



120V N-CANNEL TRENCH FET

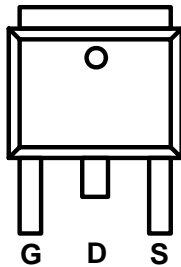
FEATURES

- $V_{DSS}=120V$
- $I_{DS}=30A @ V_{GS}=10V$
- $R_{DS(ON)}<28m\Omega @ V_{GS}=10V I_D=10A$
- $R_{DS(ON)}<30m\Omega @ V_{GS}=6V I_D=5A$
- $Q_{g_typ.}=58nC @ V_{GS}=10V$

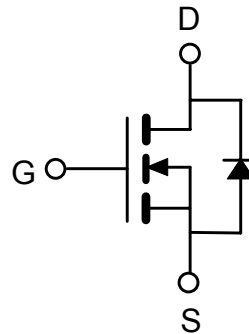
APPLICATION

- PWM
- Load switching
- General purpose application

TO-252 D-PAK
Top View



Drain Connected
to Tab



ABSOLUTE MAXIMUM RATING

($T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	120	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current ^A	$T_C=25^\circ C$	I_D	30	A
	$T_C=100^\circ C$		20	
Pulsed Drain Current ^C	Pulse	I_{DM}	53	
Single Pulse Avalanche Current ^B	$T_A=25^\circ C$	I_{AS}	37	A
Power Dissipation ^A	$T_C=25^\circ C$	P_D	50	W
	$T_C=100^\circ C$		25	
Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ C$
Single Avalanche Energy ^B	$L=0.3mH$	E_{AS}	200	mJ

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^D	$R_{\theta JA}$	60	$^\circ C/W$
Maximum Junction-to-Case ^D	$R_{\theta JC}$	3	$^\circ C/W$



TRENCH FET ELECTRICAL CHARACTERISTICS

SPECIFICATIONS (T _A = 25°C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250μA	120			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2		4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 96V, V _{GS} = 0 V			100	nA
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 15A		22	28	mΩ
		V _{GS} = 6 V, I _D = 10 A		24	30	
		V _{GS} = 10V, I _D = 10A, T _J = 125°C		43		
Forward Transconductance	g _{FS}	V _{DS} = 5V, I _D = 10 A		10		S
Dynamic Characteristics						
Input Capacitance	C _{ISS}	V _{DS} = 40V, V _{GS} = 0V, f = 1.0MHz		2949		pF
Output Capacitance	C _{OSS}			181		
Reverse Transfer Capacitance	C _{RSS}			91		
Total Gate Charge (V _{GS} = 10V)	Q _g	V _{DS} = 96V, I _D = 10 A		60		nC
Gate-Source Charge	Q _{gs}			10		
Gate-Drain Charge	Q _{gd}			20		
Switching Characteristics^E						
Turn-On Delay Time	t _{d(on)}	V _{DS} = 96V, R _{GEN} = 3Ω, I _D = 10A, V _{GS} = 10V		17		nS
Rise Time	t _r			14		
Turn-Off Delay Time	t _{d(off)}			43		
Fall-Time	t _f			12		
Gate Resistance	R _g	f = 1MHz		1.4		Ω
Body Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} = 0V, I _F = 1A		0.7	0.8	V
Reverse Recovery Time ^E	t _{rr}	V _{GS} = 0V, I _F = 10A, di _F /dt = 100A/μs		56		ns
Diode Reverse Charge ^E	Q _{rr}				132	

Notes:

A, Drain current and Power dissipation are based on maximum junction temperature T_{J(max)} = 175°C.

B, Single pulse UIS energy, inductor = 0.3mH, V_{GS} = 10V, T_{start} = 25°C.

C, Pulse width limited by junction temperature T_{J(max)} = 175°C, the pulse current value was based on T_A = 25°C, repetitive rating based on duty cycles to keep initial T_J = 25°C.

D, The value of R_{θJA} and R_{θJC} were measured with device mounted on tested board based on JESD51-7 requirement, and in still air environment with T_A = 25°C in according to JESD51-2.

E, Pulse test: PW ≤ 300μs duty cycle ≤ 2%.



