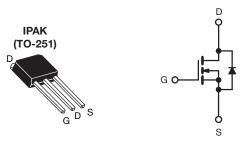


www.vishay.com

Vishay Siliconix

Power MOSFET



N-Channel MOSFET

PRODUCT SUMMARY					
V _{DS} (V)	100				
R _{DS(on)} (Ω)	V _{GS} = 10 V	0.54			
Q _g (Max.) (nC)	8.3				
Q _{gs} (nC)	2.3				
Q _{gd} (nC)	3.8				
Configuration	Single				

FEATURES

- · Straight lead
- Available in tape and reel
- · Dynamic dV/dt rating
- · Repetitive avalanche rated
- · Fast switching
- · Ease of paralleling
- Simple drive requirements
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>



DESCRIPTION

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

ORDERING INFORMATION				
Package	IPAK (TO-251)			
Lead (Pb)-free and halogen-free	SiHFU110-GE3			
Lead (Pb)-free	IRFU110PbF			

PARAMETER			SYMBOL	LIMIT	UNIT	
Drain-source voltage			V_{DS}	100	V	
Gate-source voltage			V_{GS}	± 20	V	
Continuous drain current	V _{GS} at 10 V	$T_{\rm C} = 25 ^{\circ}{\rm C}$ $T_{\rm C} = 100 ^{\circ}{\rm C}$	I _D	4.3	А	
		T _C = 100 °C		2.7		
Pulsed drain current ^a			I _{DM}	17		
Linear derating factor				0.2	W/°C	
Single pulse avalanche energy b			E _{AS}	75	mJ	
Repetitive avalanche current ^a			I _{AR}	4.3	Α	
Repetitive avalanche energy ^a			E _{AR}	2.5	mJ	
Maximum power dissipation	T _C = 25 °C		P_{D}	25	W	
Peak diode recovery dV/dt ^c			dV/dt	5.5	V/ns	
Operating junction and storage temperature range			T _J , T _{stg}	- 55 to + 150	°C	
Soldering recommendations (peak temperature)	for	10 s	-	300 d		

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11)
- b. V_{DD} = 25 V, starting T_J = 25 °C, L = 8.1 mH, R_g = 25 Ω , I_{AS} = 4.3 A (see fig. 12)
- c. $I_{SD} \le 5.6$ A, $dI/dt \le 75$ A/ μ s, $V_{DD} \le V_{DS}$, $T_J \le 150$ °C
- d. 1.6 mm from case



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THERMAL RESISTANCE RATINGS						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Maximum Junction-to-Ambient	R_{thJA}	-	-	110	°C/W	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	-	5.0	C/VV	

SPECIFICATIONS (T _J = 25 °C, u		,	T CONDITIONS	NAIN!	TVD	MAN	
PARAMETER	SYMBOL	TES	MIN.	TYP.	MAX.	UNIT	
Static				T	T	T	I
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		100	-	-	V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$		Reference to 25 °C, I _D = 1 mA		0.63	-	V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	V _{DS} =	$V_{DS} = V_{GS}, I_D = 250 \mu A$		-	4.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 20 V		-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}		$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}$ $V_{DS} = 80 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 125 \text{ °C}$		-	25 250	μΑ
Dynin Course On State Resistance			I _D = 0.90 A ^b	-			
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	_	-	-	0.54	Ω S
Forward Transconductance	9 _{fs}	$V_{DS} = 50 \text{ V}, I_D = 0.90 \text{ A}$		1.1	-	_	5
Dynamic				_	T	T	1
Input Capacitance	C _{iss}	_	$V_{GS} = 0 V$,		180	-	pF
Output Capacitance	C _{oss}	$V_{DS} = 25 \text{ V},$ f = 1.0 MHz, see fig. 5		-	81	-	
Reverse Transfer Capacitance	C _{rss}			-	15	-	
Total Gate Charge	Q_g		1 504 1/ 001/	-	-	8.3	nC
Gate-Source Charge	Q_{gs}	$V_{GS} = 10 \text{ V}$	I _D = 5.6 A, V _{DS} = 80 V, see fig. 6 and 13 ^b	-	-	2.3	
Gate-Drain Charge	Q_{gd}			-	-	3.8	
Turn-On Delay Time	t _{d(on)}				6.9	-	- ns
Rise Time	t _r	$V_{DD} = 50 \text{ V}, \ I_D = 5.6 \text{ A}, \ R_g = 24 \ \Omega, \ R_D = 8.4 \ \Omega, \ \text{see fig. } 10^b$		-	16	-	
Turn-Off Delay Time	$t_{d(off)}$			-	15	-	
Fall Time	t _f			-	9.4	-	
Internal Drain Inductance	L _D	Between lead, 6 mm (0.25") from package and center of die contact		-	4.0	-	- nH
Internal Source Inductance	L _S			-	6.0	-	
Drain-Source Body Diode Characteristic	s						
Continuous Source-Drain Diode Current	Is	MOSFET symbol showing the integral reverse p - n junction diode		-	-	1.5	Α
Pulsed Diode Forward Current ^a	I _{SM}			-	-	12	_ ^
Body Diode Voltage	V_{SD}	T _J = 25 °C, I _S = 1.5 A, V _{GS} = 0 V ^b		-	-	2.5	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 5.6 A, dI/dt = 100 A/μs ^b		-	100	200	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	0.44	0.88	μC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L _S ar				v Loand	1-2)

Notes

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11)
- b. Pulse width $\leq 300~\mu s;~duty~cycle \leq 2~\%$



