

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

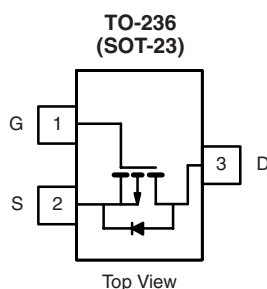
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET
- ESD Protected: 3000 V



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

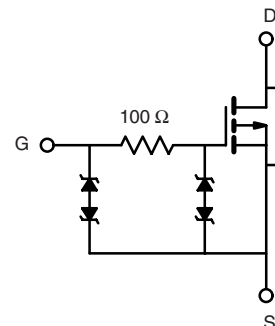
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems, DC/DC Converters
- Power Supply Converter Circuits
- Load/Power Switching-Cell Phones, Pagers



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	- 0.58	A
		- 0.46	
Pulsed Drain Current ^a	I_{DM}	- 2	
Continuous Source-Drain (Diode Current) ^b	I_S	- 0.3	W
Power Dissipation ^b	P_D	0.35	
		0.22	
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, $t \leq 10$ 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, $t \leq 10$ 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 V, I _D = - 10 μA	- 20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 50 μA	- 0.5	- 0.7	- 1.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = - 0 V, V _{GS} = ± 4.5 V			± 5	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 20 V, V _{GS} = 0 V			- 1	
		V _{DS} = - 20 V, V _{GS} = 0 V, T _J = 55 °C			- 10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ - 5 V, V _{GS} = - 4.5 V	- 1.2			A
		V _{DS} ≤ - 5 V, V _{GS} = - 2.5 V	- 0.5			
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 4.5 V, I _D = - 0.58 A		0.42	0.65	Ω
		V _{GS} = - 2.5 V, I _D = - 0.5 A		0.64	0.85	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 5 V, I _D = - 0.58 A		1300		mS
Diode Forward Voltage ^a	V _{SD}	I _S = - 0.3 A, V _{GS} = 0 V		- 0.9	- 1.2	V
Dynamic ^b						
Total Gate Charge	Q _g	V _{DS} = - 6 V, V _{GS} = - 4.5 V I _D ≅ - 0.58 A		1400	2200	pC
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 V, R _L = 10 Ω I _D ≅ - 0.58 A, V _{GEN} = - 4.5 V, R _g = 6 Ω		25	35	ns
	t _r			30	45	
Turn-Off Time	t _{d(off)}			55	85	
	t _f			38	60	

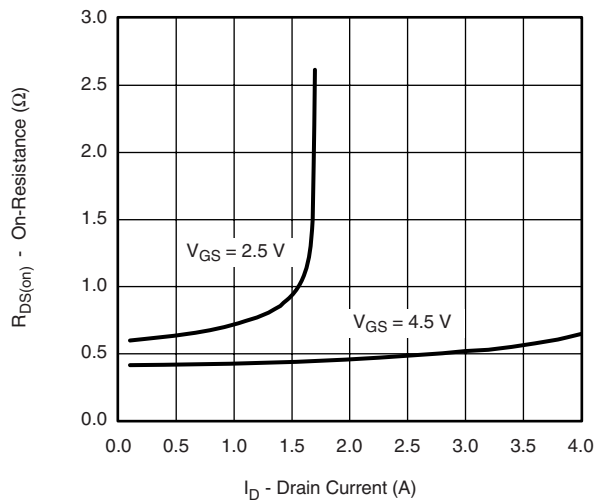
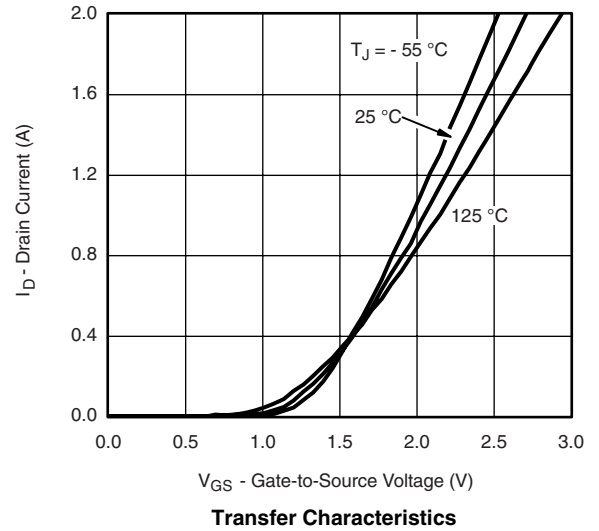
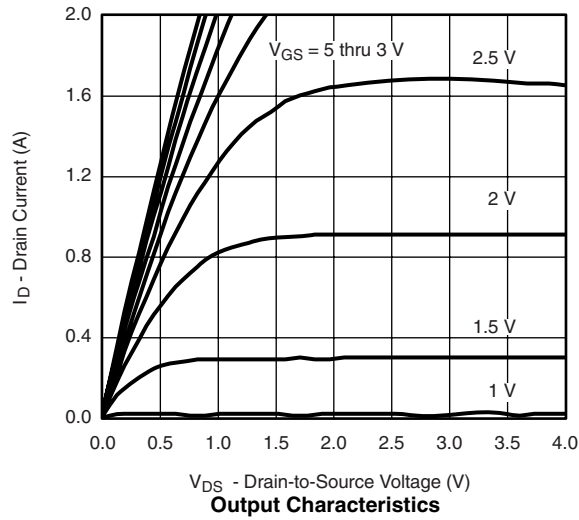
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

