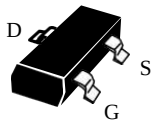
P-Channel High Density Trench MOSFET

Features:

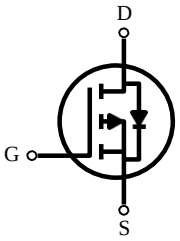
- Super high dense cell trench design for low $R_{DS(on)}$.
- Rugged and reliable.
- Surface Mount package.

SOT-23



PRODUCT SUMMARY

V_{DSS}	I_D	$R_{DS(on)}$ (m-ohm) Max
-20V	-5.6 A	38 @ V_{GS} = 4.5V
	-4.2 A	52 @ V_{GS} = 2.5V



ABSOLUTE MAXIMUM RATINGS (T_A = 25 ℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	12	V
Drain Current-Continuous[a] @ T_A = 25 ℃	I_D	-4	A
-Pulse[b]	I_{DM}	-15	A
Maximum Power Dissipation[a]	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	- 55 to 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient[a]	R_{thJA}	100	℃/W

Note
a. Surface Mounted on FR4 Board , t ≤ 10sec.
b. Pulse width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS (T_A = 25 ℃ 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	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -30V , V_{GS} = 0V			-1	uA
Gate-Body Leakage Current, Forward	I_{GSSF}	V_{GS} = 12V , V_{DS} = 0V			100	nA
Gate Body Leakage Current, Reverse	IGSSR	VGS = -12V, VDS = OV			-100	nA
ON CHARACTERISTICS[c]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = -250uA	-0.4	-0.6	-0.8	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = -10V , I_D = -4.8A		32	38	mΩ
		VGS = -4.5V , ID = -3.5A		44	52	mΩ
		V_{GS} = -2.5V , I_D = -1.2A		66	74	mΩ
DYNAMIC CHARACTERISTICS[c]						
Forward Transconductance	gFS	VDS = -1OV, ID = -4A		5		S
Input Capacitance	C_{ISS}	V_{DS} = -15V , V_{GS} = 0V f = 1.0MHz		900		pF
Output Capacitance	C_{OSS}			155		pF
Reverse Transfer Capacitance	C_{RSS}			205		pF
SWITCHING CHARACTERISTICS[c]						
Turn-On Delay Time	$t_{D(ON)}$	V_{DD} = -15V , I_D = 4A V_{GEN} = -10V R_{GEN} = 6 ohm		9	20	ns
Rise Time	t_r			4	10	ns
Turn-Off Delay Time	$t_{D(OFF)}$			42	85	ns
Fall Time	t_f			5	10	ns
Total Gate Charge	Q_g	V_{DS} = 15V I_D = -4A V_{GS} = -4.5V		8.4	11	nC
Gate-Source Charge	Q_{gs}			2.4		nC
Gate-Drain Charge	Q_{gd}			1.5		nC
Drain-Source Diode Characteristics and Maximun Ratings						
Drain-Source Diode Forward Current [b]	IS				-4	A
Drain-Source Diode Forward Voltage [c]	VSD	VGS = OV, IS = -1A			-1	V

