

P-Channel 20-V (D-S) MOSFET, Low-Threshold

PRODUCT SUMMARY		
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^e
- 20	0.65 at V _{GS} = - 4.5 V	- 0.58
	0.85 at V _{GS} = - 2.5 V	- 0.5

FEATURES

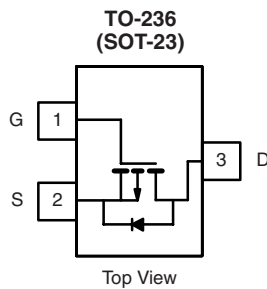
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET[®] Power MOSFET
- ESD Protected: 3000 V



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

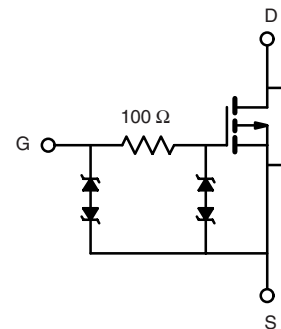
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems, DC/DC Converters
- Power Supply Converter Circuits
- Load/Power Switching-Cell Phones, Pagers



Marking Code: K4ywl

K4 = Part Number Code for TP0101K

y = Year Code
w = Week Code
l = Lot Traceability



Ordering Information: TP0101K-T1-E3 (Lead (Pb)-free)
TP0101K-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	- 20	V	
Gate-Source Voltage	V _{GS}	± 8		
Continuous Drain Current (T _J = 150 °C) ^b	I _D	T _A = 25 °C	A	
		T _A = 70 °C		
Pulsed Drain Current ^a	I _{DM}	- 2		
Continuous Source-Drain (Diode Current) ^b	I _S	- 0.3		
Power Dissipation ^b	P _D	T _A = 25 °C	W	
		T _A = 70 °C		
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C	

Notes:

- a. Pulse width limited by maximum junction temperature.
b. Surface Mounted on FR4 board, t ≤ 10 s.

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Limits	Unit	
Thermal Resistance, Junction-to-Ambient ^b	R _{thJA}	357	°C/W	

Notes:

- a. Pulse width limited by maximum junction temperature.
b. Surface Mounted on FR4 board, t ≤ 10 s.