Typical Electrical Characteristics (N-Channel)

$T_A = +25^\circ\text{C}$, unless otherwise noted

Figure 1. On-Regions Characteristics

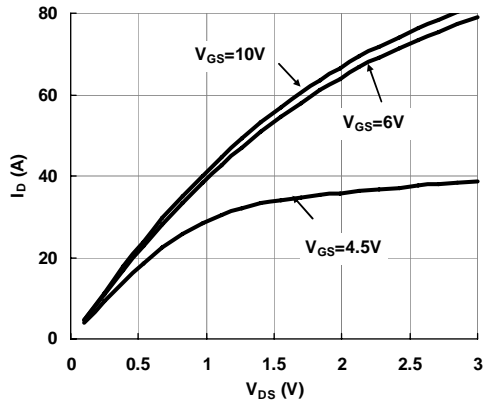


Figure 2. On-Resistance versus Drain Current

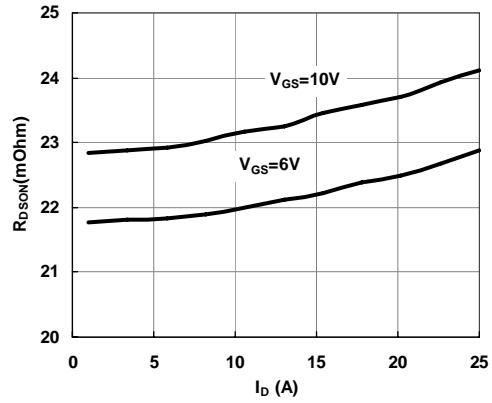


Figure 3. On-Resistance Normalized versus Temperature

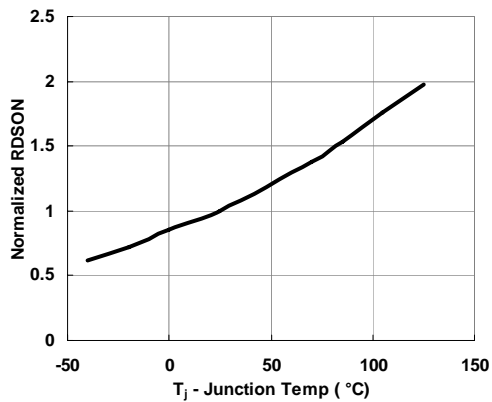


Figure 4. On-Resistance versus Gate to Source Voltage

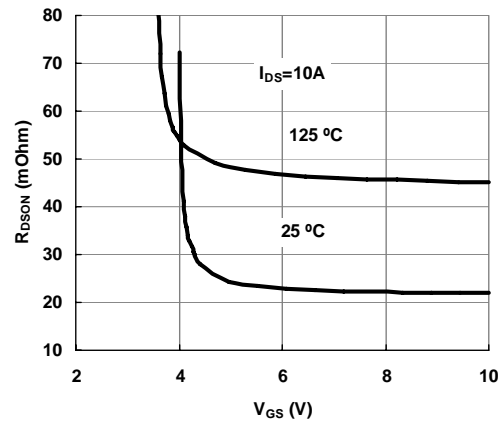


Figure 5. Transfer Characteristics

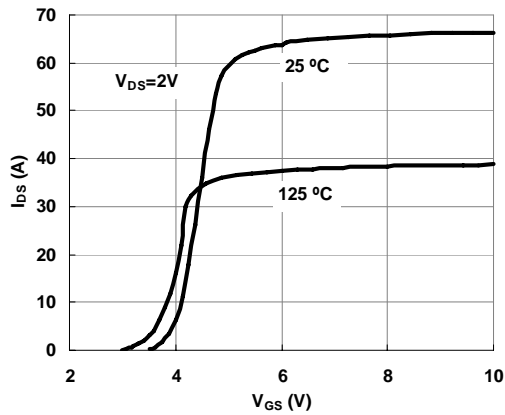
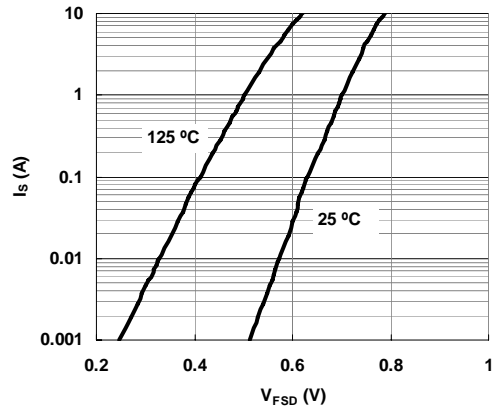


Figure 6. Body Diode Forward Voltage versus Source Current





Typical Electrical Characteristics (N-Channel) $T_A = +25^\circ\text{C}$, unless otherwise noted

