

2SK1534-VB Datasheet

N-Channel 900V (D-S) Super Junction Power MOSFET

PRODUCT SUMMARY				
V _{DS} (V)	900			
$R_{DS(on)}(\Omega)$	V _{GS} = 10 V	1.3		
Q _g (Max.) (nC)	200			
Q _{gs} (nC)	24			
Q _{gd} (nC)	110			
Configuration	Single			

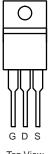
FEATURES

- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Compliant to RoHS Directive 2002/95/EC

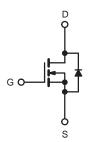




TO-220AB



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _C	= 25 °C, unl	ess otherwis	se noted)		
PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V_{DS}	900	V
Gate-Source Voltage			V_{GS}	± 20	7 v
Continuous Drain Current	V_{GS} at 10 V $T_C = 25^{\circ}$	T _C = 25 °C	l _D	5	
	VGS at 10 V	T _C = 100 °C		3.9	A
Pulsed Drain Current ^a			I _{DM}	21	
Linear Derating Factor				1.5	W/°C
Single Pulse Avalanche Energy ^b			E _{AS}	770	mJ
Repetitive Avalanche Currenta			I _{AR}	7.8	А
Repetitive Avalanche Energy ^a			E _{AR}	19	mJ
Maximum Power Dissipation $T_C = 25 ^{\circ}C$			P_{D}	190	W
Peak Diode Recovery dV/dt ^c			dV/dt	2.0	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	7
Mounting Torque	6-32 or M3 screw			10	lbf ⋅ in
				1.1	N⋅m

- a. Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11). b. $V_{DD}=50~V$, starting $T_J=25~^{\circ}C$, L=23~mH, $R_g=25~\Omega$, $I_{AS}=7.8~A$ (see fig. 12). c. $I_{SD}\leq 7.8~A$, $dI/dt\leq 140~A/\mu s$, $V_{DD}\leq 600~V$, $T_J\leq 150~^{\circ}C$. d. 1.6 mm from case.

^{*} Pb containing terminations are not RoHS compliant, exemptions may apply



THERMAL RESISTANCE RATINGS					
PARAMETER	SYMBOL	TYP.	MAX.	UNIT	
Maximum Junction-to-Ambient	R _{thJA}	-	40		
Case-to-Sink, Flat, Greased Surface	R _{thCS}	0.24	-	°C/W	
Maximum Junction-to-Case (Drain)	R _{thJC}	-	0.65		

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static						,	
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		900	-	-	V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	Reference	Reference to 25 °C, I _D = 1 mA		0.98	-	V/°C
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} :	= V _{GS} , I _D = 250 μA	2.0	-	4.0	V
Gate-Source Leakage	I _{GSS}		V _{GS} = ± 20 V	-	-	± 100	nA
Zoro Cata Voltago Prain Current	1	V _{DS} :	= 800 V, V _{GS} = 0 V	-	-	100	,.,
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 640 \	V _{DS} = 640 V, V _{GS} = 0 V, T _J = 125 °C		-	500	μA
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	$I_D = 3.7 \text{ A}^b$	-	1.3	-	Ω
Forward Transconductance	g _{fs}	V _{DS} =	: 100 V, I _D = 3.7 A ^b	5.6	-	-	S
Dynamic							
Input Capacitance	C _{iss}		V _{GS} = 0 V,		3100	-	
Output Capacitance	C _{oss}	1	$V_{DS} = 25 \text{ V},$	-	800	-	pF
Reverse Transfer Capacitance	C _{rss}	f = 1	.0 MHz, see fig. 5	-	490	-	
Total Gate Charge	Q_g			-	-	200	nC
Gate-Source Charge	Q_{gs}	$V_{GS} = 10 \text{ V}$	$V_{GS} = 10 \text{ V}$ $I_D = 3.8 \text{ A}, V_{DS} = 400 \text{ V},$ see fig. 6 and 13 ^b		-	24	
Gate-Drain Charge	Q_{gd}				-	110	
Turn-On Delay Time	t _{d(on)}			-	19	-	
Rise Time	t _r	$V_{DD} = 400 \text{ V, } I_{D} = 3.8 \text{ A,}$ $R_{g} = 6.2 \Omega, R_{D} = 52 \Omega$ see fig. 10^{b}		-	38	-	ns
Turn-Off Delay Time	t _{d(off)}			-	120	-	
Fall Time	t _f			-	39	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact		-	5.0	-	mll
Internal Source Inductance	L _S			-	13	-	- nH
Drain-Source Body Diode Characteristic	s					•	
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	5.0	
Pulsed Diode Forward Current ^a	I _{SM}			-	-	21	A
Body Diode Voltage	V _{SD}	T _J = 25 °C	$I_{S} = 3.8 \text{ A}, V_{GS} = 0 \text{ V}^{b}$	-	-	1.8	V
Body Diode Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = 3.8 A, dl/dt = 100 A/μs ^b		-	650	980	ns
Body Diode Reverse Recovery Charge	Q _{rr}			-	3.8	5.7	μC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L _S a			ov Le and	L _D)	

