

N-Channel Power MOSFET

GENERAL DESCRIPTION

The FTK50N03D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge.

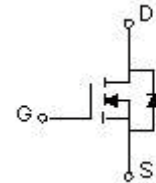
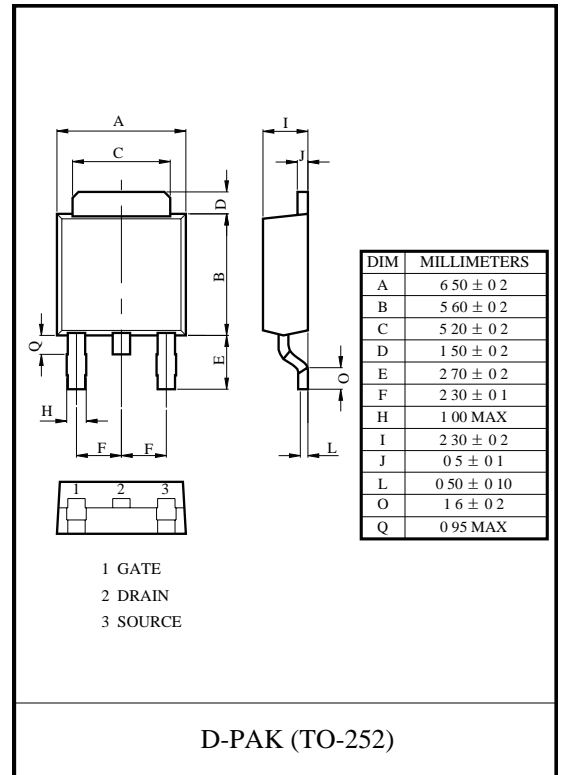
It can be used in a wide variety of applications.

FEATURE

- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

APPLICATION

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



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

Parameter	Symbol	Limit	Unit
Drain- Source Voltage	V_{DS}	30	V
Gate- Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	50	A
Pulsed Drain Current	I_{DM}	200	A
Single Pulsed Avalanche Energy	$E_{AS}^{(1)}$	70	mJ
Power Dissipation	P_D	1.25	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	100	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 55 ~ +150	$^\circ\text{C}$
Lead Temperature for Soldering Purposes(1/8" from case for 10s)	L T	260	$^\circ\text{C}$

(1). E_{AS} condition: $V_{DD}=20\text{V}$, $L=0.5\text{mH}$, $R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$



FTK50N03D

ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain - source breakdown voltage	$V_{(BR) DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$			1	μA
Gate - body leakage current	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
On characteristics (note1)						
Gate - threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0		3.0	V
Static drain - source on - state resistance	$R_{DS(on)}$	$V_{GS} = 5V, I_D = 20A$			16	$m\Omega$
		$V_{GS} = 10V, I_D = 25A$			11	$m\Omega$
Forward transconductance	g_{fs}	$V_{DS} = 5V, I_D = 20A$	15			S
Dynamic characteristics (note 2)						
Input capacitance	C_{iss}	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1MHz$		2000		pF
Output capacitance	C_{oss}			280		
Reverse transfer capacitance	C_{res}			160		
Switching characteristics (note 2)						
Total gate charge	Q_g	$V_{DS} = 10V, V_{GS} = 10V,$ $I_D = 25A$		23		nC
Gate - source charge	Q_{gs}			7		
Gate - drain charge	Q_{gd}			4.5		
Turn - on delay time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 20A,$ $V_{GS} = 10V, R_G = 1.8\Omega$		10		ns
Turn - on rise time	t_r			8		
Turn - off delay time	$t_{d(off)}$			30		
Turn - off fall time	t_f			5		
Drain-Source Diode Characteristics						
Drain - source diode forward voltage(note1)	I_{SD}	$V_{GS} = 0V, I_S = 25A$			1.2	V
Continuous drain - source diode forward current	I_S				50	A
Pulsed drain - source diode forward current	I_{SM}				200	A

Notes:

1. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Guaranteed by design, not subject to production.