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

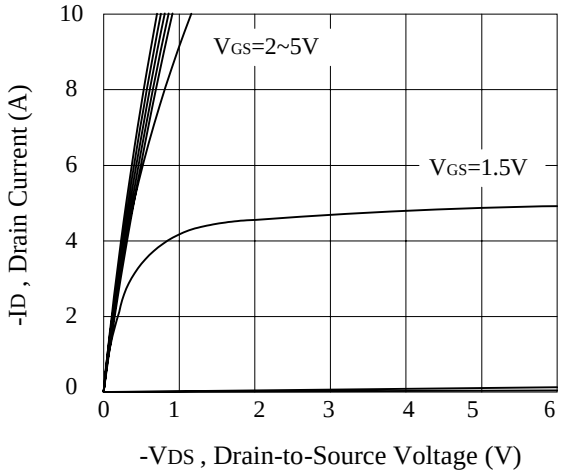


Figure 1. Output Characteristics

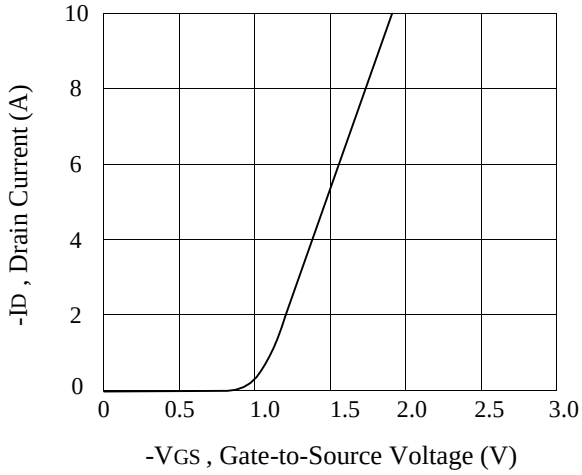


Figure 2. Transfer Characteristics

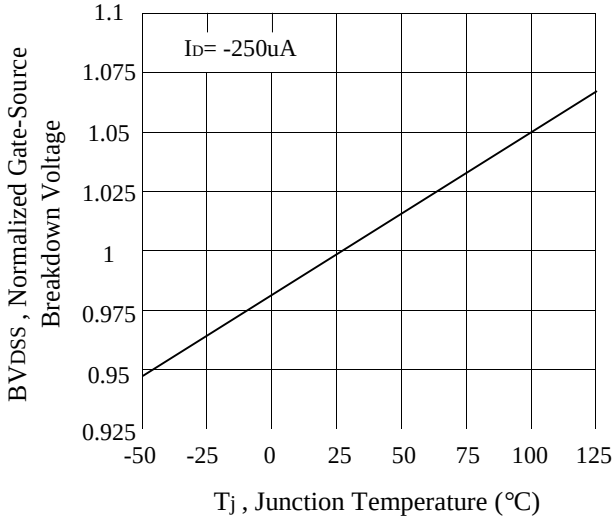


Figure 3. Breakdown Voltage Variation with Temperature

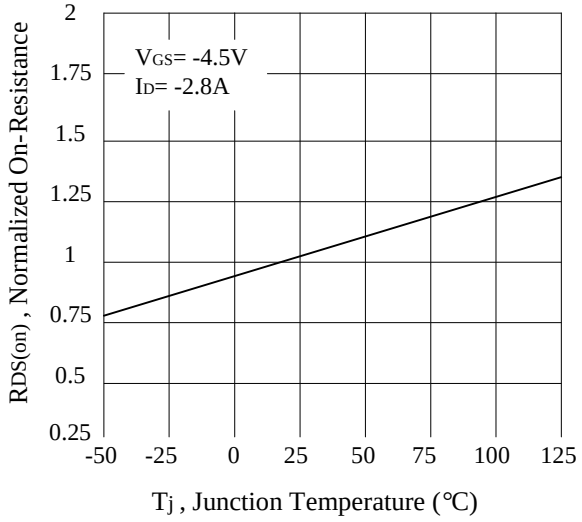


Figure 4. On-Resistance Variation with Temperature

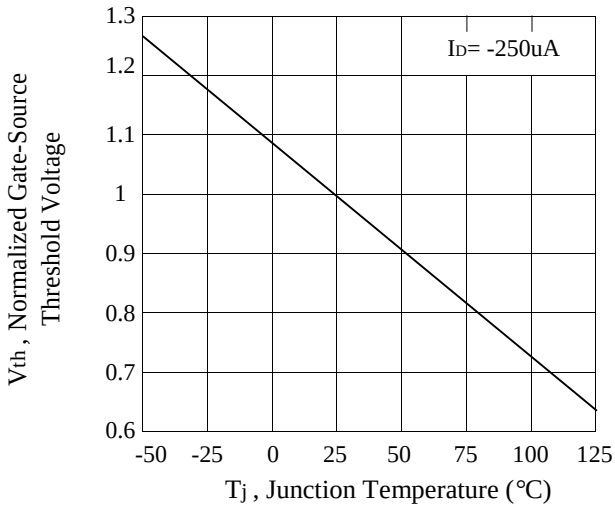


Figure 5. Gate Threshold Variation with Temperature

