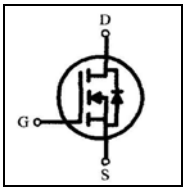
FCI2302 N-Channel High-Density Trench MOSFET

DESCRIPTION

Our FCI2302 N-Channel High-Density Trench MOSFETs utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design of our products provides the designer with an extremely efficient and reliable device for use in a variety of applications.

FEATURES

- Super high dense cell trench design for low $R_{DS(on)}$
- N-Channel Trench MOSFET
- SOT-23-3L Footprint
- Available in Tape and Reel
- Rugged and Reliable





V_{DSS} = 20V
$R_{DS(on)}$ = 85mΩ (max.) @ V_{GS} = 4.5V (I_D = 3.6A)
$R_{DS(on)}$ = 115mΩ (max.) @ V_{GS} = 2.5V (I_D = 3.1A)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Continuous Drain Current[1] @ T_A = 25°C	I_D	2.8	A
Pulsed Drain Current[2]	I_{DM}	10	
Maximum Power Dissipation[1]	P_D	1.25	W
Drain-Source Diode Forward Current[1]	I_S	1.6	A
Gate-to-Source Voltage	V_{GS}	± 8	V
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to + 150	°C

THERMAL RESISTANCE

Characteristic	Symbol	Value	Unit
Junction-to-Ambient Thermal Resistance[1]	$R_{\theta JA}$	85	°C/W

Notes:
1. Surface Mounted on FR4 Board, t ≤ 10 sec.
2. Pulse Test: Pulse width ≤ 300 μs, Duty Cycle ≤ 2%.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.[3]	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16V, V_{GS} = 0V			1	μA
Gate-Body Leakage	I_{GSS}	V_{GS} = 8V, V_{DS} = 0V			100	nA
ON CHARACETERISTICS[2]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.7			V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = -2.8A			85	mΩ
		V_{GS} = 2.5V, I_D = -2.0A			115	mΩ
DRAIN-SOURCE DIODE CHARACTERISTICS[2]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = 1.0A			1.0	V
SWITCHING CHARACTERISTICS[2]						
Total Gate Charge	Q_g	V_{DS} = 10V, I_D = 1A V_{GS} = 4.5V		6.52		nC
Gate-Source Charge	Q_{gs}			1.6		nC
Gate-Drain Charge	Q_{gd}			1.16		nC
SWITCHING CHARACTERISTICS[3]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = 10V, I_D = 1A V_{GEN} = 4.5V R_L = 10 ohms R_{GEN} = 10 ohms		12		ns
Rise Time	t_r			36		ns
Turn-Off Delay Time	$t_{D(OFF)}$			34		ns
Fall Time	t_f			10		ns

Notes:
2. Pulse Test: Pulse width ≤ 300 μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production testing.

