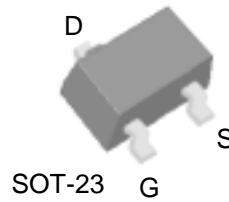


N-CHANNEL ENHANCEMENT-MODE POWER MOSFET

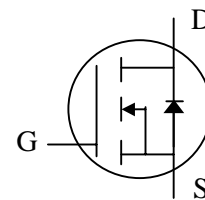
Capable of 2.5V gate drive
 Small package outline
 Surface-mount package



BV_{DSS} 20V
 $R_{DS(ON)}$ 85m Ω
 I_D 2.8A

Description

Power MOSFETs from Silicon Standard provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_A=25^\circ\text{C}$	Continuous Drain Current ³ , $V_{GS} @ 4.5\text{V}$	2.8	A
$I_D @ T_A=70^\circ\text{C}$	Continuous Current ³ , $V_{GS} @ 4.5\text{V}$	2.2	A
I_{DM}	Pulsed Drain Current ^{1,2}	10	A
$P_D @ T_A=25^\circ\text{C}$	Total Power Dissipation	1.25	W
	Linear Derating Factor	0.01	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-a	Thermal Resistance Junction-ambient ³	Max. 100	$^\circ\text{C}/\text{W}$

Electrical Characteristics @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	-	0.1	-	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=3.6A$	-	-	85	$m\Omega$
		$V_{GS}=2.5V, I_D=3.1A$	-	-	115	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	-	-	V
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=3.6A$	-	6	-	S
I_{DSS}	Drain-Source Leakage Current ($T_j=25^\circ\text{C}$)	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
	Drain-Source Leakage Current ($T_j=55^\circ\text{C}$)	$V_{DS}=20V, V_{GS}=0V$	-	-	10	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 12V$	-	-	± 100	nA
Q_g	Total Gate Charge ²	$I_D=3.6A$	-	4.4	-	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=10V$	-	0.6	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=4.5V$	-	1.9	-	nC
$t_{d(on)}$	Turn-on Delay Time ²	$V_{DS}=10V$	-	5.2	-	ns
t_r	Rise Time	$I_D=3.6A$	-	37	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=6\Omega, V_{GS}=5V$	-	15	-	ns
t_f	Fall Time	$R_D=2.8\Omega$	-	5.7	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	145	-	pF
C_{oss}	Output Capacitance	$V_{DS}=10V$	-	100	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	50	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current (Body Diode)	$V_D=V_G=0V, V_S=1.2V$	-	-	1.6	A
I_{SM}	Pulsed Source Current (Body Diode) ¹		-	-	10	A
V_{SD}	Forward On Voltage ²	$I_S=1.6A, V_{GS}=0V$	-	-	1.2	V

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Surface mounted on FR4 board, $t \leq 5$ sec.