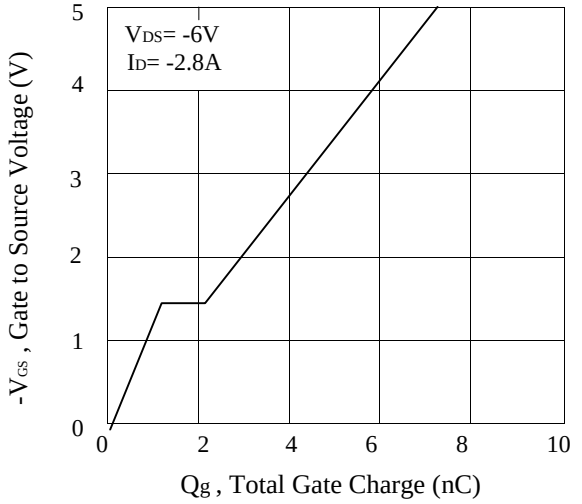


Figure 6. Gate Charge

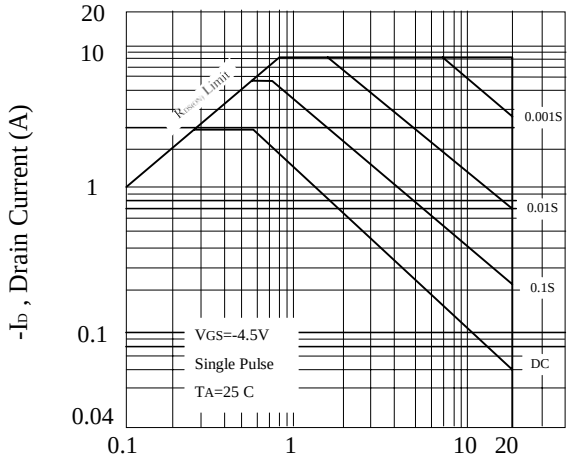


Figure 7. Maximum Safe Operating Area

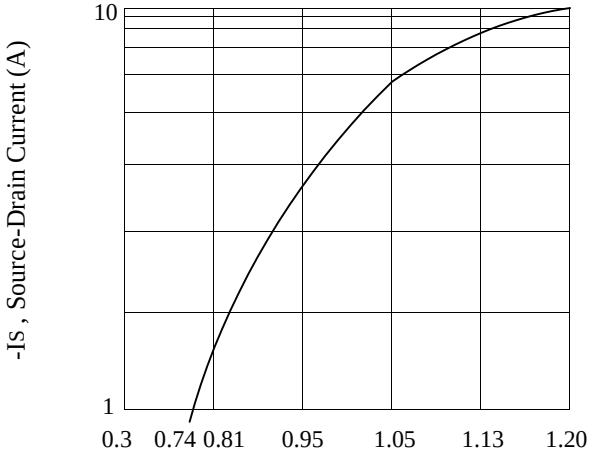
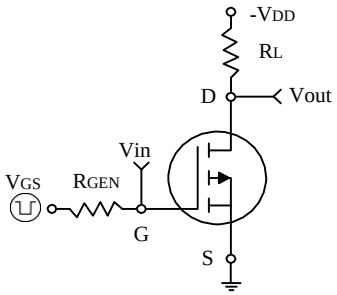


Figure 8. Body Diode Forward Voltage Variation with Source Current



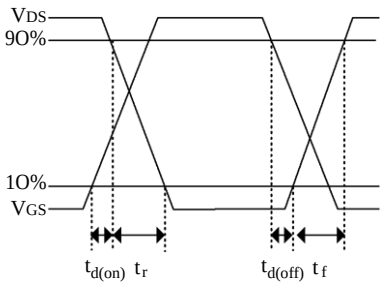


Figure 9. Switching Test Circuit and Switching Waveforms

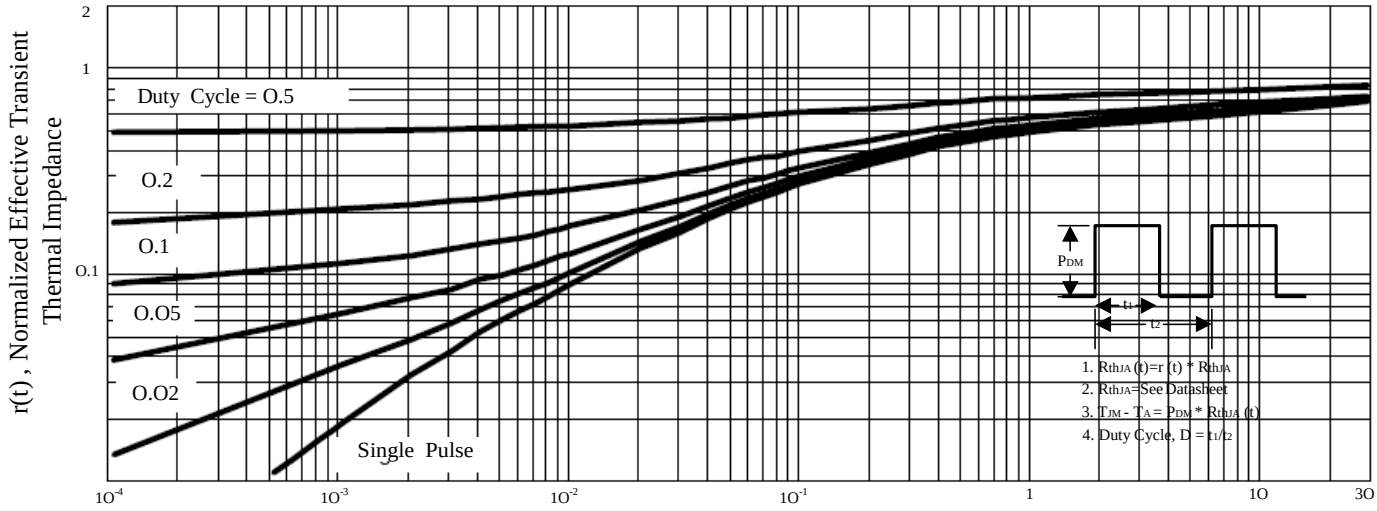


Figure 10. Normalized Thermal Transient Impedance Curve