Typical Electrical and Thermal Characteristics (Curves)

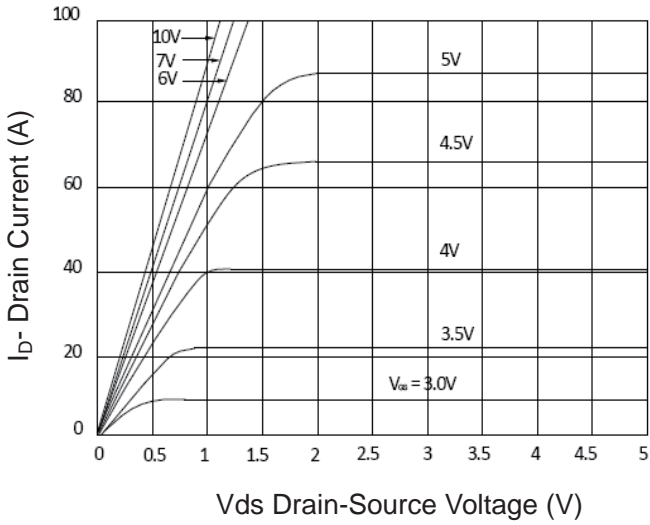


Figure 1 Output Characteristics

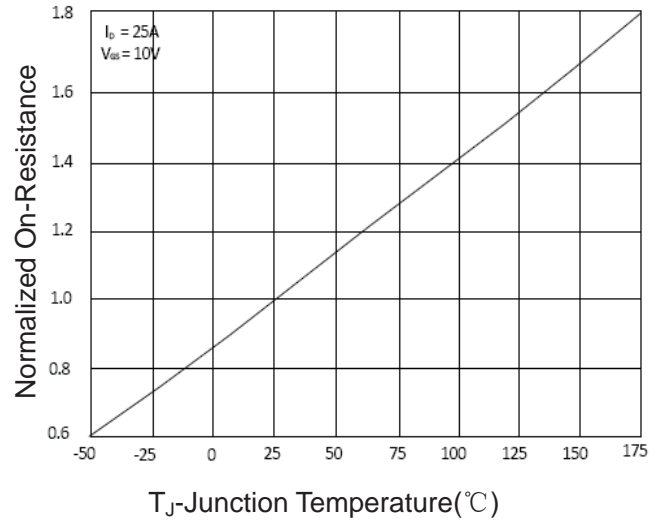


Figure 4 Rdson-Junction Temperature

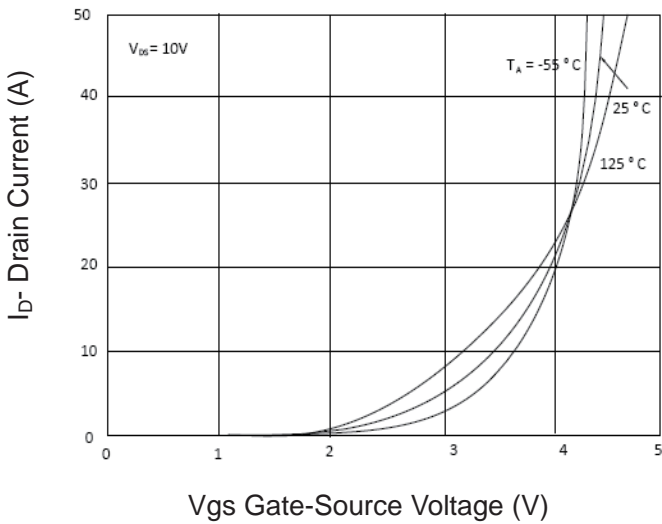


Figure 2 Transfer Characteristics

