

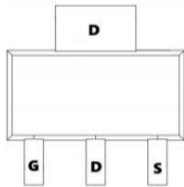
**Product Summary**

- $V_{DS}$  -220 V
- $I_{DS}$  -0.26 A
- $R_{DS(ON)}$  (at  $V_{GS}=-10V$ ) <12 $\Omega$

**Application**

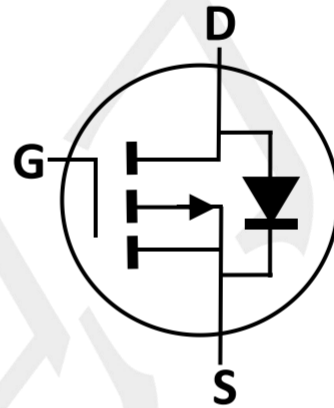
- Solid-State Relays
- Portable equipment and battery
- Telecommunication Switches

**Package and Pin Configuration**



**SOT89-3**

**Circuit diagram**



**Equivalent Circuit**

Marking:P52

**Absolute Maximum Ratings** ( $T_A=25^\circ C$  unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	-220	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ C$	-0.26
		$T_C=70^\circ C$	-0.18
Pulsed Drain Current	$I_{DM}$	-1	A
Total Power Dissipation	$P_{DTOT}$	1	W
Operating Junction Temperature Range	$T_J$	-55 to +150	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ C$

**Thermal Characteristic**

PARAMETER	Symbol	Value	Unit
Junction-to-Ambient Thermal Resistance	$R_{thJA}$	125	$^\circ C/W$

Note : When mounted on 1" square PCB (FR4 material).

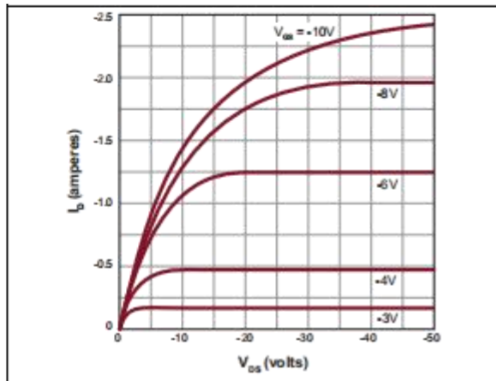
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-2mA	BV <sub>DSS</sub>	-220	--	--	V
Gate-Source Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -1mA	V <sub>GS(th)</sub>	-1	-1.5	-2.5	V
Gate-Source Leakage	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	I <sub>GSS</sub>	--	--	±100	nA
Zero Gate Voltage Drain Current	V <sub>DS</sub> = -220V, V <sub>GS</sub> =0V	I <sub>DSS</sub>	--	--	-1	μA
	V <sub>DS</sub> = -220V, T <sub>J</sub> =125°C		--	--	-800	μA
Drain-Source On-State Resistance (Note 1)	V <sub>GS</sub> = -10V, I <sub>D</sub> = -0.2A	R <sub>DS(on)</sub>	--	8	12	Ω
	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.1A		--	10	15	
Forward Transconductance (Note 2)	V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.1A	g <sub>fs</sub>	--	1.5	--	S
<b>Dynamic (Note 2)</b>						
Total Gate Charge (Note 3)	V <sub>DS</sub> = -25V, I <sub>D</sub> = -0.26A, V <sub>GS</sub> = -10V	Q <sub>g</sub>	--	4.9	--	nC
Gate-Source Charge (Note 3)		Q <sub>gs</sub>	--	0.7	--	
Gate-Drain Charge (Note 3)		Q <sub>gd</sub>	--	0.8	--	
Input Capacitance	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, F= 1.0MHz	C <sub>iss</sub>	--	75	--	pF
Output Capacitance		C <sub>oss</sub>	--	20	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	10	--	
<b>Switching</b>						
Turn-On Delay Time (Note 3)	V <sub>DD</sub> = -25V, I <sub>D</sub> = -0.2A, V <sub>GS</sub> = -10V, R <sub>GEN</sub> = 2Ω	t <sub>d(on)</sub>	--	10	--	nS
Rise Time (Note 3)		t <sub>r</sub>	--	15	--	
Turn-Off Delay Time (Note 3)		t <sub>d(off)</sub>	--	72	--	
Fall Time (Note 3)		t <sub>f</sub>	--	50	--	
<b>Source-Drain Diode Ratings and Characteristics (Note 2)</b>						
Forward Voltage	V <sub>GS</sub> = 0V, I <sub>F</sub> = -0.2A	V <sub>SD</sub>	--	-0.78	-1.2	V
Continuous Source Current	Integral reverse diode in the MOSFET	I <sub>S</sub>	--	--	-0.26	A
Pulsed Current (Note 1)		I <sub>SM</sub>	--	--	-0.78	A