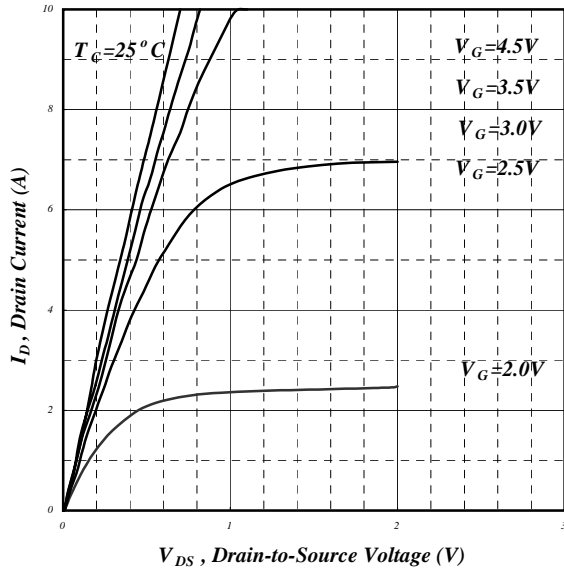


Fig 1. Typical Output Characteristics

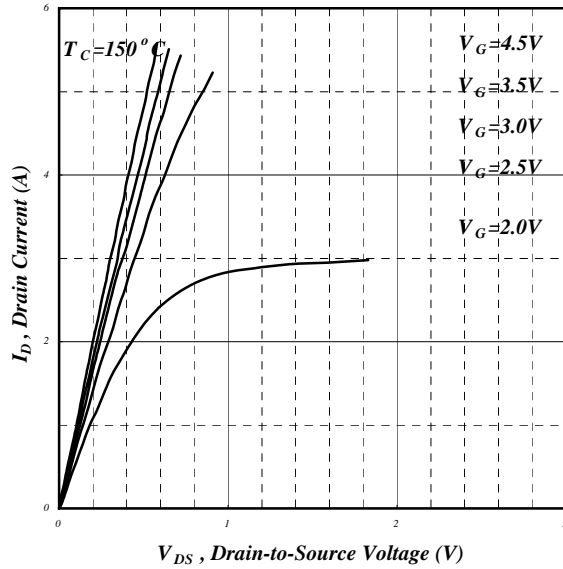


Fig 2. Typical Output Characteristics

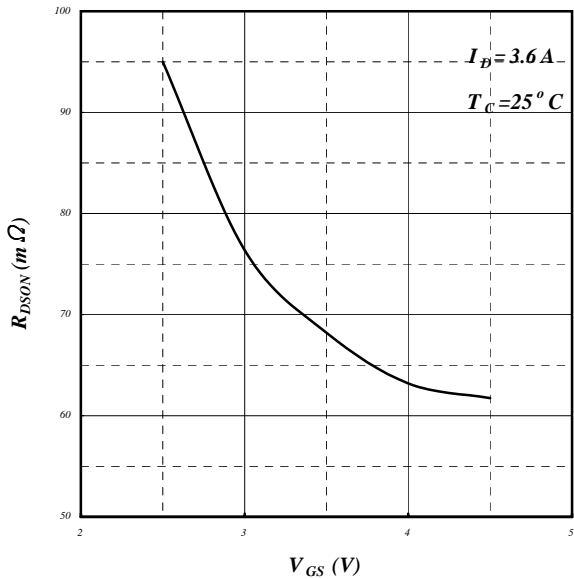


Fig 3. On-Resistance vs. Gate Voltage

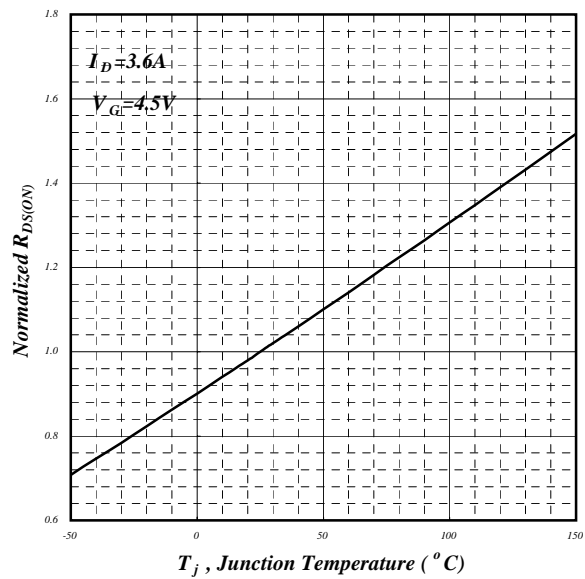


Fig 4. Normalized On-Resistance vs. Junction Temperature