RATINGS AND CHARACTERISTIC CURVES

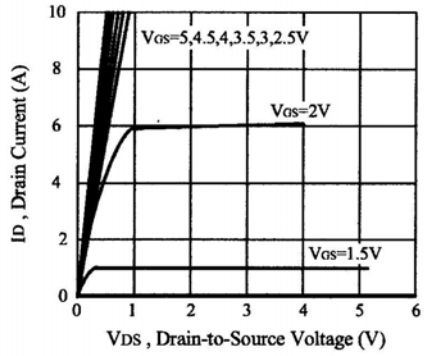


Figure 1. Output Characteristics

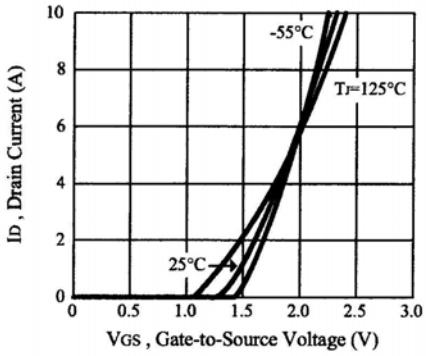


Figure 2. Transfer Characteristics

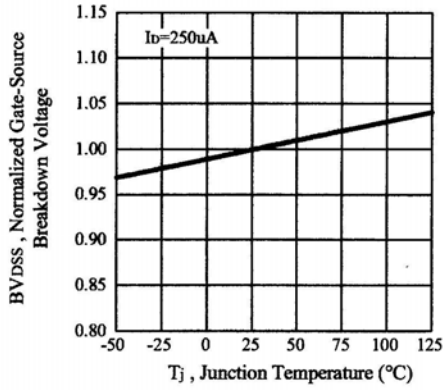


Figure 3. Breakdown Voltage Variation with Temperature

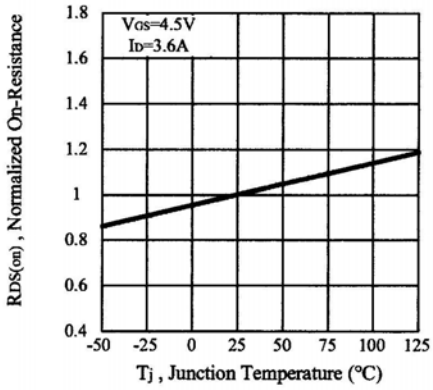


Figure 4. On-Resistance Variation with Temperature

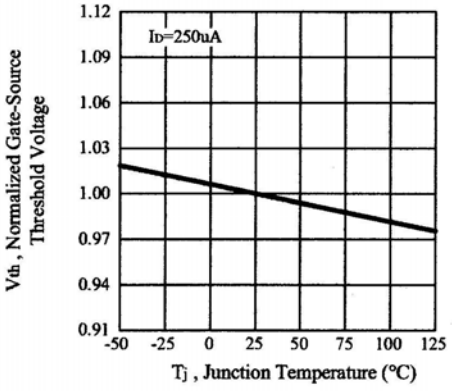


Figure 5. Gate Threshold Variation with Temperature

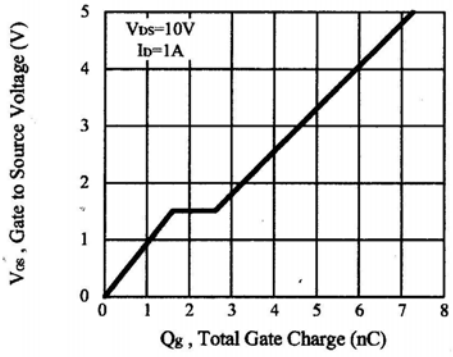


Figure 6. Gate Charge

