

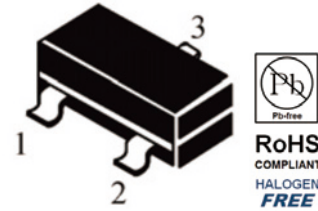
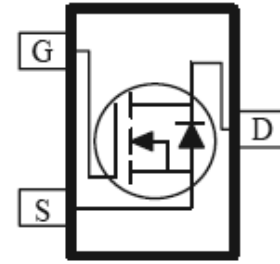
## MSD23N22

### N-Channel 30V (D-S) MOSFET

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low RDS (on) and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, and PCMCIA cards, cellular and cordless telephones.

#### Key Features:

- Low rDS(on) provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe
- SOT-23 saves board space
- Fast switching speed
- High performance trench technology



### Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	VDS	30	V
Gate-Source Voltage	VGS	±20	V
Continuous Drain Current @ TC=25°C	ID	2.5	A
Continuous Drain Current @ TC=70°C	ID	2.0	A
Pulsed Drain Current	IDM	10	A
Continuous Source Current (Diode Conduction)	IS	0.46	A
Power Dissipation (TC=25°C)	PD	1.25	W
Power Dissipation (TC=100°C)		0.8	W
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

#### Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

### Thermal characteristics (Tc=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Maximum Junction-to-Ambient(RthJA)	t ≤ 5 sec	150	°C/W
	Steady State	200	

**Characteristics (Tc=25°C, unless otherwise specified)**

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>					
VGS	VGS = VDS, ID = 250 uA	1.0	1.5	3.0	V
IGSS	VDS = 0 V, VGS = 8 V	-	4	100	nA
IDSS	VDS = 16 V, VGS = 0 V	-	-	1.0	uA
	VDS = 20 V, VGS = 0 V, T J = 55oC	-	-	10.0	uA
ID(on)	VDS = 5 V, VGS = 4.5 V	6	-	-	A
RDS(on)	VGS = 10 V, ID = 2.5 A	-	62	85	mΩ
	VGS = 4.5 V, ID = 1.7 A	-	102	125	mΩ
gfs	VDS = 5V, ID = 3 A	-	3.5	-	S
VSD	IS = 0.46 A, VGS = 0 V	-	0.65	-	V

**Dynamic Characteristics**

Qg	VDS = 10 V, VGS = 4.5 V, ID = 2.5 A	-	3.5	7	nC
Qgs		-	0.8	2	nC
Qgd		-	1.0	2	nC
Ciss	VDS = 15 V, VGS = 0 V, f = 1MHz	-	720	1500	pF
Coss		-	165	400	pF
Crs		-	60	200	pF
td(on)	VDD = 10 V, ID = 1 A, RG = 6 Ω, VGEN = 4.5 V	-	10	20	nS
tr		-	13	30	nS
td(off)		-	14	30	nS
tf		-	4	20	nS