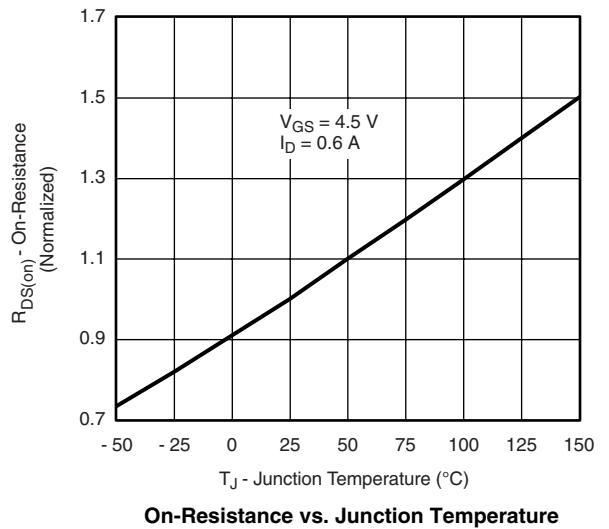
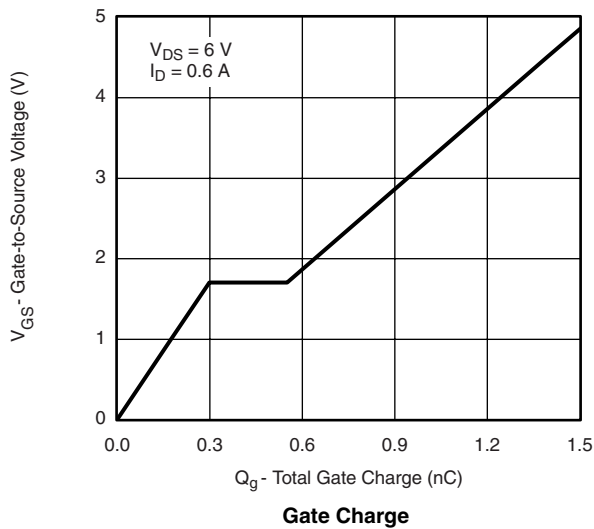
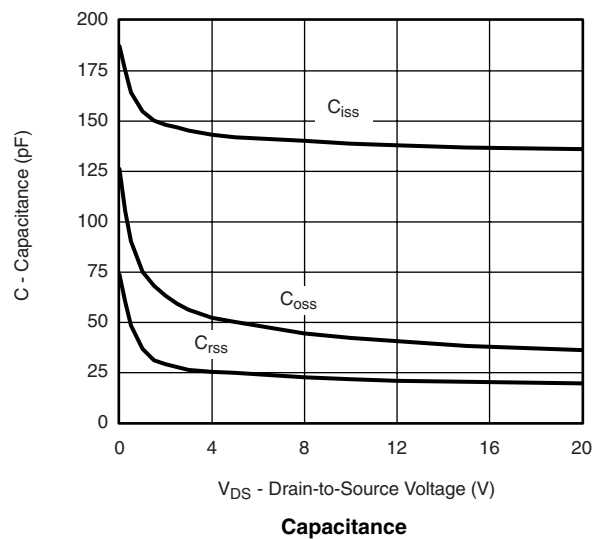
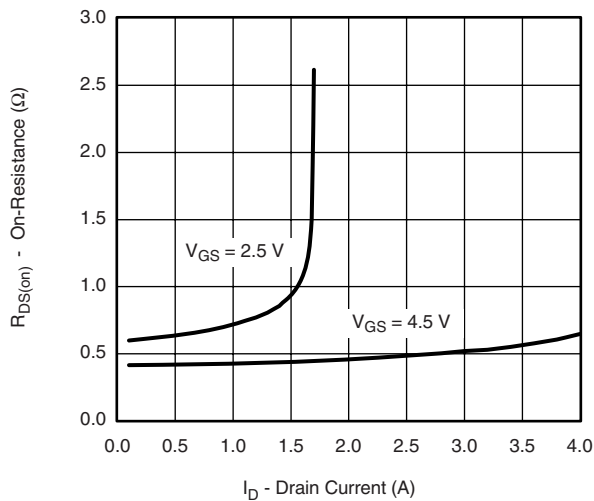
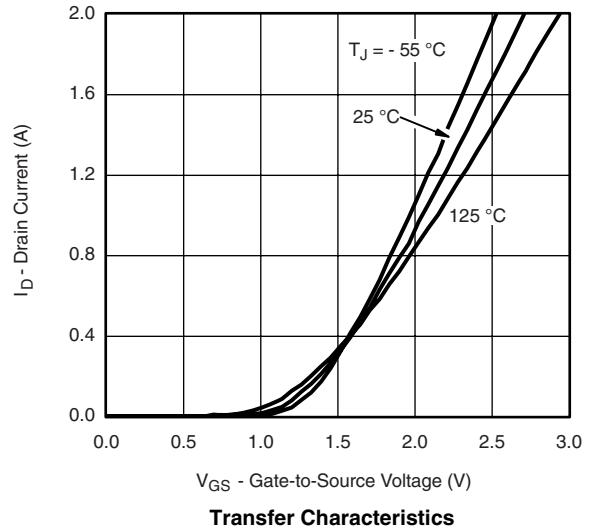
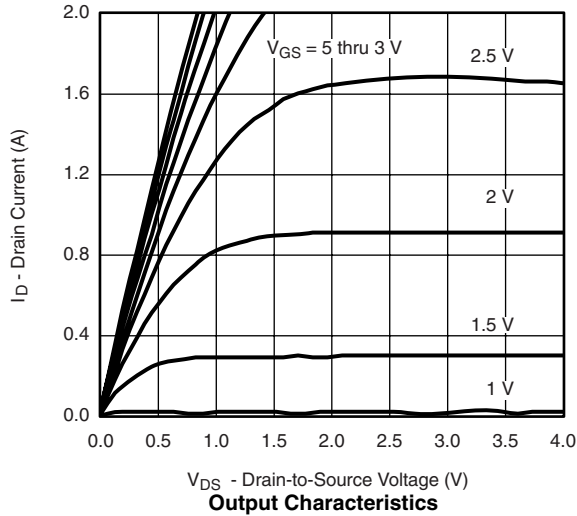
SPECIFICATIONS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -10\text{ }\mu\text{A}$	- 20			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -50\text{ }\mu\text{A}$	- 0.5	- 0.7	- 1.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = -0\text{ V}, V_{GS} = \pm 4.5\text{ V}$			± 5	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			- 1 - 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -4.5\text{ V}$ $V_{DS} \leq -5\text{ V}, V_{GS} = -2.5\text{ V}$	- 1.2 - 0.5			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -0.58\text{ A}$ $V_{GS} = -2.5\text{ V}, I_D = -0.5\text{ A}$		0.42 0.64	0.65 0.85	Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -0.58\text{ A}$		1300		mS
Diode Forward Voltage ^a	V_{SD}	$I_S = -0.3\text{ A}, V_{GS} = 0\text{ V}$		- 0.9	- 1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = -6\text{ V}, V_{GS} = -4.5\text{ V}$ $I_D \cong -0.58\text{ A}$		1400	2200	μC
Gate-Source Charge	Q_{gs}			300		
Gate-Drain Charge	Q_{gd}			250		
Gate Resistance	R_g			150		Ω
Turn-On Time	$t_{d(on)}$	$V_{DD} = -6\text{ V}, R_L = 10\text{ }\Omega$ $I_D \cong -0.58\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 6\text{ }\Omega$		25	35	ns
	t_r			30	45	
Turn-Off Time	$t_{d(off)}$			55	85	
	t_f			38	60	

