TECH MOS Technology.

TM2301N
TM2301FN(Pb-free)
July , 2005

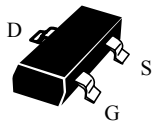
P-Channel High Density Trench MOSFET

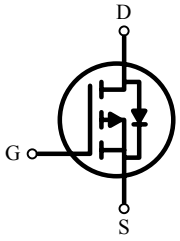
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(on)}$ (m-ohm) Max
-20V	-2.3A	130 @ V_{GS} = -4.5V
	-2.0A	190 @ V_{GS} = -2.5V

FEATURES

- Super high dense cell trench design for low $R_{DS(on)}$.
- Rugged and reliable.
- SSOT-23 package.

SSOT-23





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	V
Drain Current-Continuous[a] @ T_A = 25 °C	I_D	- 2.3	A
-Pulse[b]	I_{DM}	- 10	A
Drain-Source Diode Forward Current[a]	I_S	- 1.6	A
Maximum Power Dissipation[a]	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	- 55 to 150	°C

THERMAL CHARACTERISTICS

Parameter	Symbol	Typ[c]	Max	Unit
Thermal Resistance,Junction-to-Ambient[a]	R_{thJA}	75	100	°C/W

Note：
a. Surface Mounted on FR4 Board , t ≤ 5sec .
b. Pulse Test：Pulse width ≤ 300us , Duty Cycle ≤ 2% .

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

Parameter	Symbol	Condition	Min	Typ[c]	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V , I_D = -250uA	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -16V , V_{GS} = 0V			-1	uA
Gate-Body Leakage	I_{GSS}	V_{GS} = -8V , V_{DS} = 0V			-100	nA
ON CHARACTERISTICS[b]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = -250uA	-0.6	-0.9	-1.3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} = -4.5V , I_D = -2.3A		100	130	m-ohm
		V_{GS} = -2.5V , I_D = -2.0A		150	190	m-ohm
DRAIN-SOURCE DIODE CHARACTERISTICS[b]						
Diode Forward Voltage	V_{SD}	V_{GS} = 0V , I_S = -1.0A			-1.0	V
SWITCHING CHARACTERISTICS[c]						
Total Gate Charge	Q_g	V_{DS} = -10V , I_D = -1A V_{GS} = -4.5V		4.32		nC
Gate-Source Charge	Q_{gs}			1.06		nC
Gate-Drain Charge	Q_{gd}			0.84		nC
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = -10V , I_D = -1A V_{GEN} = -4.5V R_L = 10 ohm R_{GEN} = 10 ohm		13		ns
Rise Time	t_r			36		ns
Turn-Off Delay Time	$t_{D(OFF)}$			42		ns
Fall Time	t_f			34		ns

Note：
b. Pulse Test：Pulse width ≤ 300us , Duty Cycle ≤ 2% .
c. Guaranteed by design , not subject to production testing .