## Notes

- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

• **Characteristic Curves**

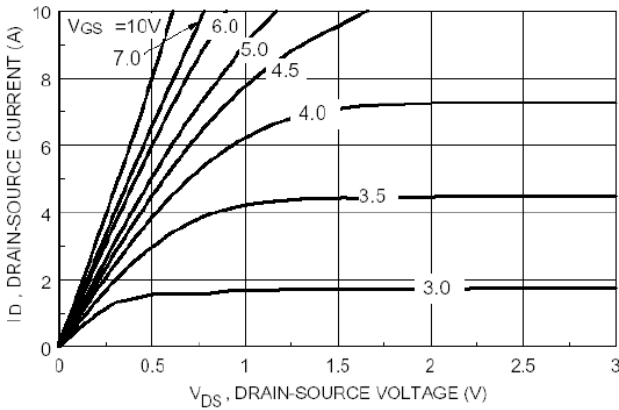


Figure 1. On-Region Characteristics

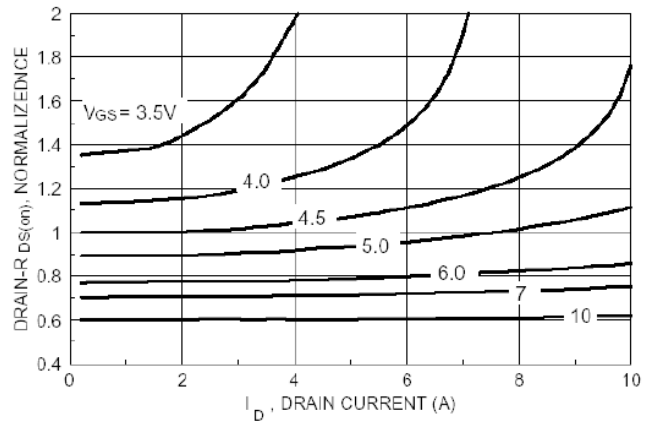


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

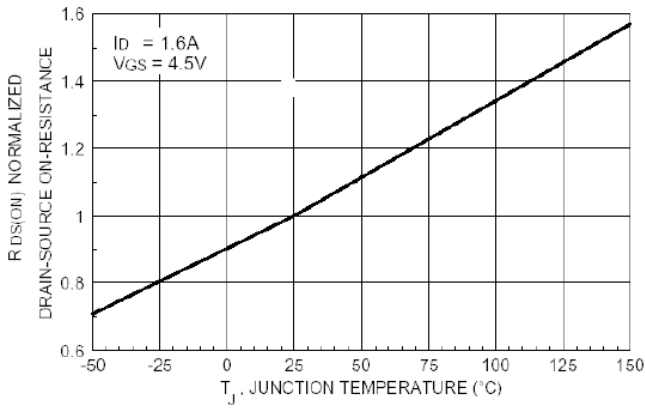


Figure 3. On-Resistance Variation with Temperature

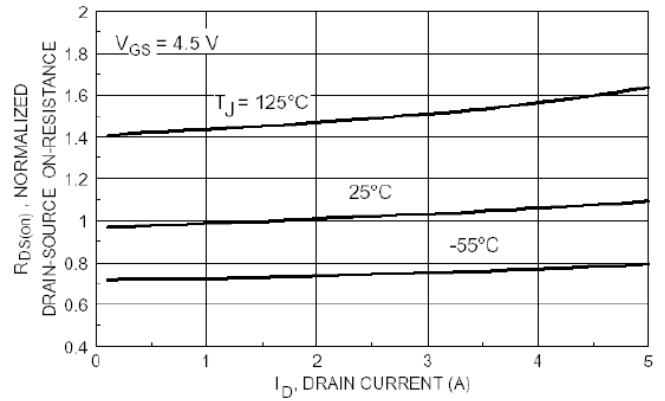


Figure 4. On-Resistance Variation with Drain Current and Temperature