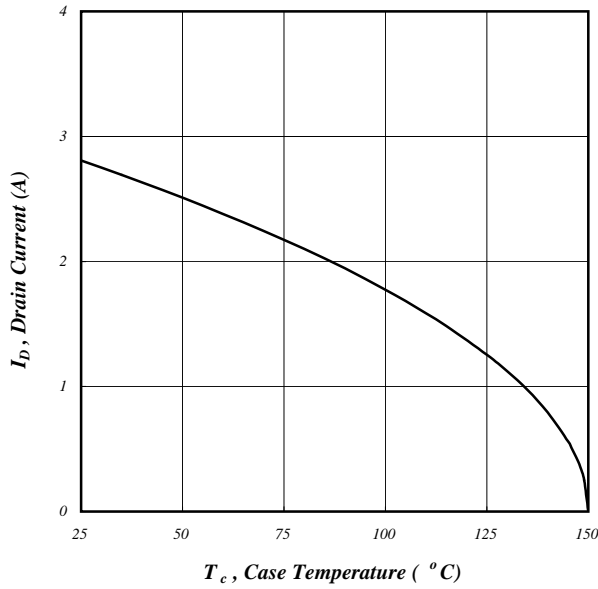


Fig 5. Maximum Drain Current vs. Case Temperature

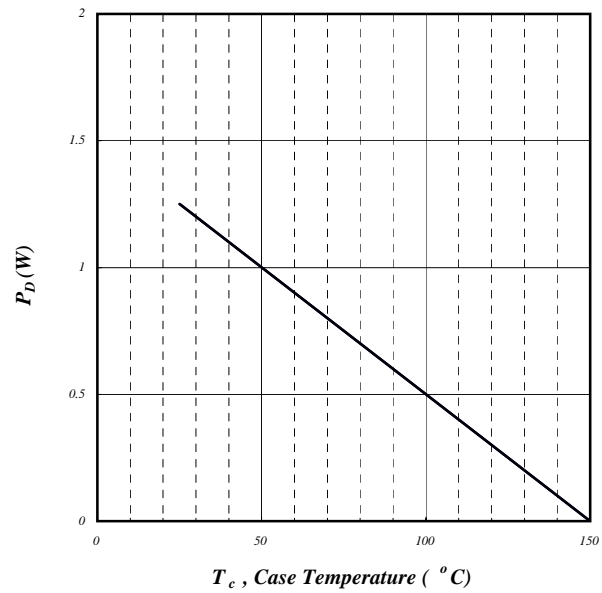


Fig 6. Typical Power Dissipation

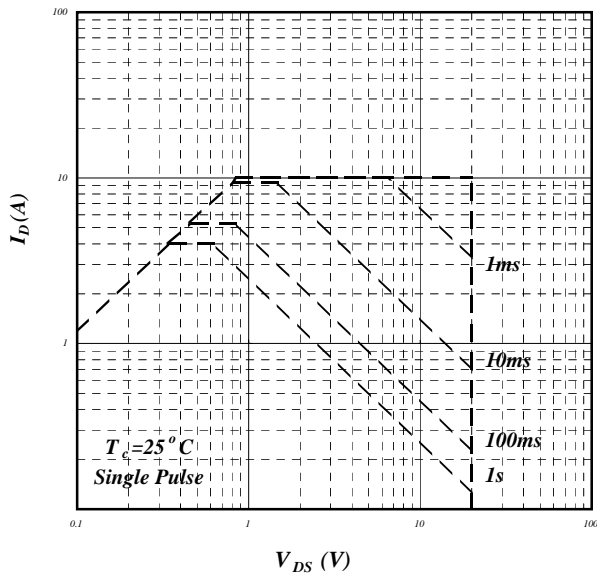


Fig 7. Maximum Safe Operating Area

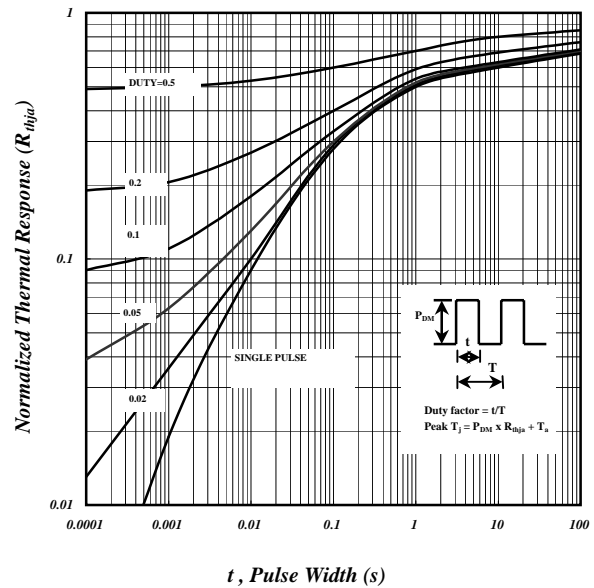


Fig 8. Effective Transient Thermal Impedance