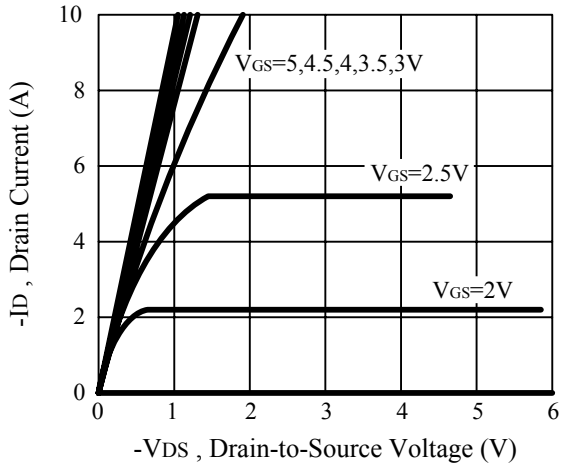


Figure 1. Output Characteristics

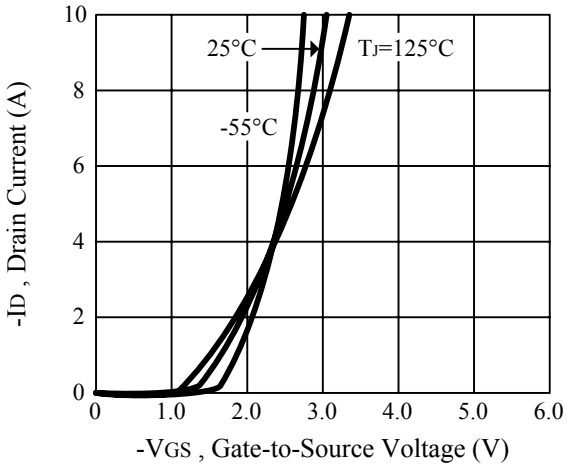


Figure 2. Transfer Characteristics

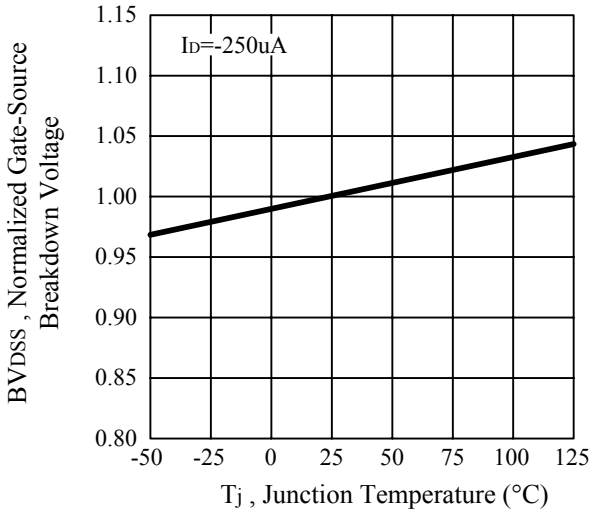


Figure 6. Breakdown Voltage Variation with Temperature

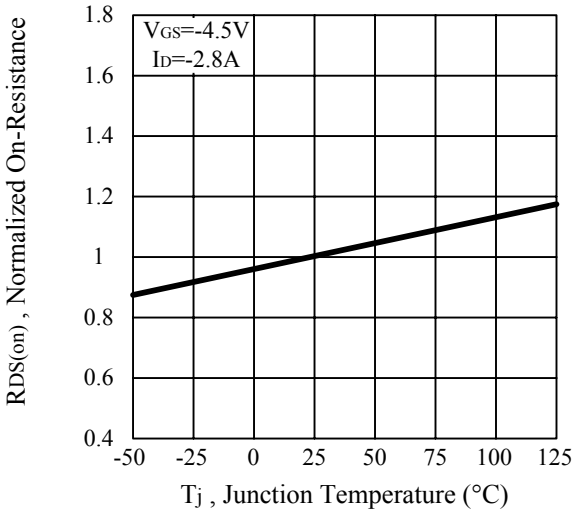


Figure 4. On-Resistance Variation with Temperature

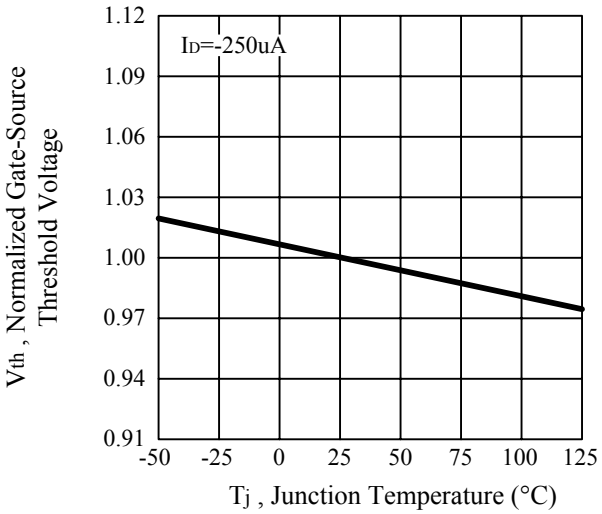


Figure 5. Gate Threshold Variation with Temperature