Notes:

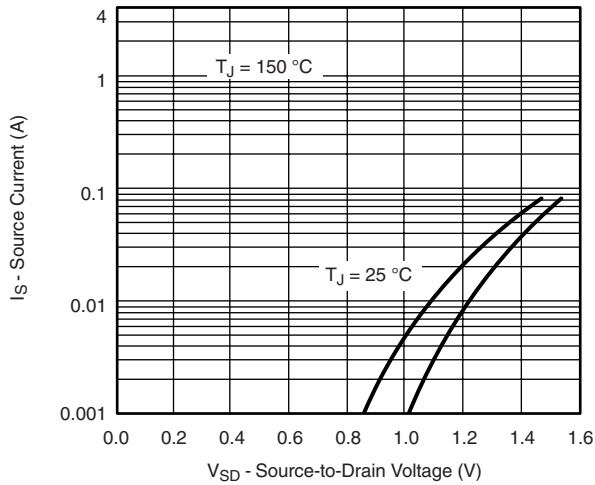
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

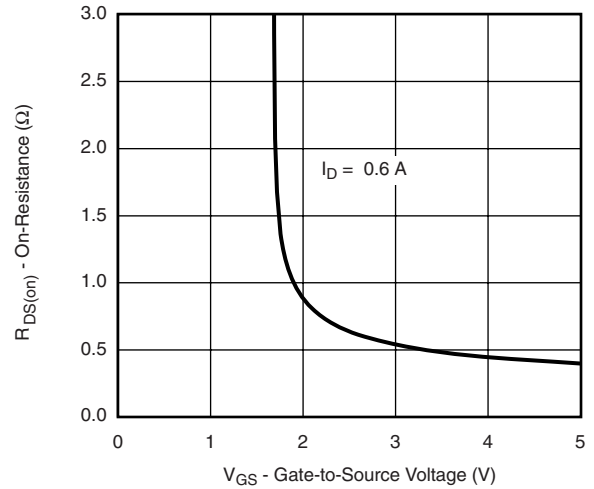
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



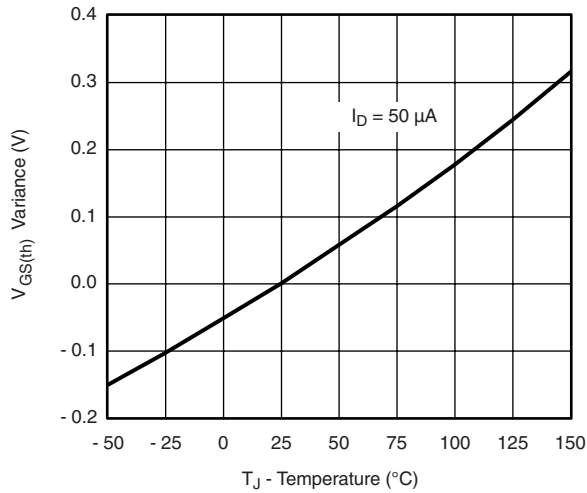
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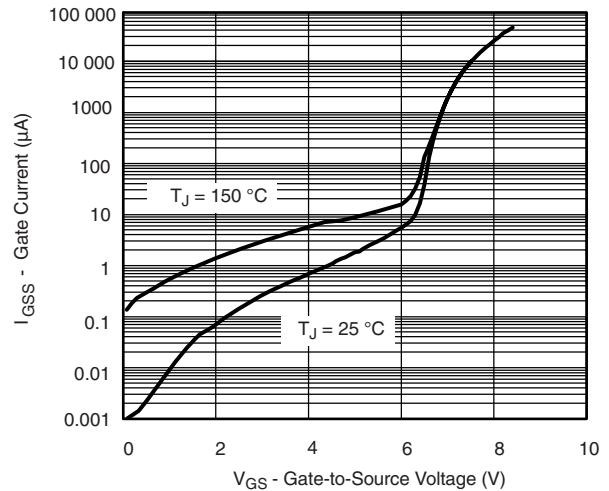
Source-Drain Diode Forward Voltage



