

M33796-VB Datasheet Dual P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY							
V _{DS} (V)	$R_{DS(on)}$ (Ω)	I _D (A) ^{d, e}	Q _g (Typ.)				
- 30	0.035 at V _{GS} = - 10 V	- 7.3	17 nC				
- 30	0.045 at V _{GS} = - 4.5 V	- 6.3	17 110				

FEATURES

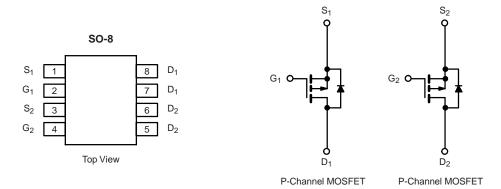
- Halogen-free
- Trench Power MOSFET
- 100 % UIS Tested



RoHS

APPLICATIONS

· Load Switches



Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	- 30	V	
Gate-Source Voltage	V_{GS}	± 20	V	
	T _C = 25 °C		- 7.3 ^e	
Continuous Drain Current (T _{.1} = 150 °C)	T _C = 70 °C		- 7.0 ^e	
Continuous Diam Curient (1) = 130 °C)	T _A = 25 °C	- I _D	- 7.3 ^{a, b}	
	T _A = 70 °C		- 5.9 ^{a, b}	Λ.
Pulsed Drain Current	I _{DM}	- 32 ^e	A	
Continuous Course Danie Die de Courset	T _C = 25 °C		- 4.1	
Continuous Source-Drain Diode Current	T _A = 25 °C	- Is	- 2.0 ^{a, b}	
Avalanche Current	1 0.1 ml l	I _{AS}	- 20	
Single-Pulse Avalanche Energy	L = 0.1 mH	E _{AS}	20	mJ
	T _C = 25 °C		5.0	
Mariana Persan Dissipation	T _C = 70 °C	D .	3.2	w
Maximum Power Dissipation	T _A = 25 °C	P _D	2.5 ^{a, b}	VV
	T _A = 70 °C		1.6 ^{a, b}	
Operating Junction and Storage Temperature Rang	T _J , T _{stg}	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{a, c}	t ≤ 10 s	R _{thJA}	38	50	°C/W	
Maximum Junction-to-Foot	Steady State	R_{thJF}	20	25	-0/00	

Notes:

- a. Surface mounted on 1" x 1" FR4 board.
- b. t = 10 s.
- c. Maximum under Steady State conditions is 85 °C/W.
- d. Based on $T_C = 25 \, ^{\circ}C$.
- e. Limited by package.



Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static					l.	L	
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = -250 \mu\text{A}$	- 30			V	
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	In = - 250 µA		- 31		mV/°C	
V _{GS(th)} Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	I _D = - 250 μA		4.5			
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	- 1.0		- 3.0	V	
Gate-Source Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
	I _{DSS}	$V_{DS} = -30 \text{ V}, V_{GS} = 0 \text{ V}$			- 1		
Zero Gate Voltage Drain Current		V _{DS} = - 30 V, V _{GS} = 0 V, T _J = 55 °C	- 5		- 5	μA	
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge -10 \text{ V}, V_{GS} = -10 \text{ V}$	- 30			Α	
		V _{GS} = - 10 V, I _D = - 6.3 A		0.035		Ω	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 4.5 V, I _D = - 6.2 A		0.040			
Forward Transconductance ^a	9 _{fs}	V _{DS} = - 10 V, I _D = - 6.1 A		23		S	
Dynamic ^b	l			L	l.	L	
Input Capacitance	C _{iss}			1350		pF	
Output Capacitance	C _{oss}	V _{DS} = - 15 V, V _{GS} = 0 V, f = 1 MHz		215			
Reverse Transfer Capacitance	C _{rss}			185			
Total Gate Charge		V _{DS} = -15 V, V _{GS} = -10 V, I _D = -6.1 A		32	50		
	$Q_g = \frac{V_{DS} - V_{S} V_{GS} - V_{S} V_{GS}}{V_{S} V_{S} V_{S} V_{S}}$			15	25		
Gate-Source Charge	Q _{gs}	V _{DS} = - 15 V, V _{GS} = - 4.5 V, I _D = - 6.1 A		4		nC	
Gate-Drain Charge	Q_{gd}			7.5			
Gate Resistance	R _g	f = 1 MHz		5.8		Ω	
Turn-On Delay Time	t _{d(on)}			10	15		
Rise Time	ì,	$V_{DD} = -15 \text{ V}, R_{L} = 15 \Omega$		8	15		
Turn-Off DelayTime	t _{d(off)}	$I_D \cong$ - 1 A, V_{GEN} = - 10 V, R_g = 1 Ω		45	70		
Fall Time	t _f	·		12	25		
Turn-On Delay Time	t _{d(on)}			42	70	ns	
Rise Time	ì,	$V_{DD} = -15 \text{ V}, R_{L} = 15 \Omega$		35	60	-	
Turn-Off DelayTime	t _{d(off)}	$I_D \cong$ - 1 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		40	70		
Fall Time	t _f			16	30		
Drain-Source Body Diode Characterist	ics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			- 4.1	۸	
Pulse Diode Forward Current	I _{SM}				- 32	Α	
Body Diode Voltage	V _{SD}	I _S = -2 A, V _{GS} = 0 V		- 0.75	- 1.2	V	
Body Diode Reverse Recovery Time	t _{rr}			34	60	ns	
Body Diode Reverse Recovery Charge	de Reverse Recovery Charge Q _{rr} I _r = -2 A, dl/dt = 100 A/us, T ₁ = 25			22	40	nC	
Reverse Recovery Fall Time				11			
Reverse Recovery Rise Time	t _b			23		ns	

Notes:

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

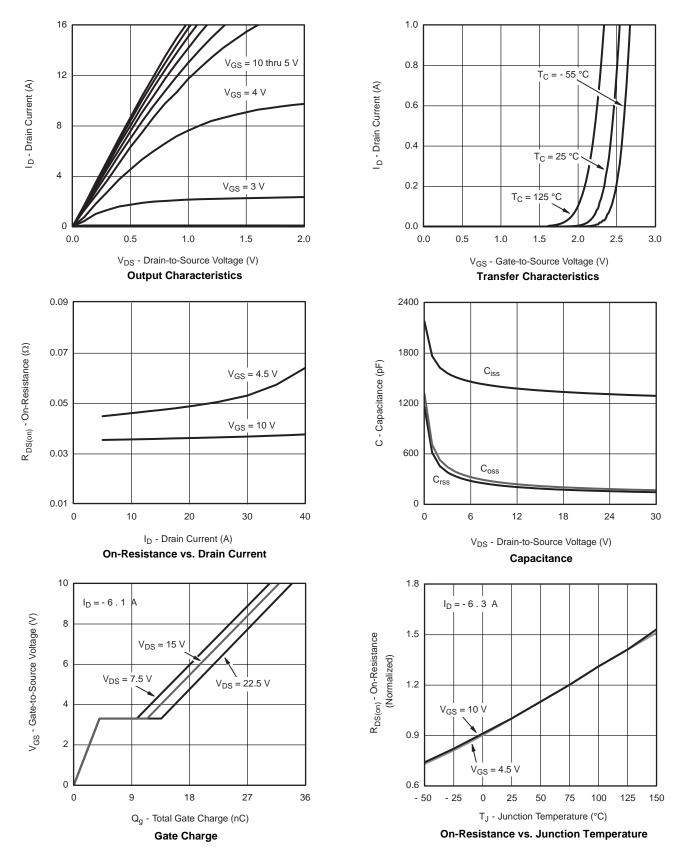
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a. Pulse test; pulse width $\leq 300~\mu s,$ duty cycle $\leq 2~\%.$

b. Guaranteed by design, not subject to production testing.