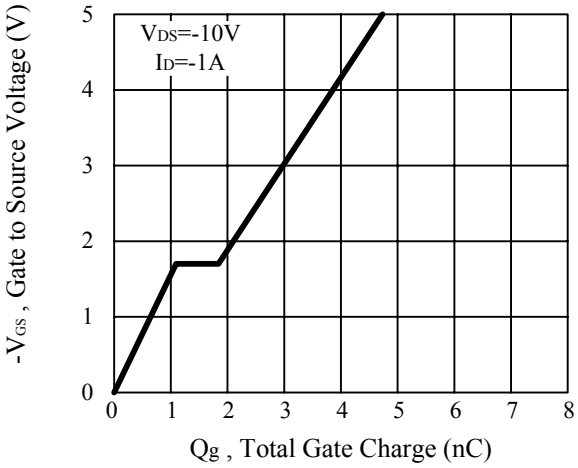


Figure 7. Gate Charge

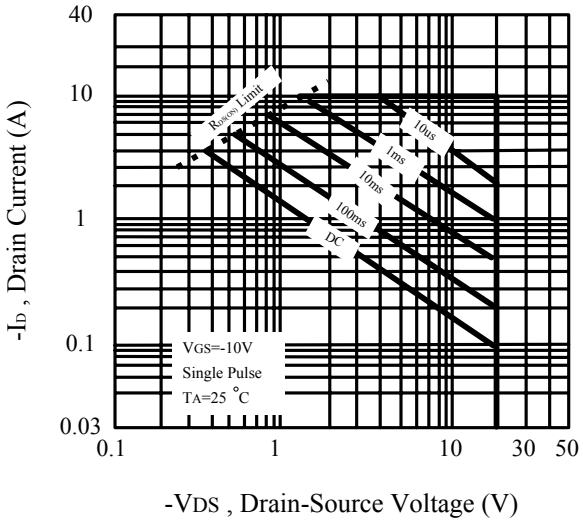


Figure 9. Maximum Safe Operating Area

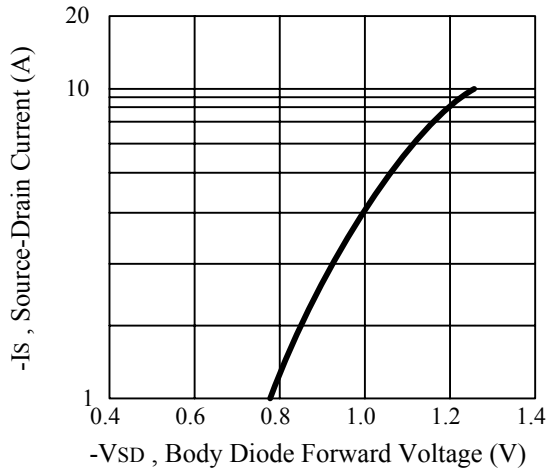


Figure 8. Body Diode Forward Voltage Variation with Source Current

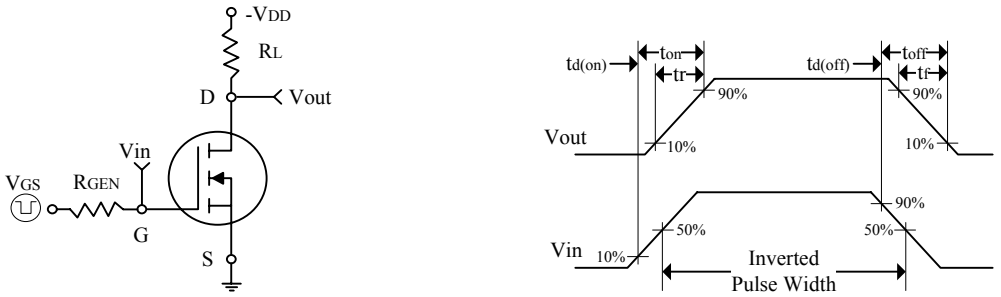


Figure 10. Switching Test Circuit and Switching Waveforms

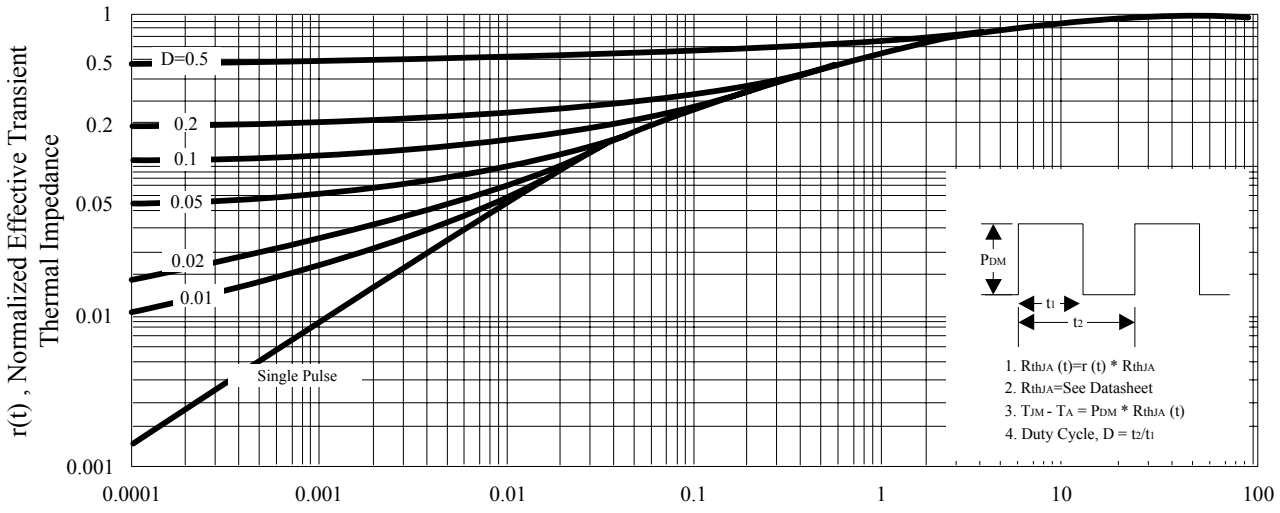


Figure 11. Normalized Thermal Transient Impedance Curve