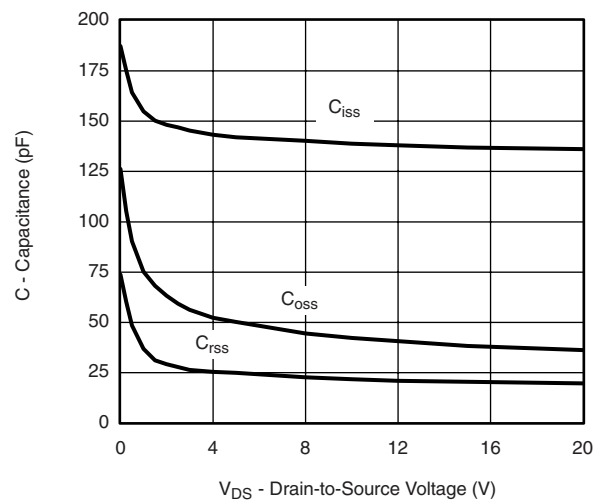
b. Guaranteed by design, not subject to production testing.

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.

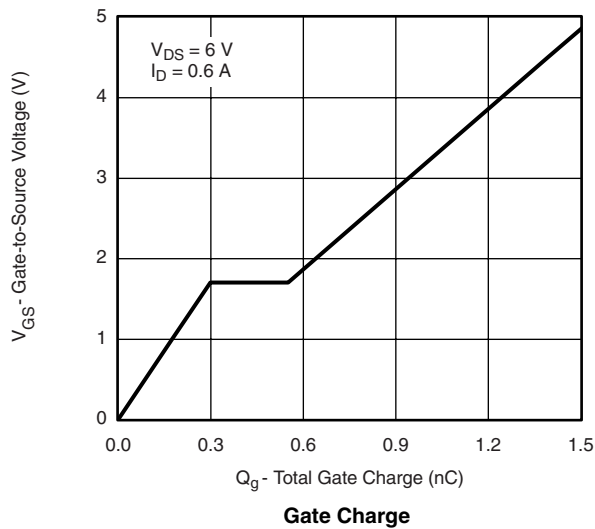
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



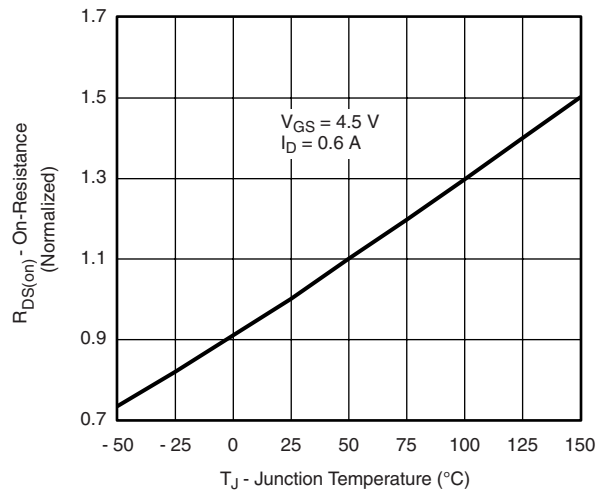
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