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

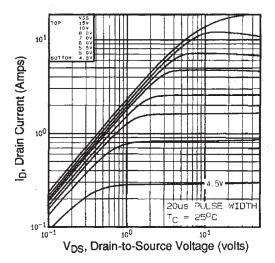


Fig. 1 - Typical Output Characteristics, T_C = 25 °C

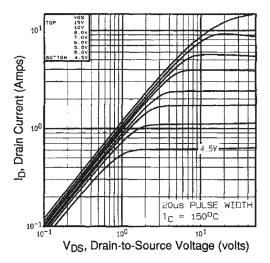


Fig. 1 - Typical Output Characteristics, $T_C = 150$ °C

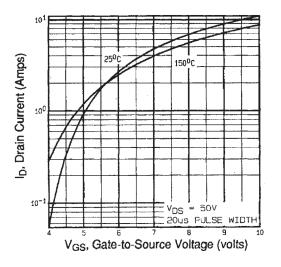


Fig. 2 - Typical Transfer Characteristics

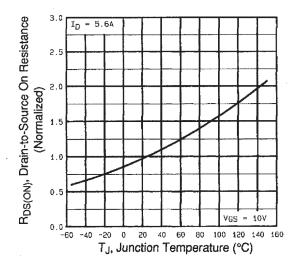


Fig. 3 - Normalized On-Resistance vs. Temperature



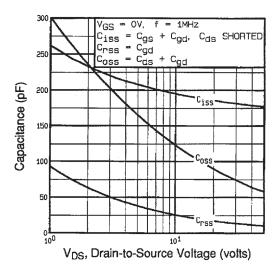


Fig. 4 - Typical Capacitance vs. Drain-to-Source Voltage

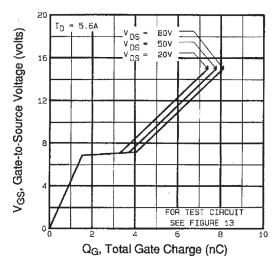


Fig. 5 - Typical Gate Charge vs. Gate-to-Source Voltage

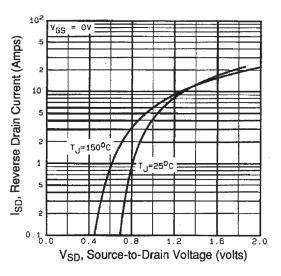


Fig. 6 - Typical Source-Drain Diode Forward Voltage

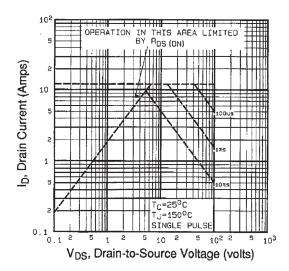
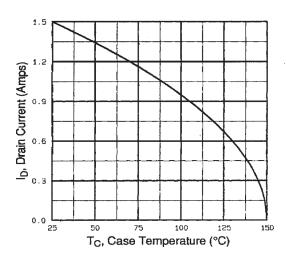


Fig. 7 - Maximum Safe Operating Area

 R_{D}

D.U.T.







V_{DS}

Fig. 10a - Switching Time Test Circuit

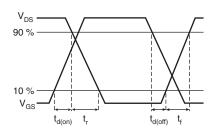


Fig. 8 - Maximum Drain Current vs. Case Temperature

Fig. 10b - Switching Time Waveforms

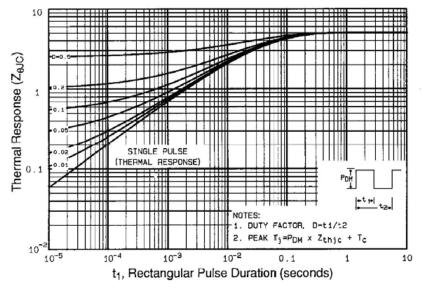


Fig. 9 - Maximum Effective Transient Thermal Impedance, Junction-to-Case



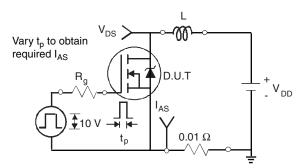


Fig. 12a - Unclamped Inductive Test Circuit

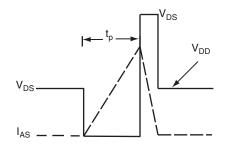


Fig. 12b - Unclamped Inductive Waveforms

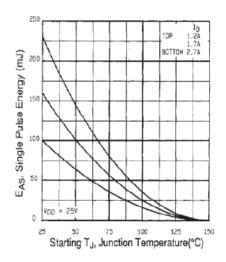


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

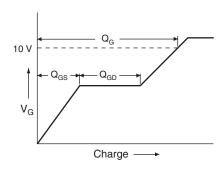


Fig. 13a - Basic Gate Charge Waveform

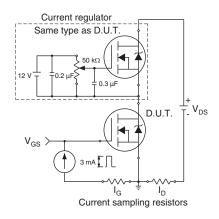
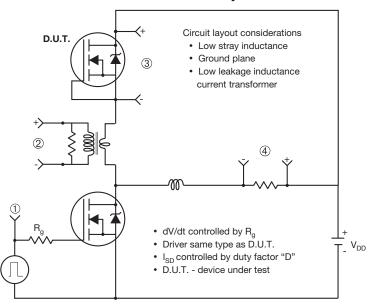


Fig. 13b - Gate Charge Test Circuit



Peak Diode Recovery dV/dt Test Circuit



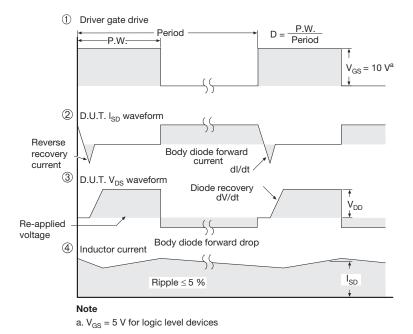


Fig.14 - For N-Channel

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