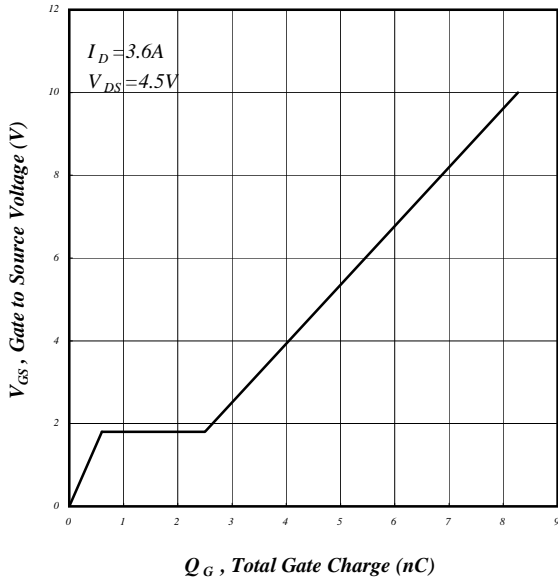


Fig 9. Gate Charge Characteristics

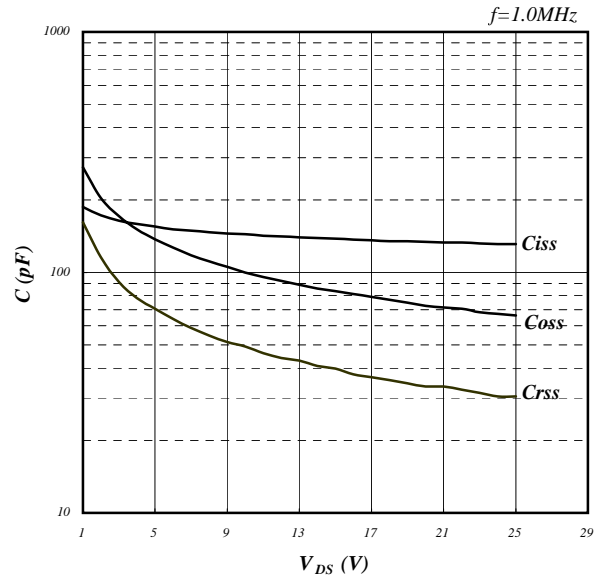


Fig 10. Typical Capacitance Characteristics

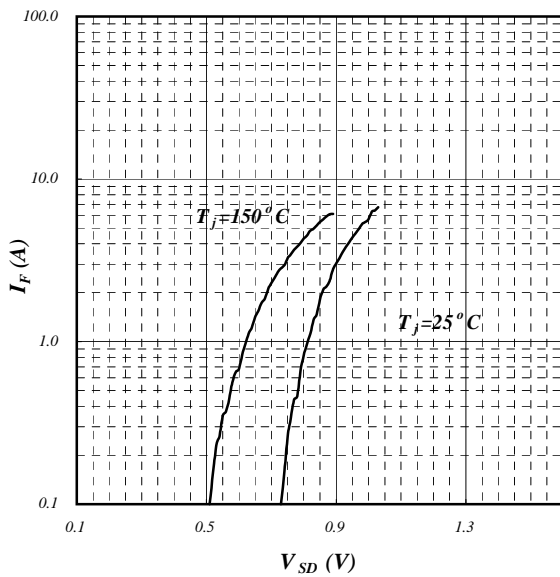


Fig 11. Forward Characteristic of Reverse Diode

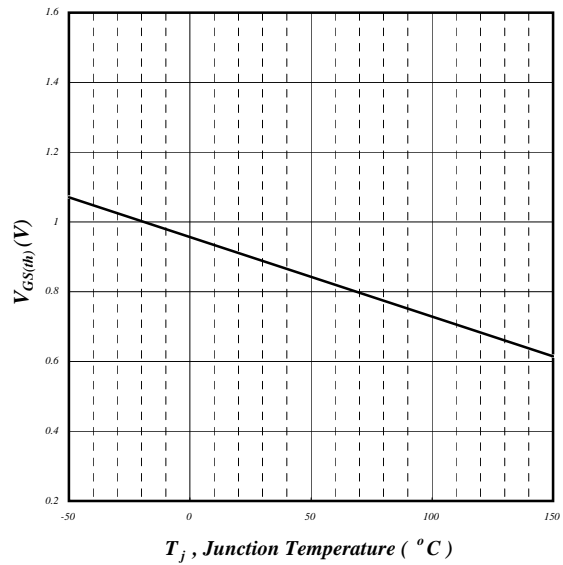
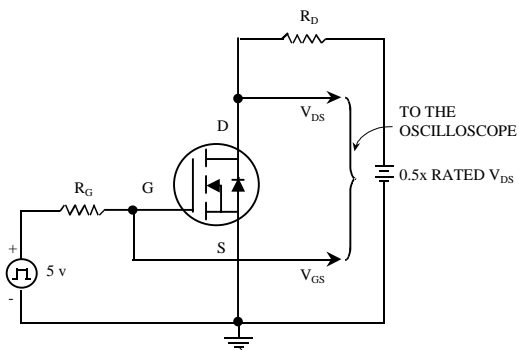