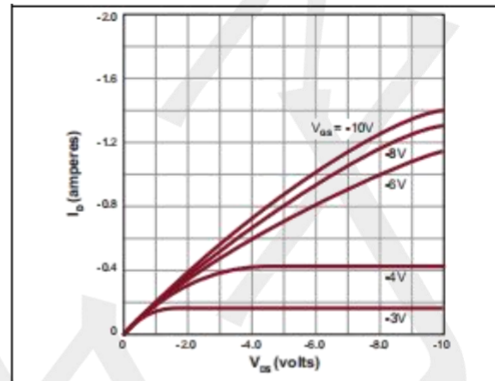
Notes:

1. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
2. Guaranteed by design, not subject to production testing.
3. Independent of operating temperature

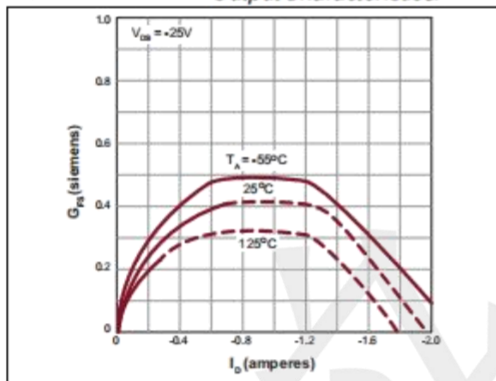
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



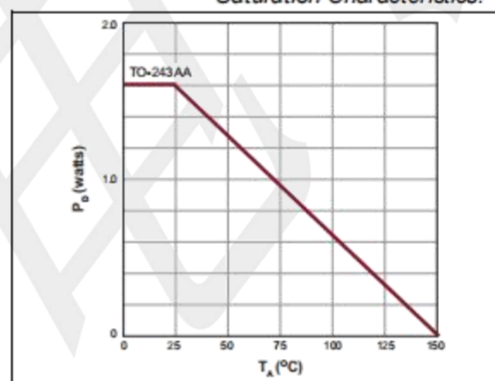
Output Characteristics.



Saturation Characteristics.

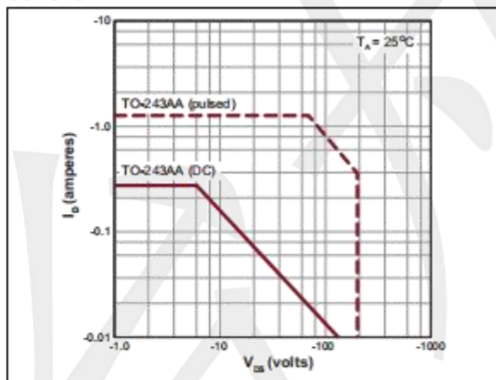


Transconductance vs. Drain Current.



Power Dissipation vs. Ambient Temperature.

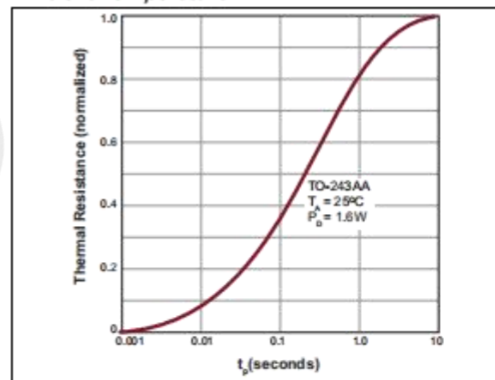
Current.



Maximum Rated Safe Operating Area.

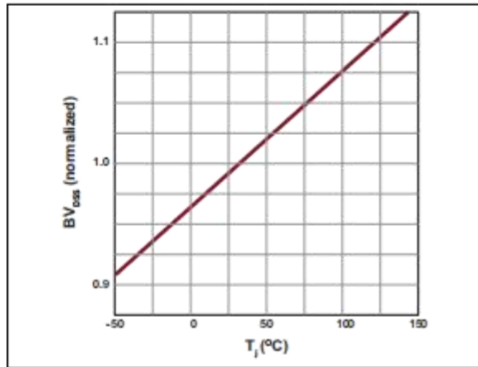
Operating Area.

Ambient Temperature.



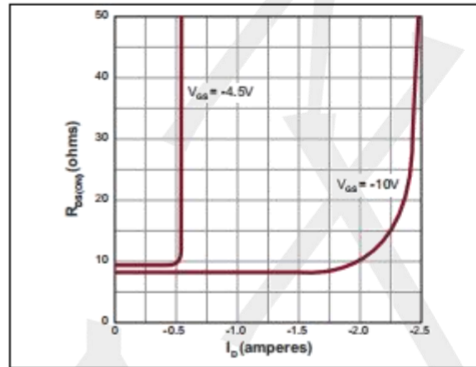
Thermal Response Characteristics.

### TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



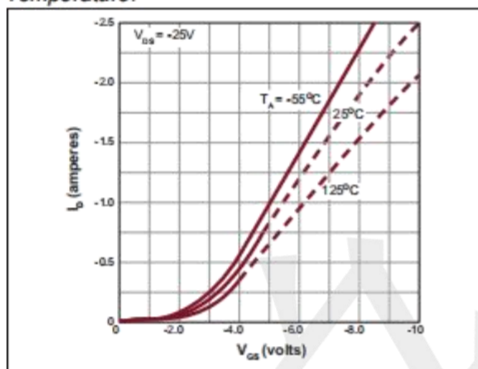
*BV<sub>DSS</sub> Variation with*

*Temperature.*

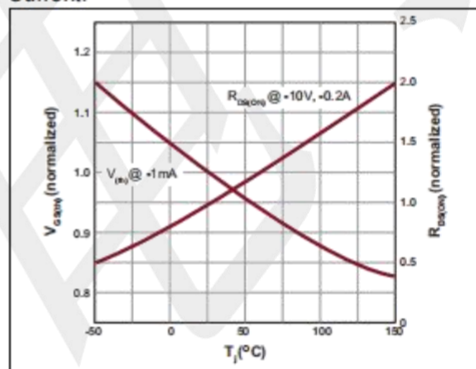


*On-Resistance vs. Drain*

*Current.*

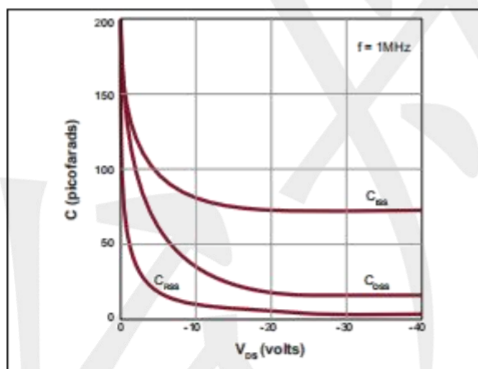


*Transfer Characteristics.*



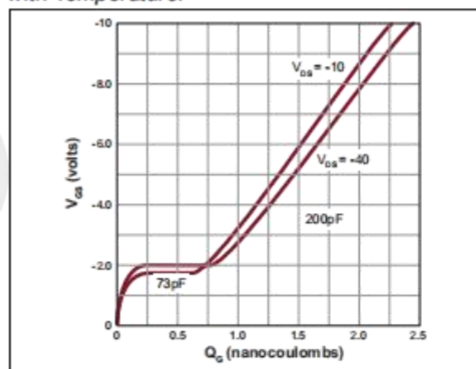
*V<sub>GS(th)</sub> and R<sub>DS</sub> Variation*

*with temperature.*



*Capacitance vs.*

*Drain-to-Source Voltage.*

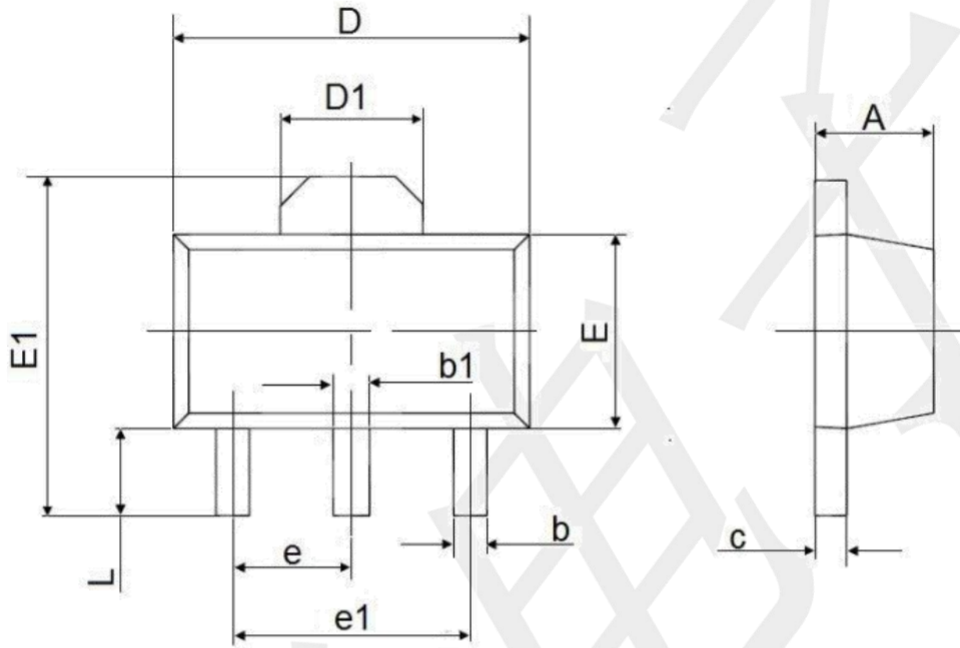


*Gate Drive Dynamic*

*Characteristics.*

\* The power dissipation PD is based on T<sub>J(max)</sub> = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

Package Information - SOT89-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

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