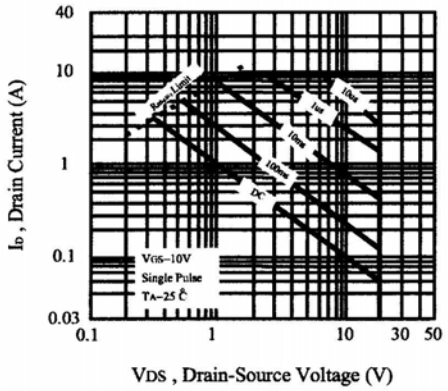


Figure 7. Maximum Safe Operating Area

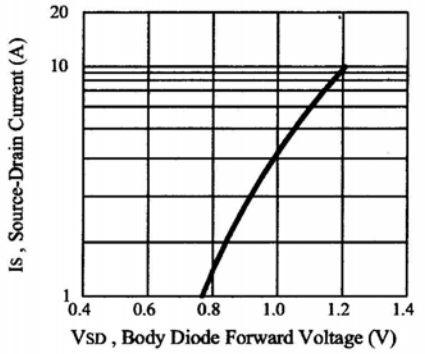


Figure 8. Body Diode Forward Voltage Variation with Source Current

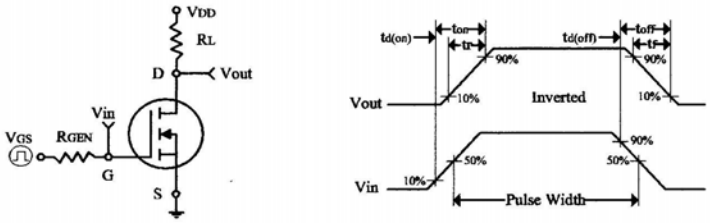


Figure 9. Switching Test Circuit and Switching Waveforms

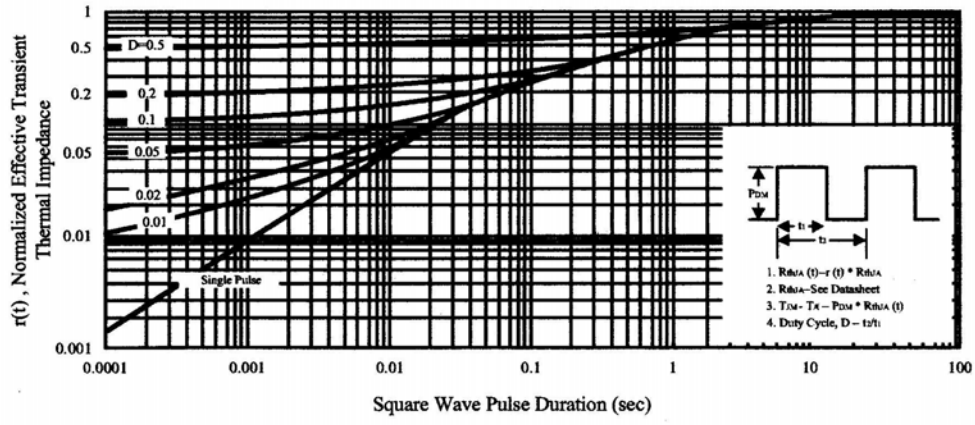
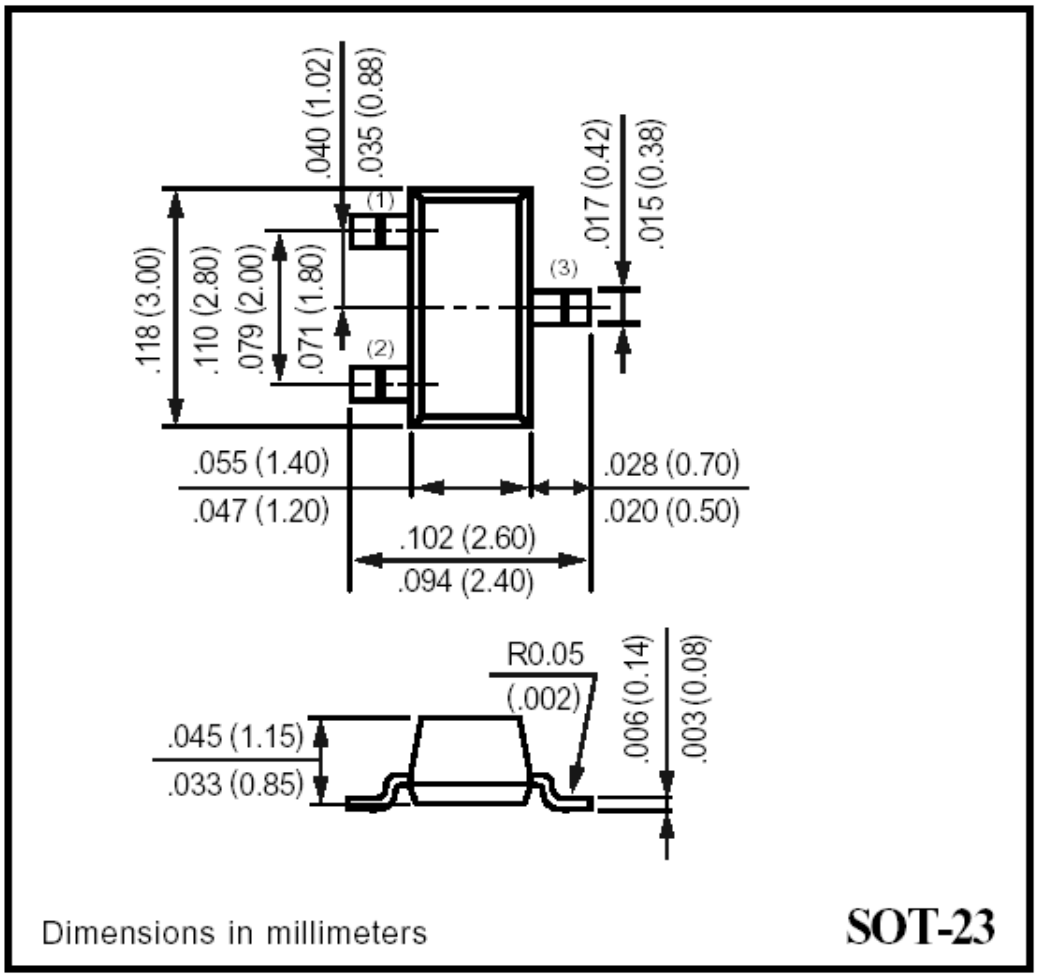
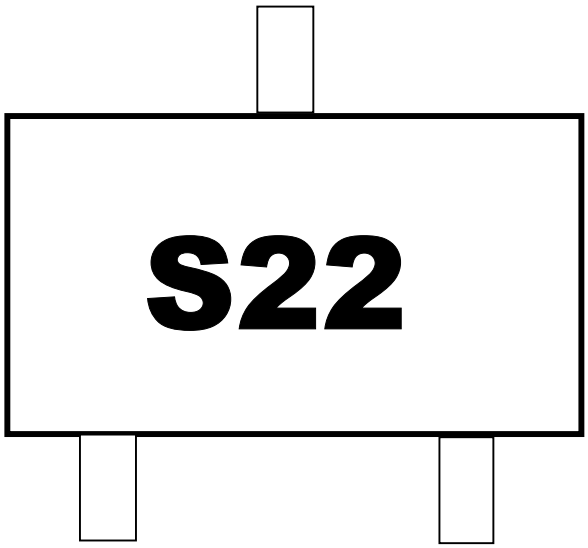


Figure 10. Normalized Thermal Transient Impedance Curve

SOT-23 PACKAGE DIMENSIONS



MARKING SPECIFICATIONS



Marking Guide: S22 = FCI2302 SOT-23 Package