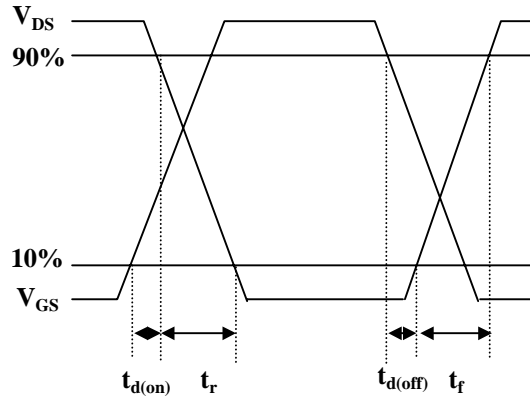
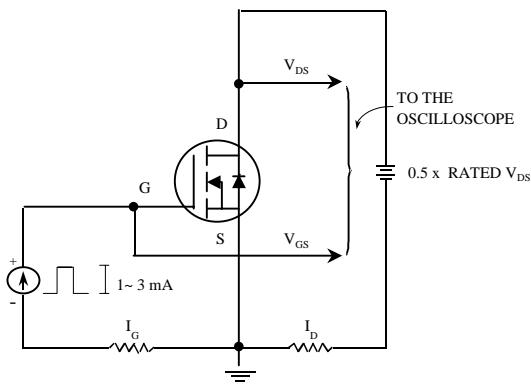
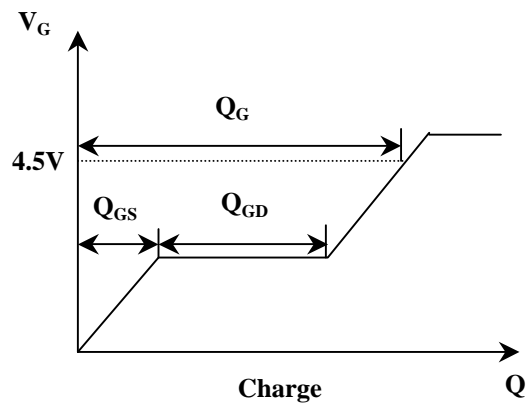


Fig 12. Gate Threshold Voltage vs. Junction Temperature


Fig 13. Switching Time Circuit

Fig 14. Switching Time Waveform

Fig 15. Gate Charge Circuit

Fig 16. Gate Charge Waveform

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