TYPICAL CHARACTERISTICS 25 C, unless otherwise noted





 $I_D = -6.3 A$

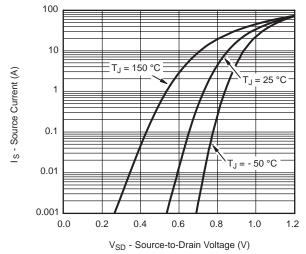
T_J = 125 °C

T_J = 25 °C

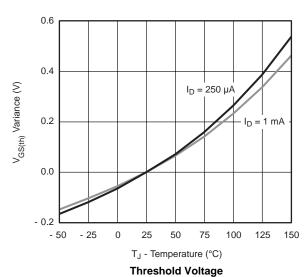
8

10

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Source-Drain Diode Forward Voltage



V_{GS} - Gate-to-Source Voltage (V)

2

0.10

0.08

0.06

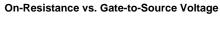
0.04

0.02

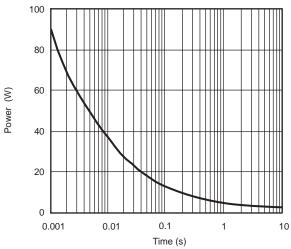
0.00

0

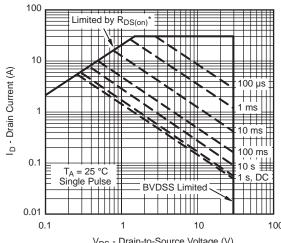
 $R_{DS(on)}$ - On-Resistance (Ω)



6



Single Pulse Power, Junction-to-Ambient



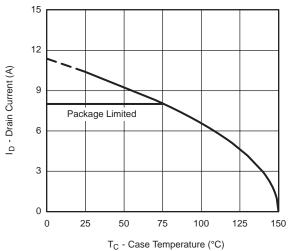
V_{DS} - Drain-to-Source Voltage (V)

Safe Operating Area

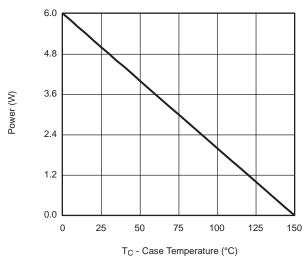
^{*} V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

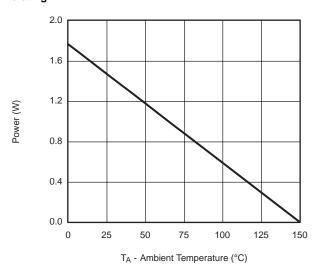


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted







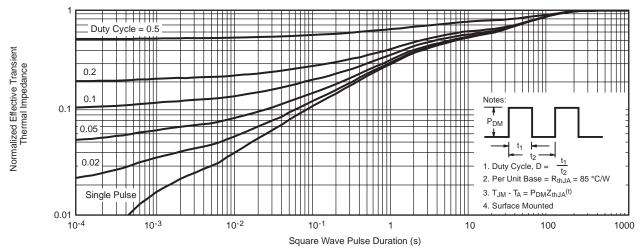


Power, Junction-to-Foot Power Derating, Junction-to-Ambient

^{*} The power dissipation P_D is based on $T_{J(max)} = 150$ °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



TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient

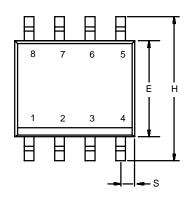


Normalized Thermal Transient Impedance, Junction-to-Foot

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SOIC (NARROW): 8-LEADJEDEC Part Number: MS-012







	MILLIMETERS		INC	HES		
DIM	Min	Max	Min	Max		
Α	1.35	1.75	0.053	0.069		
A ₁	0.10	0.20	0.004	0.008		
В	0.35	0.51	0.014	0.020		
С	0.19	0.25	0.0075	0.010		
D	4.80	5.00	0.189	0.196		
E	3.80	4.00	0.150	0.157		
е	1.27	BSC	0.050 BSC			
Н	5.80	6.20	0.228	0.244		
h	0.25	0.50	0.010	0.020		
L	0.50	0.93	0.020	0.037		
q	0°	8°	0°	8°		
S	0.44	0.64	0.018	0.026		
FCN: C-06527-Rev 11-Sen-06						

ECN: C-06527-Rev. I, 11-Sep-06

DWG: 5498

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RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads Dimensions in Inches/(mm)



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