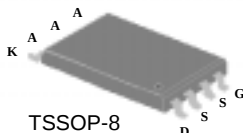


P-CHANNEL POWER MOSFET WITH SCHOTTKY DIODE

Low on-resistance
Fast switching characteristics
Surface-mount package



P-channel MOSFET

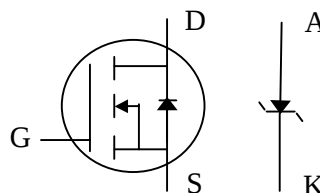
BV_{DSS}	-20V
$R_{DS(ON)} @ 4.5V$	50m Ω
I_D	-3.5A

Schottky Diode

V_{KA}	20V
$V_f @ 0.5V$	1A
I_F	1.5A

Description

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



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage (MOSFET and Schottky)	-20	V
V_{KA}	Reverse Voltage (Schottky)	20	V
V_{GS}	Gate-Source Voltage (MOSFET)	± 12	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current ³ (MOSFET)	- 3.5	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current ³ (MOSFET)	- 2.8	A
I_{DM}	Pulsed Drain Current ^{1,2} (MOSFET)	- 30	A
I_F	Average Forward Current (Schottky)	1	A
I_{FM}	Pulsed Forward Current (Schottky)	25	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation (MOSFET)	1	W
	Linear Derating Factor (MOSFET)		W/ $^\circ C$
	Total Power Dissipation (Schottky)	1	W
	Linear Derating Factor (Schottky)		W/ $^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 125	$^\circ C$

Thermal Data

Symbol	Parameter	Value	Unit
R_{thj-a}	Thermal Resistance Junction-ambient (MOSFET) Max.	125	$^\circ C/W$
	Thermal Resistance Junction-ambient (Schottky) Max.	125	$^\circ C/W$

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 , $I_D=-1\text{mA}$	-	0.03	-	$\text{V}/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-4.5V, I_D=-3.5A$	-	-	50	$\text{m}\Omega$
		$V_{GS}=-2.5V, I_D=-2.7A$	-	-	85	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.5	-	-	V
g_{fs}	Forward Transconductance	$V_{DS}=-10V, I_D=-3.5A$	-	10	-	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 ($T_j=70^{\circ}\text{C}$)	$V_{DS}=-16V, V_{GS}=0V$	-	-	25	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}= \pm 12V$	-	-	± 100	nA
Q_g	Total Gate Charge ²	$I_D= -3.5A$	-	15.6	-	nC
Q_{gs}	Gate-Source Charge	$V_{DS}= -10V$	-	2.1	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}= -4.5V$	-	5.2	-	nC
$t_{d(on)}$	Turn-on Delay Time ²	$V_{DS}= -10V$	-	8.2	-	ns
t_r	Rise Time	$I_D= -1A$	-	9.4	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G= 3.3\Omega, V_{GS}= -4.5V$	-	66.4	-	ns
t_f	Fall Time	$R_D= 10\Omega$	-	48	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	660	-	pF
C_{oss}	Output Capacitance	$V_{DS}=-20V$	-	285	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	130	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_S	Continuous Source Current (Body Diode)	$V_D=V_G=0V, V_S=-1.2V$	-	-	-0.83	A
V_{SD}	Forward On Voltage ²	$I_S=-0.83A, V_{GS}=0V$	-	-	-1.2	V

Schottky Characteristics @ $T_j=25^{\circ}\text{C}$

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Forward Voltage Drop	$I_F=1A$	-	-	0.5	V
I_{rm}	Maximum Reverse Leakage Current	$V_r=20V$	-	-	100	μA

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Surface mounted on 1 in² copper pad of FR4 board ; $208^{\circ}\text{C}/\text{W}$ when mounted on Min. copper pad.