Figure 7. Threshold versus Temperature

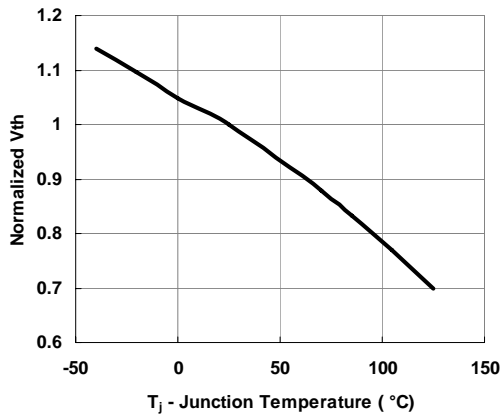


Figure 8. Body Diode Forward Voltage versus Temperature

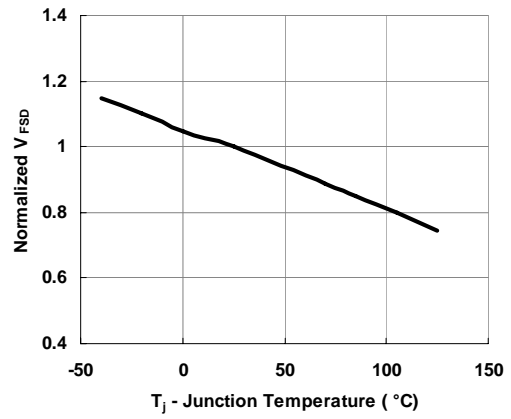


Figure 9. Gate Charge Characteristics

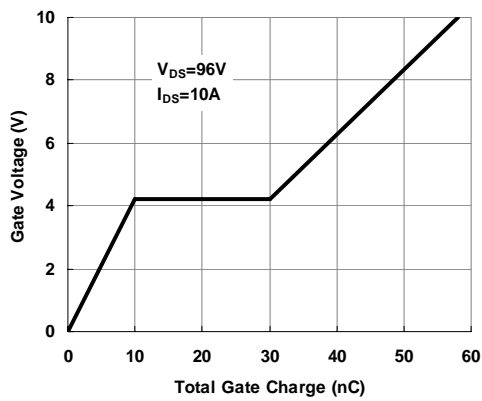
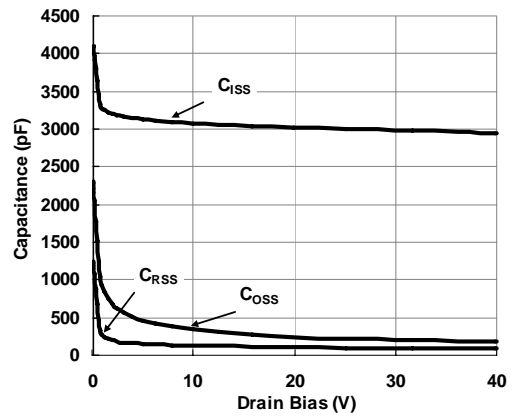
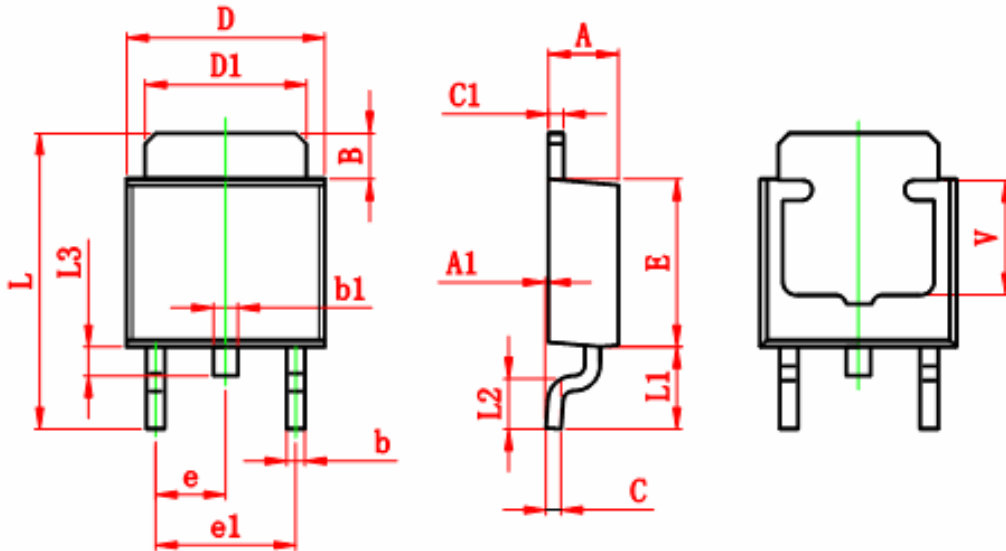


Figure 10. Capacitance Characteristics





TO-252 Package Outline Drawing



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	