Notes

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



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

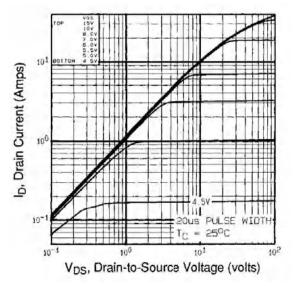


Fig. 1 - Typical Output Characteristics, T_C = 25 °C

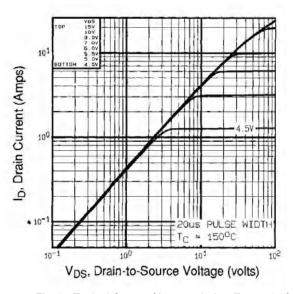


Fig. 2 - Typical Output Characteristics, T_C = 150 °C

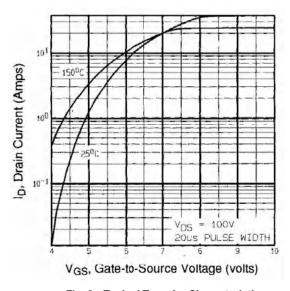


Fig. 3 - Typical Transfer Characteristics

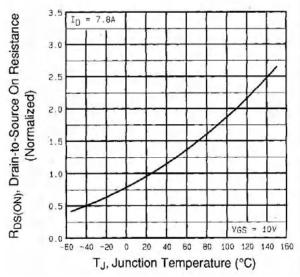


Fig. 4 - Normalized On-Resistance vs. Temperature



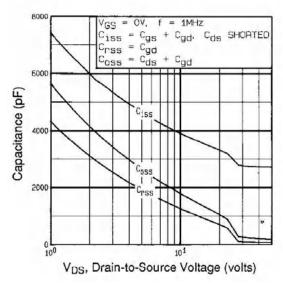


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

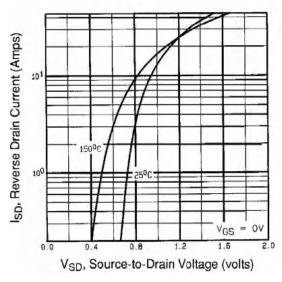


Fig. 7 - Typical Source-Drain Diode Forward Voltage

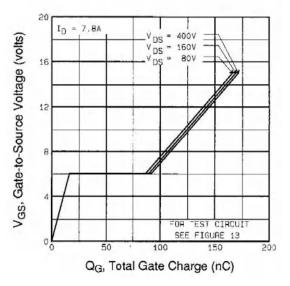


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

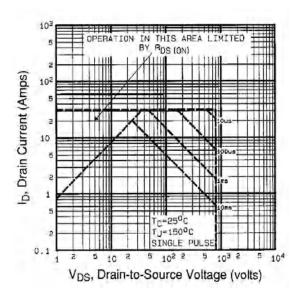


Fig. 8 - Maximum Safe Operating Area



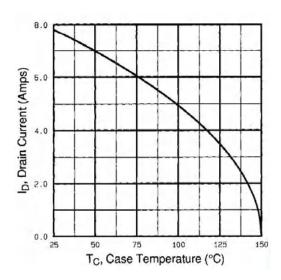


Fig. 9 - Maximum Drain Current vs. Case Temperature

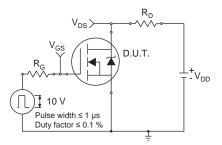


Fig. 10a - Switching Time Test Circuit

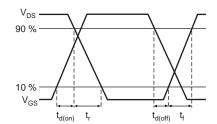


Fig. 10b - Switching Time Waveforms

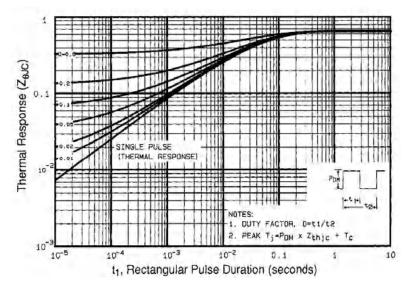


Fig. 11 - Maximum Effective Transient Thermal Impedance, Junction-to-Case