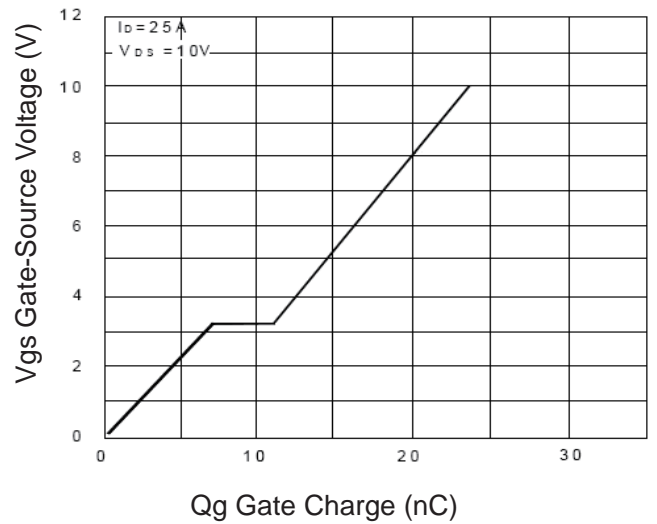


Figure 5 Gate Charge

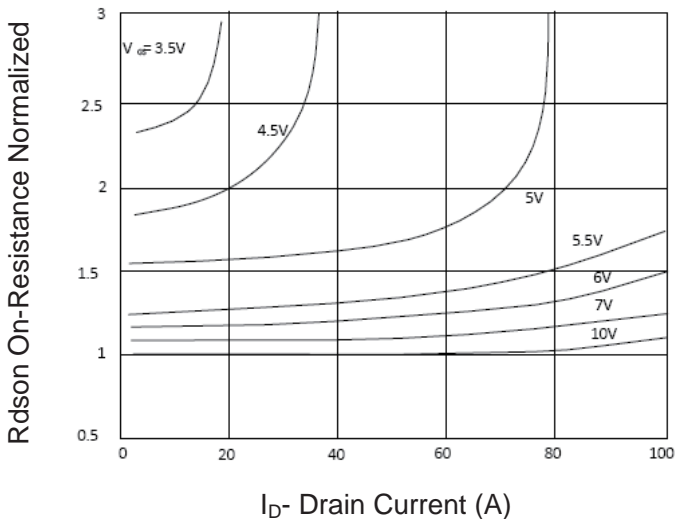


Figure 3 Rdson- Drain Current

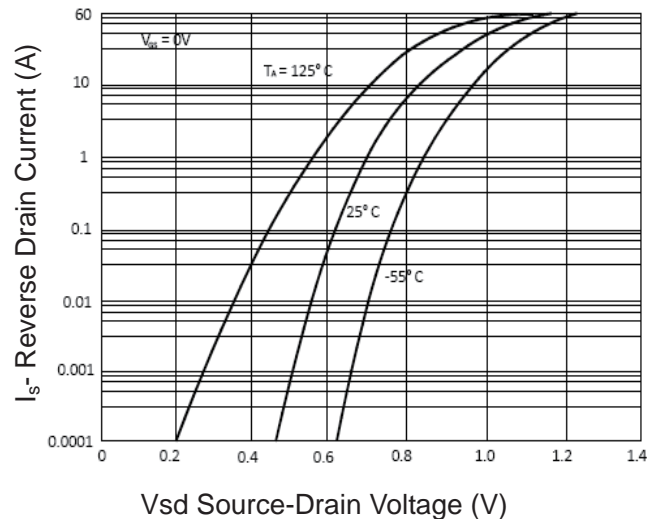


Figure 6 Source- Drain Diode Forward

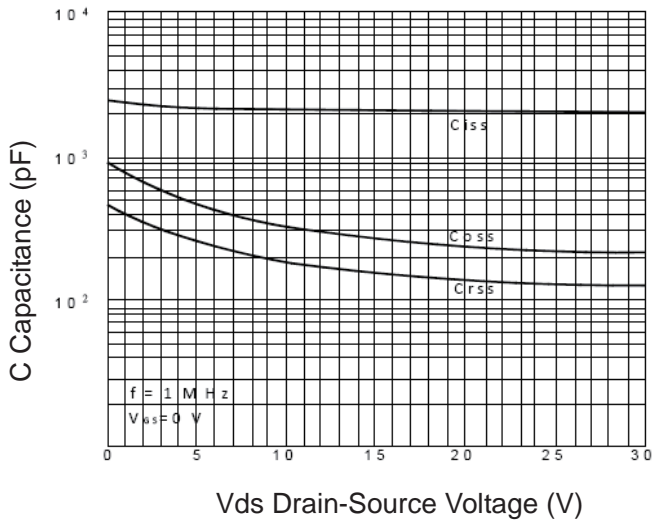


Figure 7 Capacitance vs Vds

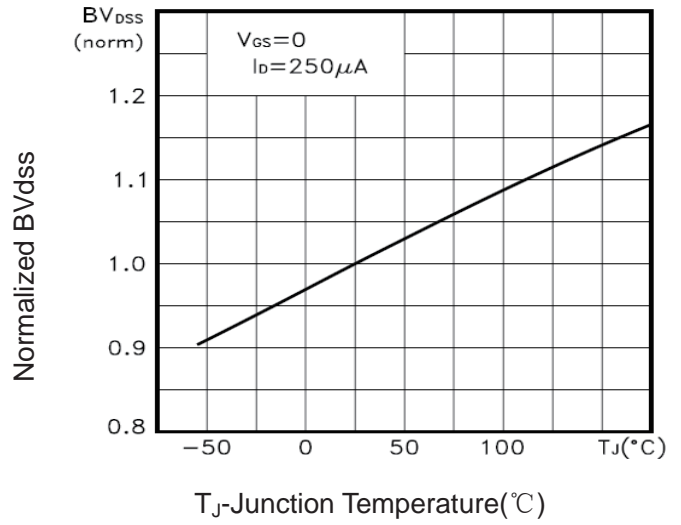