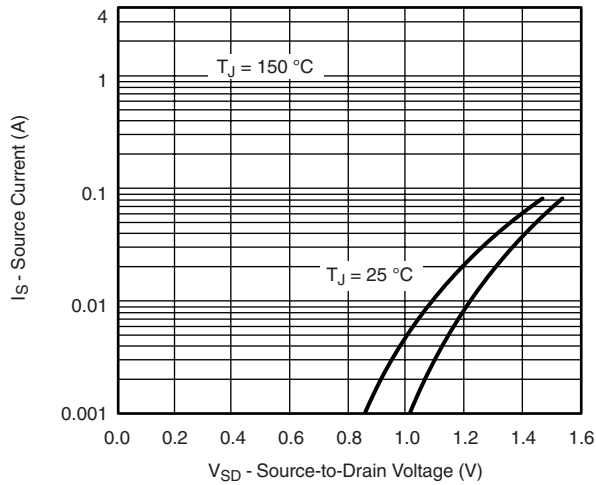


Gate Charge

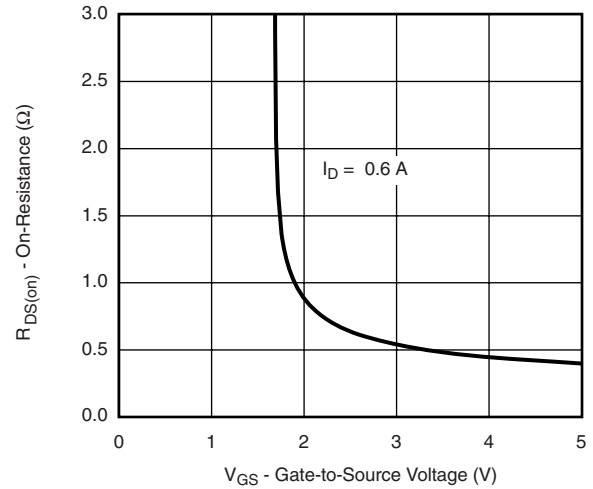


On-Resistance vs. Junction Temperature

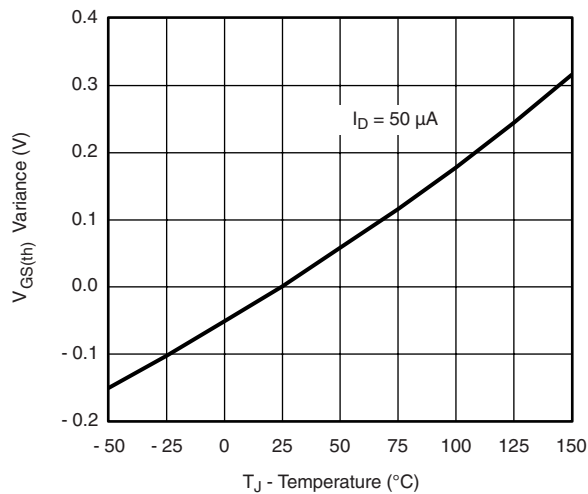
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