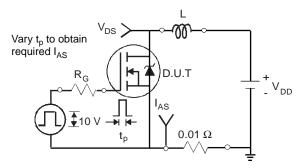


Fig. 12a - Unclamped Inductive Test Circuit

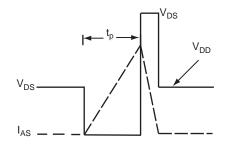


Fig. 12b - Unclamped Inductive Waveforms

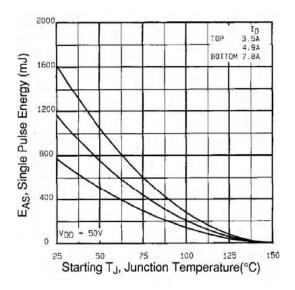


Fig. 12c - Maximum Avalanche Energy vs. Drain Current

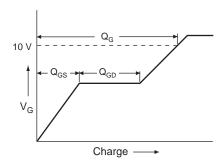


Fig. 13a - Basic Gate Charge Waveform

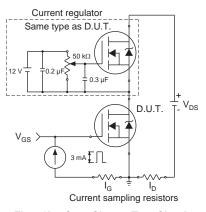
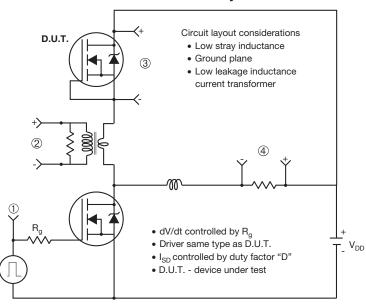


Fig. 13b - Gate Charge Test Circuit



Peak Diode Recovery dV/dt Test Circuit



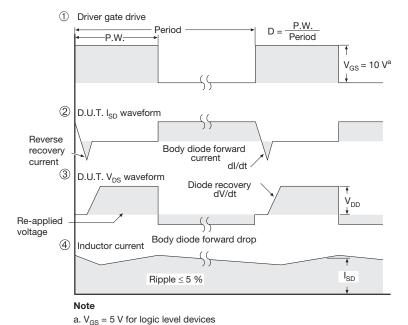
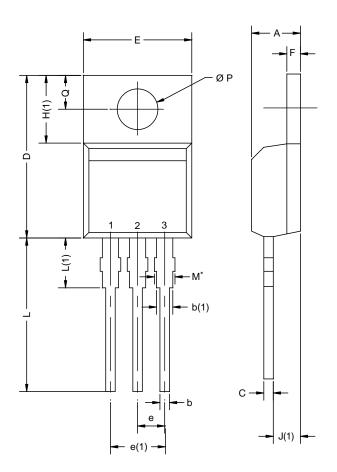


Fig. 14 - For N-Channel



TO-220AB



	MILLIM	IETERS	INC	HES		
DIM.	MIN.	MAX.	MIN.	MAX.		
Α	4.25	4.65	0.167	0.183		
b	0.69	1.01	0.027	0.040		
b(1)	1.20	1.73	0.047	0.068		
С	0.36	0.61	0.014	0.024		
D	14.85	15.49	0.585	0.610		
Е	10.04	10.51	0.395	0.414		
е	2.41	2.67	0.095	0.105		
e(1)	4.88	5.28	0.192	0.208		
F	1.14	1.40	0.045	0.055		
H(1)	6.09	6.48	0.240	0.255		
J(1)	2.41	2.92	0.095	0.115		
L	13.35	14.02	0.526	0.552		
L(1)	3.32	3.82	0.131	0.150		
ØР	3.54	3.94	0.139	0.155		
Q	2.60	3.00	0.102	0.118		
ECN: X12-0208-Rev. N, 08-Oct-12 DWG: 5471						

Notes

 $^{^{\}star}$ M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM



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