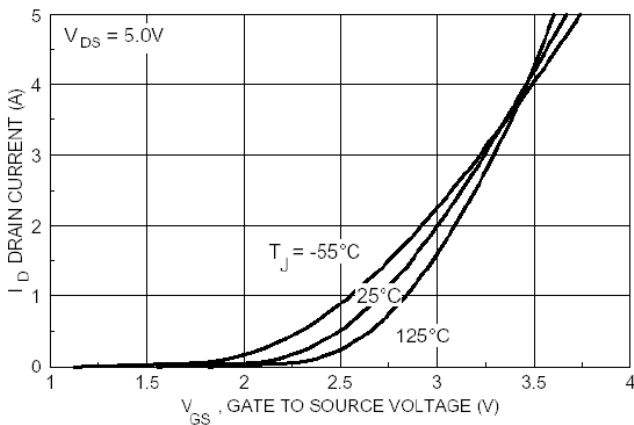


Figure 5. Transfer Characteristics

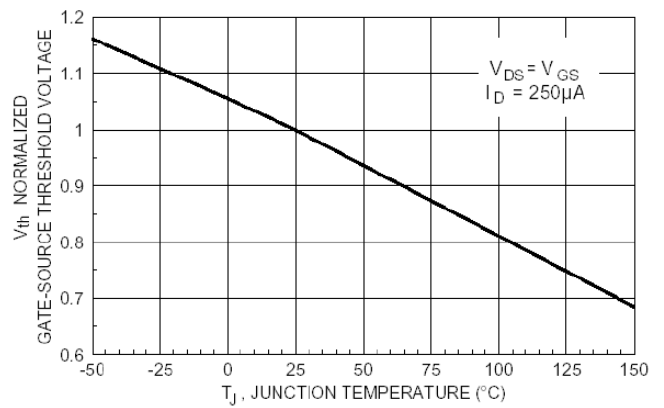
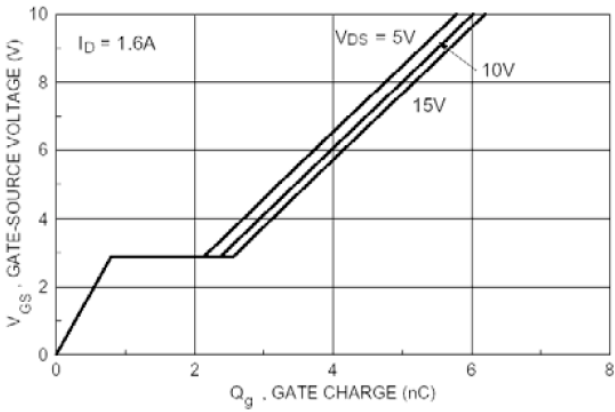
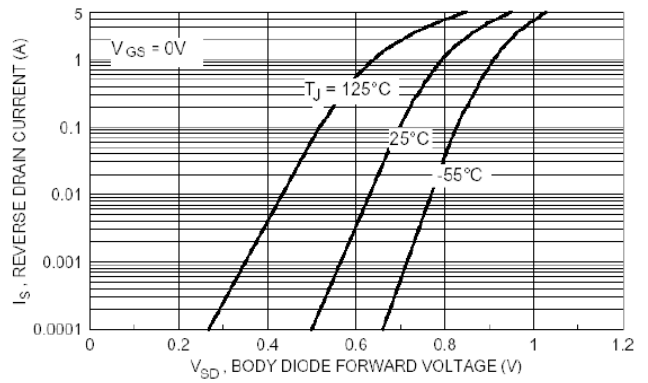


Figure 6. Gate Threshold Variation with Temperature

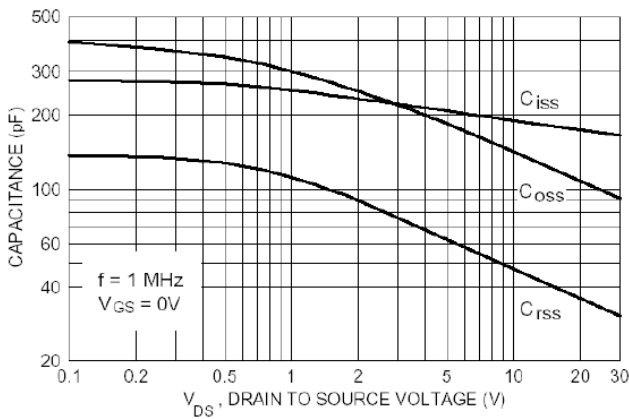
• **Characteristic Curves**



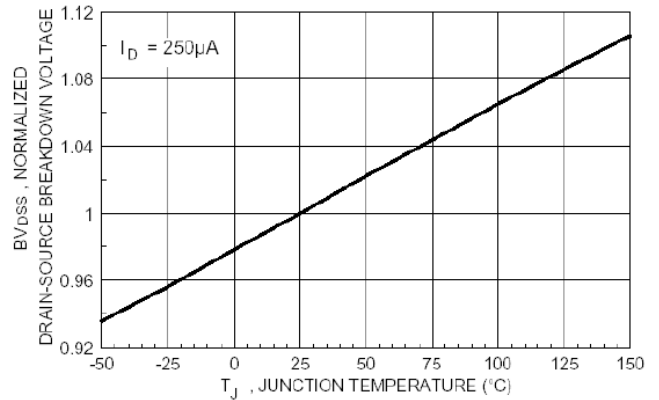
**Figure 7. Gate Charge Characteristic**