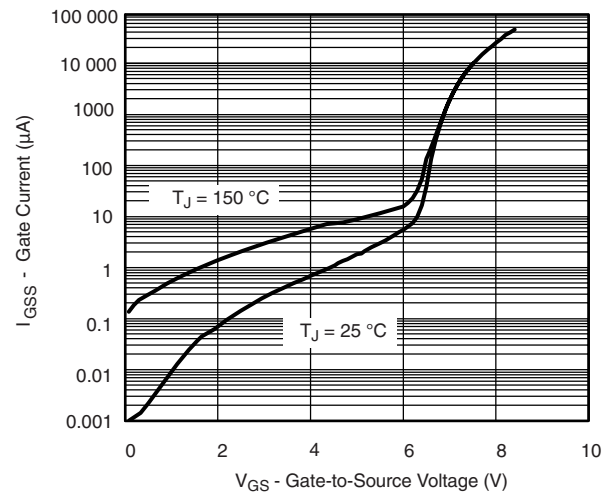
Source-Drain Diode Forward Voltage



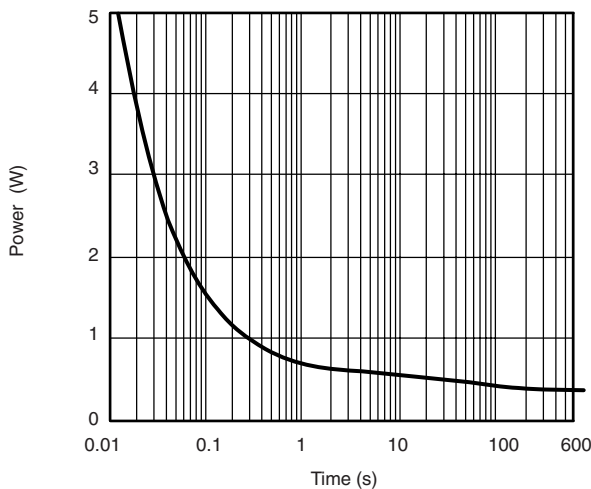
On-Resistance vs. Gate-to-Source Voltage



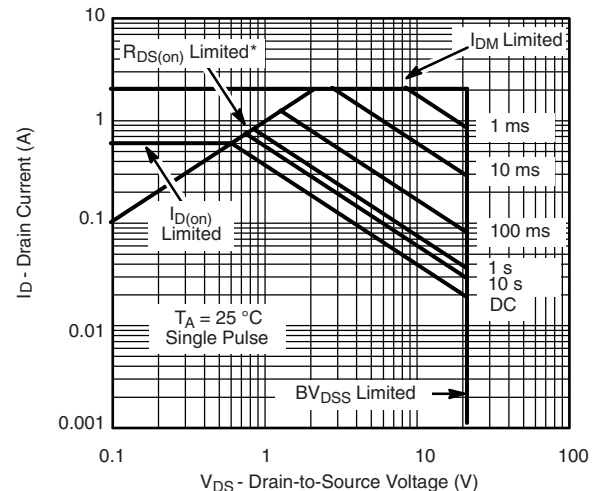
Threshold Voltage



Gate Current vs. Gate-Source Voltage

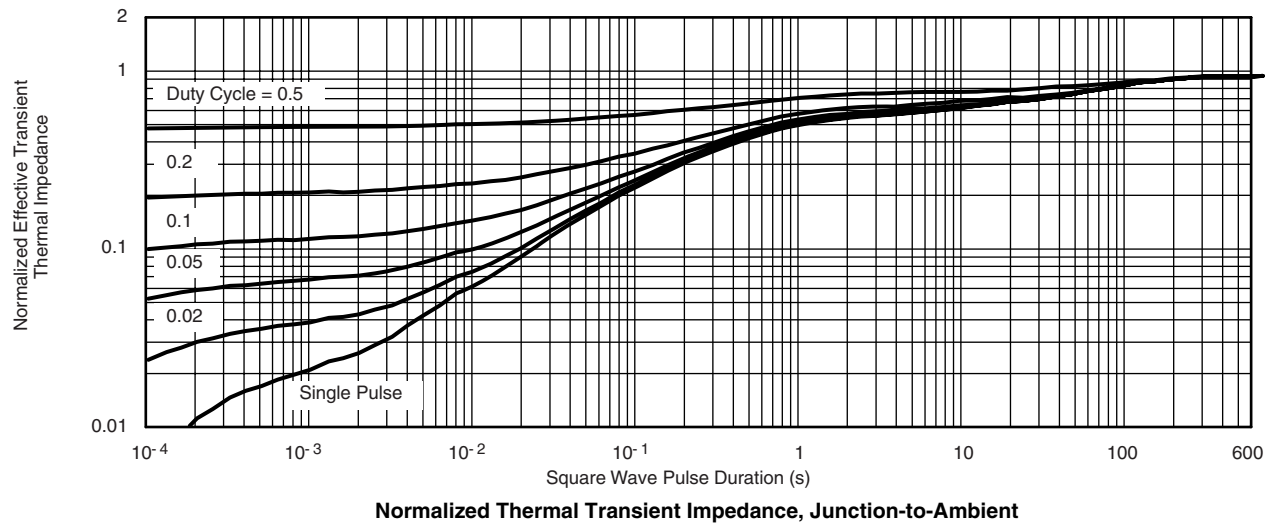


Single Pulse Power, Junction-to-Ambient



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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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