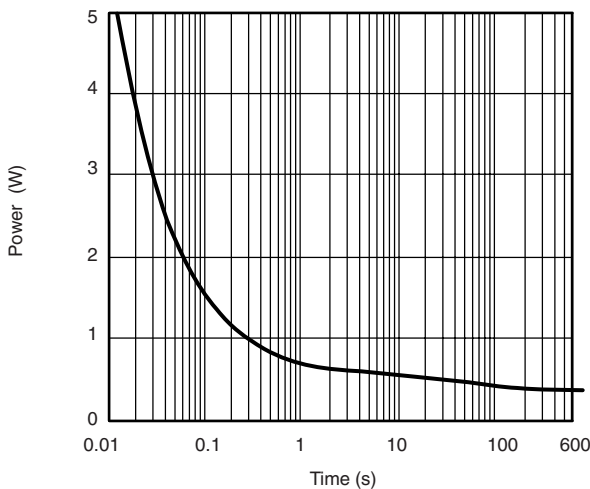
On-Resistance vs. Gate-to-Source Voltage



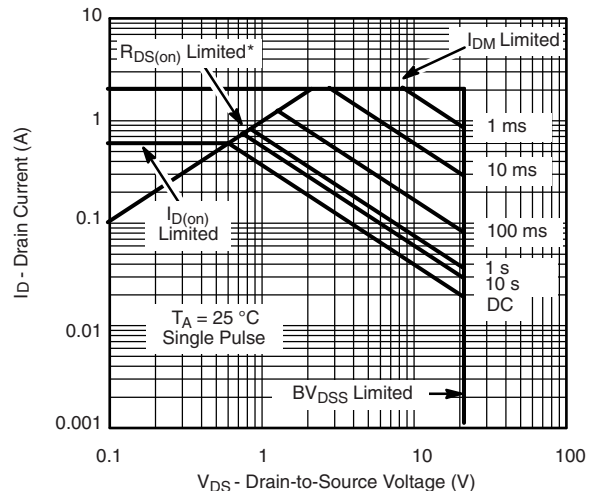
Threshold Voltage



Gate Current vs. Gate-Source Voltage

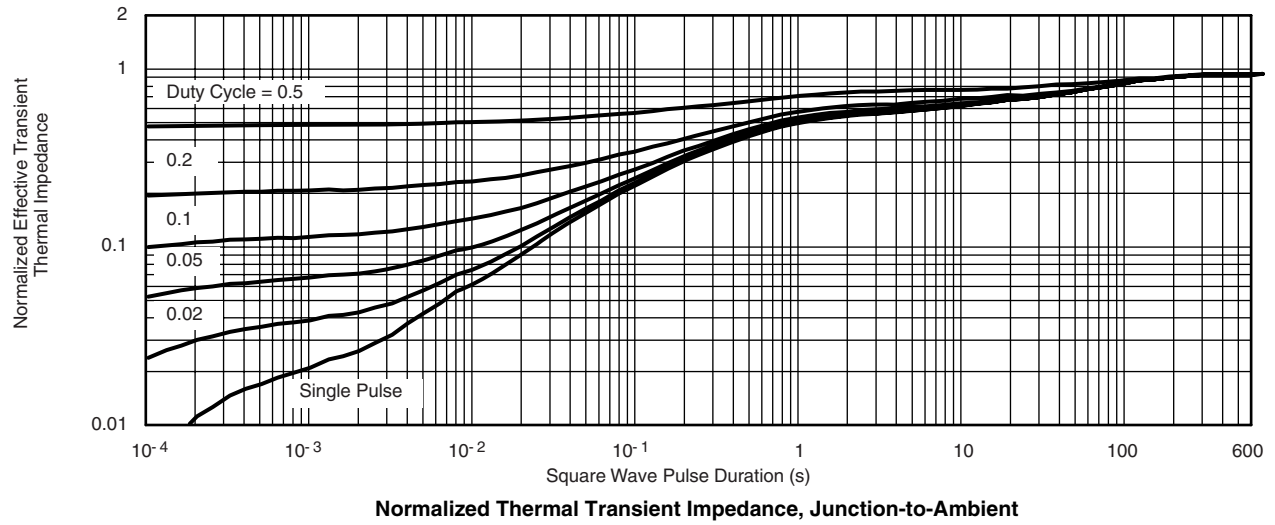


Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Ambient
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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