**Figure 8. Capacitance Characteristic**

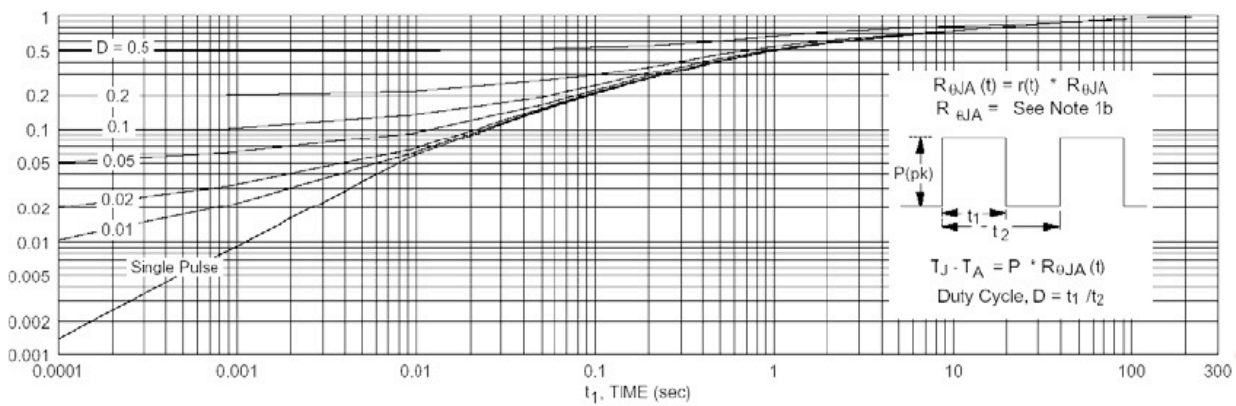


**Figure 9. Maximum Safe Operating Area**



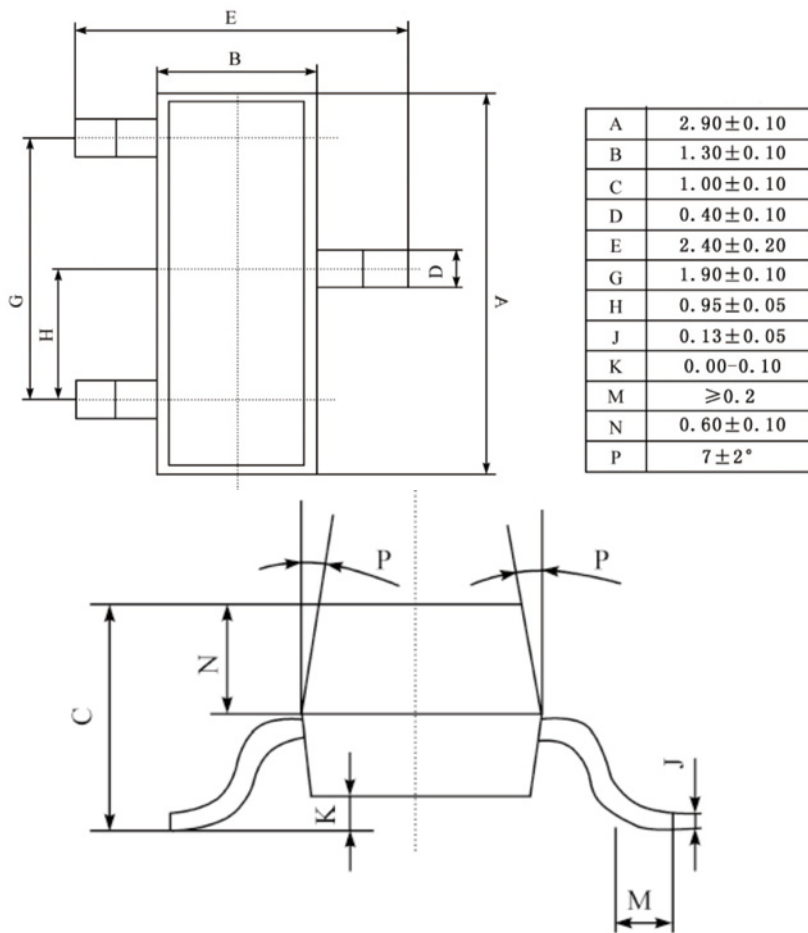
**Figure 10. Breakdown Voltage Variation with Temperature**

**Normalized Thermal Transient Impedance, Junction to Ambient**



**Figure 11. Transient Thermal Response Curve.**

- Package Dimensions  
SOT-23



**Dimensions in millimeter**