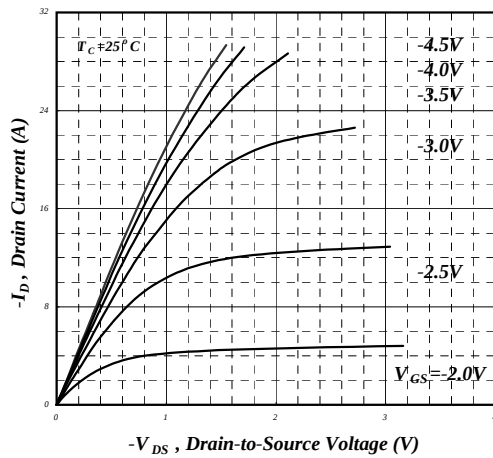
MOSFET


Fig 1. Typical Output Characteristics

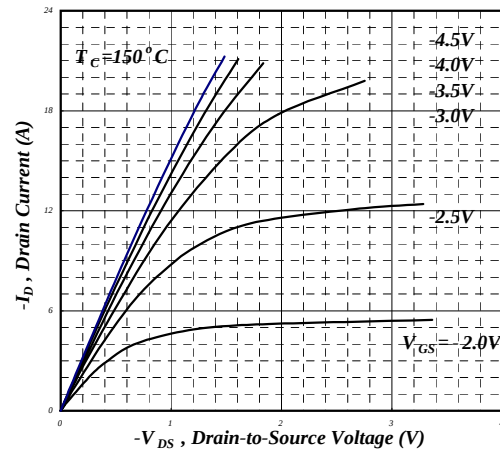


Fig 2. Typical Output Characteristics

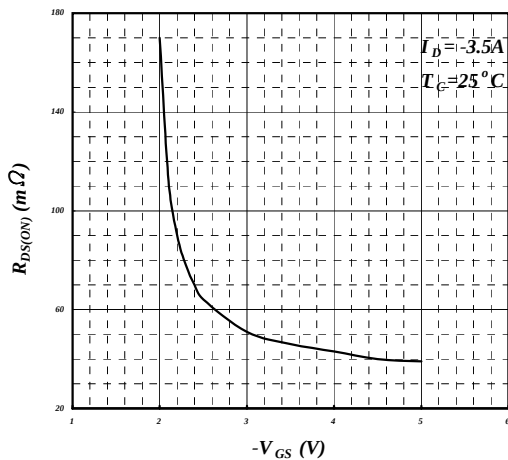


Fig 3. On-Resistance vs. Gate Voltage

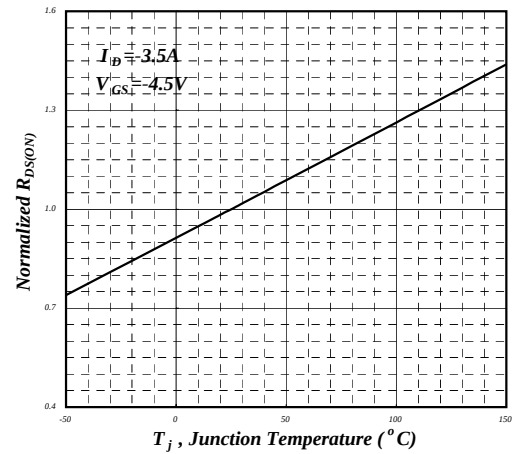


Fig 4. Normalized On-Resistance vs. Junction Temperature

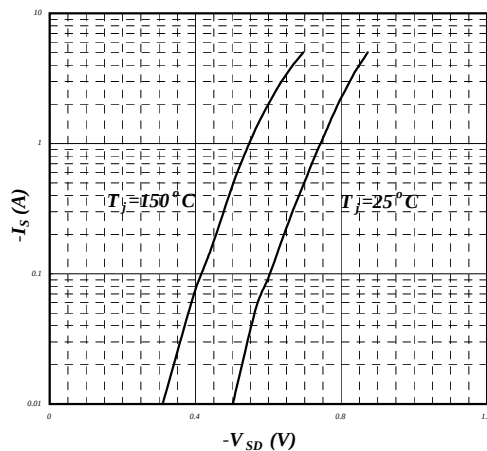


Fig 5. Forward Characteristic of Reverse Diode

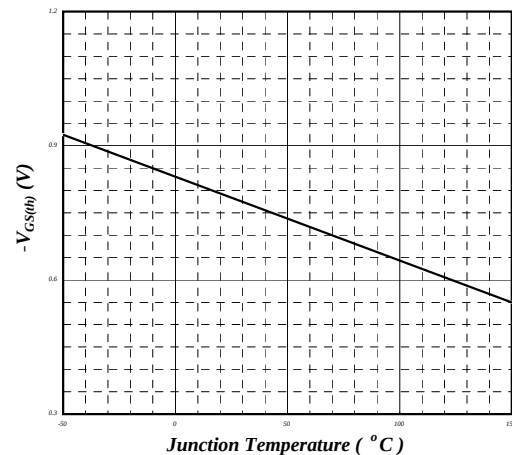


Fig 6. Gate Threshold Voltage vs. Junction Temperature

