65M1 N-Channel Power MOSFET

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650	2.0Ω@10V	4A



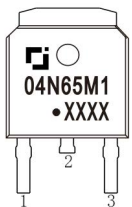
General Description

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

FEATURE

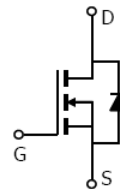
- High Current Rating
- Lower $R_{ds(on)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter VSD Specifications
- Avalanche Energy Specified

MARKING



04N65M1 = Device code.
 Solid dot = Green molding compound device,
 if none, the normal device.
 XXXX = Code.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current	I_D ^①	4	A
Pulsed Drain Current	I_{DM} ^②	16	A
Single Pulsed Avalanche Energy	E_{AS} ^③	200	mJ
Maximum Power Dissipation	P_D ^①	TBD	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	TBD	°C/W
Thermal Resistance from Junction to Case	$R_{\theta JC}$ ^①	TBD	°C/W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	°C

MOSFET ELECTRICAL CHARACTERISTICS

$T_J=25\text{ }^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 600V, V_{GS} = 0V$	$T_J = 25^\circ\text{C}$		1.0	μA
			$T_J = 125^\circ\text{C}$		100	
Gate-body leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 30V$			± 100	nA
On characteristics ^④						
Gate-threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.0	4.0	V
Static drain-source on-state resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 2.0A$		2.0	2.6	Ω
Dynamic characteristics ^⑤						
Input capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1\text{MHz}$		624		μF
Output capacitance	C_{oss}			51.1		
Reverse transfer capacitance	C_{rss}			2.1		
Gate resistance	R_g	$f = 1\text{MHz}$		2.76		Ω
Switching characteristics ^⑤						
Total gate charge	Q_g	$V_{GS} = 10V, V_{DS} = 520V, I_D = 4A$		11.3		nC
Gate-source charge	Q_{gs}			2.8		
Gate-drain charge	Q_{gd}			4.2		
Turn-on delay time	$t_{d(on)}$	TBD		TBD		ns
Turn-on rise time	t_r			TBD		
Turn-off delay time	$t_{d(off)}$			TBD		
Turn-off fall time	t_f			TBD		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD} ^④	$V_{GS} = 0V, I_S = 4A$			1.2	V
Continuous drain-source diode forward current	I_S ^①				4	A
Pulsed drain-source diode forward current	I_{SM} ^②				16	A

Notes:

- $T_C=25^\circ\text{C}$ Limited only by maximum temperature allowed.
- $P_W \leq 10\mu s$, Duty cycle $\leq 1\%$.
- EAS condition: $V_{DD} = 100V, V_{GS} = 10V, L = 10\text{mH}, R_g = 25\Omega$ Starting $T_J = 25^\circ\text{C}$.
- Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production.