Figure 9 BV_{DSS} vs Junction Temperature

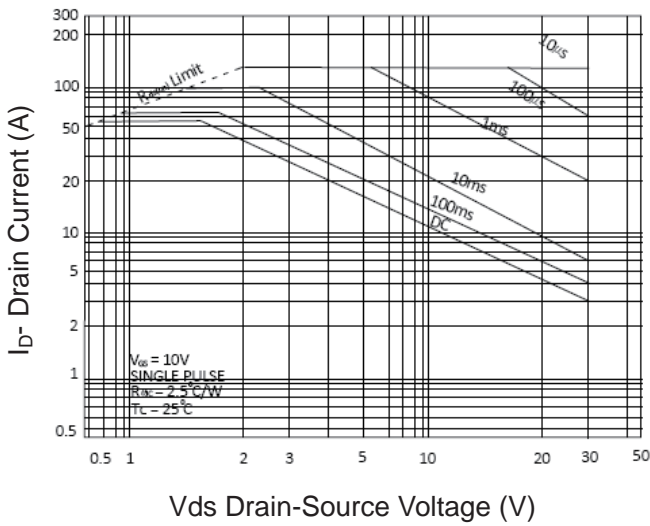


Figure 8 Safe Operation Area

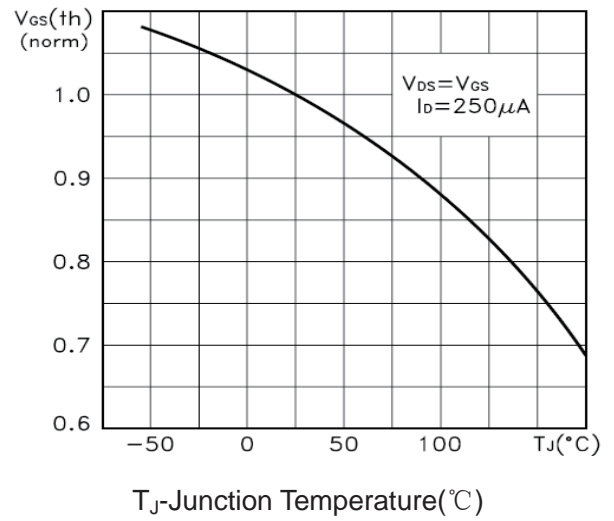


Figure 10 $V_{GS(th)}$ vs Junction Temperature

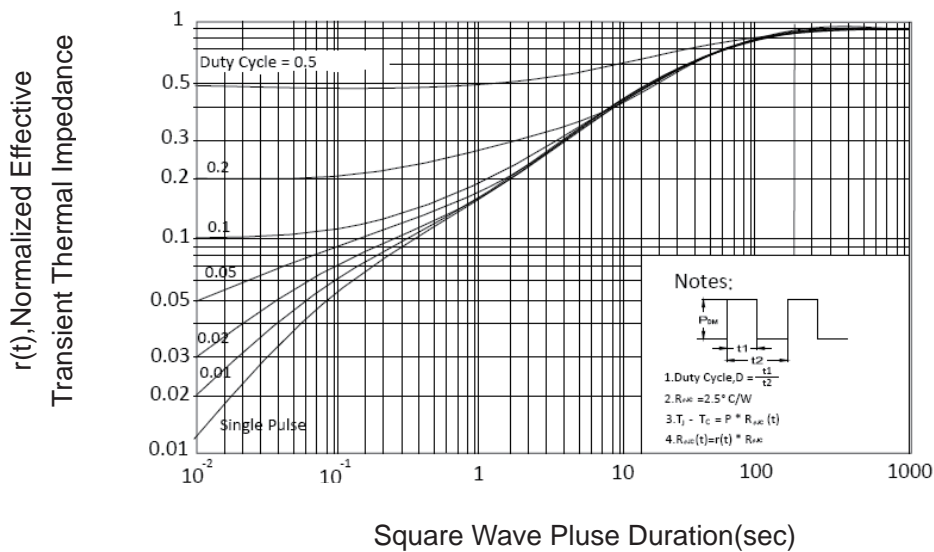


Figure 11 Normalized Maximum Transient Thermal Impedance