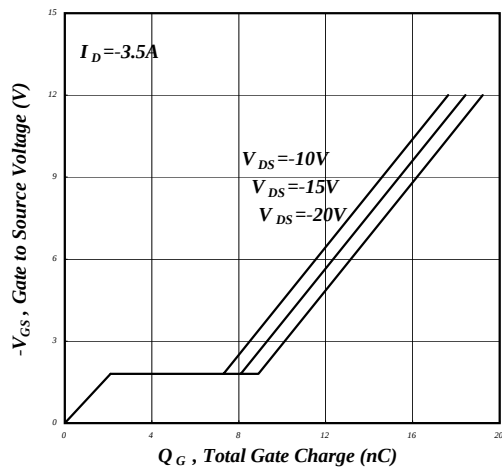


Fig 7. Gate Charge Characteristics

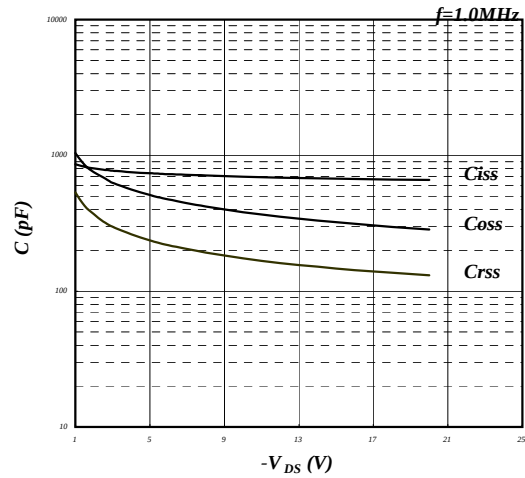


Fig 8. Typical Capacitance Characteristics

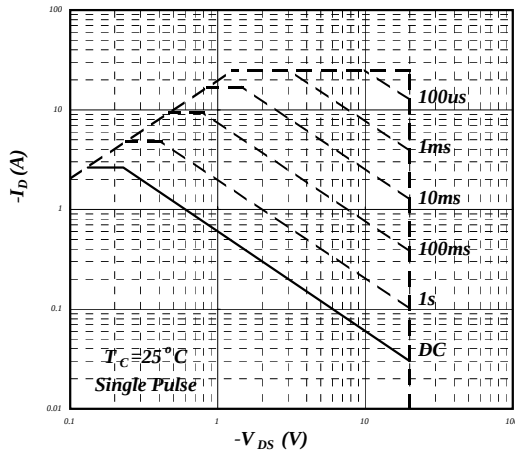


Fig 9. Maximum Safe Operating Area

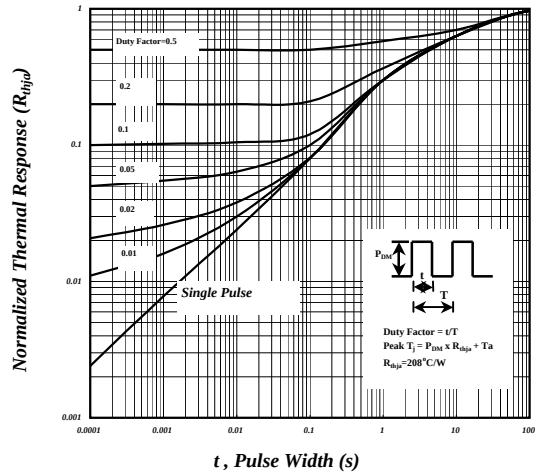


Fig 10. Effective Transient Thermal Impedance

SCHOTTKY DIODE

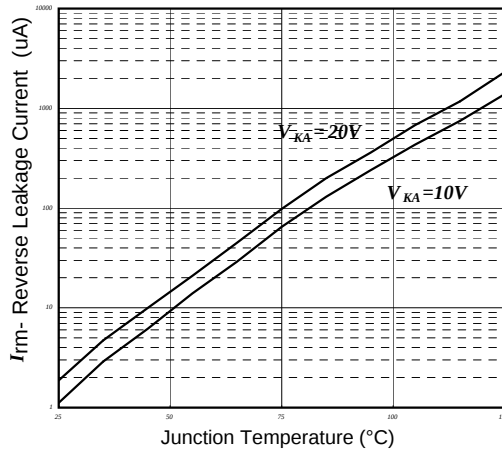


Fig 1. Reverse Leakage Current vs. Junction Temperature

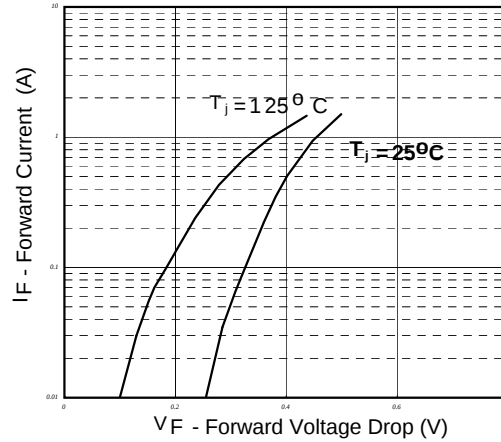


Fig 2. Forward Voltage Drop

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