



30V N-CANNEL TRENCH FET

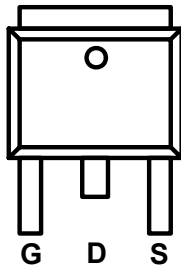
FEATURES

- $V_{DSS}=30V$
- $I_{DS}=45A @ V_{GS}=10V$
- $R_{DS(ON)} < 12m\Omega @ V_{GS}=10V I_D=20A$
- $R_{DS(ON)} < 15m\Omega @ V_{GS}=4.5V I_D=15A$
- $Q_{g_typ.}=24nC @ V_{GS}=10V$

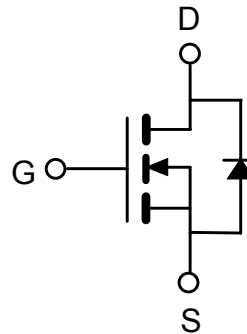
APPLICATION

- PWM
- Load switching
- General purpose application

TO-252 D-PAK
Top View



Drain Connected
to Tab



ABSOLUTE MAXIMUM RATING

(T _A = 25 °C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Rating	Units
Drain-Source Voltage		V _{DS}	30	V
Gate-Source Voltage		V _{GS}	±20	V
Drain Current ^A	T _C =25°C	I _D	45	A
	T _C =100°C		28	
Pulsed Drain Current ^C	Pulse	I _{DM}	83	
Single Pulse Avalanche Current ^B	T _A =25 °C	I _{AS}	18	A
Power Dissipation ^A	T _C =25°C	P _D	42	W
	T _C =100°C		17	
Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150	°C
Single Avalanche Energy ^B	L=1mH	E _{AS}	165	mJ

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^D	R _{θJA}	60	°C/W
Maximum Junction-to-Case ^D	R _{θJC}	3	°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	30			V	
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1		3		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20V			±100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 24V, V _{GS} = 0 V			100	nA	
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 20A		8	12	mΩ	
		V _{GS} = 4.5 V, I _D = 15 A		12	15		
		V _{GS} = 10V, I _D = 20A, T _J = 125°C		13	16		
Forward Transconductance	g _{FS}	V _{DS} = 5V, I _D = 20 A		28		S	
Dynamic Characteristics							
Input Capacitance	C _{ISS}	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz		1171		pF	
Output Capacitance	C _{OSS}			193			
Reverse Transfer Capacitance	C _{RSS}			127			
Total Gate Charge (V _{GS} = 10V)	Q _g	V _{DS} = 15V, I _D = 20 A		24		nC	
Total Gate Charge (V _{GS} = 4.5V)				13			
Gate-Source Charge			Q _{gs}		3		
Gate-Drain Charge			Q _{gd}		7		
Switching Characteristics^E							
Turn-On Delay Time	t _{d(on)}	V _{DS} = 15V, R _{GEN} = 3Ω, R _L = 1Ω, V _{GS} = 10V		10		nS	
Rise Time	t _r			6			
Turn-Off Delay Time	t _{d(off)}			35			
Fall-Time	t _f			12			
Gate Resistance	R _g	f = 1MHz		2		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 = 20A, di _F /dt = 100A/μs		28		ns	
Diode Reverse Charge ^E	Q _{rr}				12		nC

Notes:

A, Drain current and Power dissipation are based on maximum junction temperature T_{J(max)} = 150°C.

B, Single pulse UIS energy, inductor = 1mH, V_{GS} = 10V, T_{start} = 25°C.

C, Pulse width limited by junction temperature T_{J(max)} = 150°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

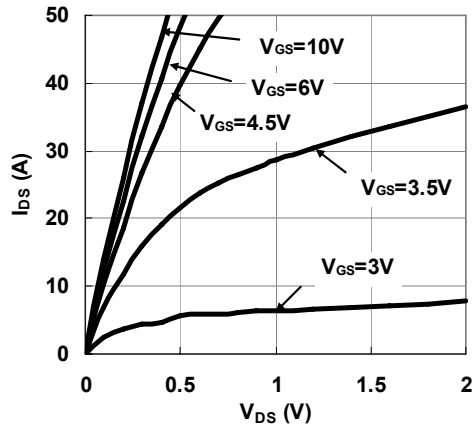


Figure 2. On-Resistance versus Drain Current

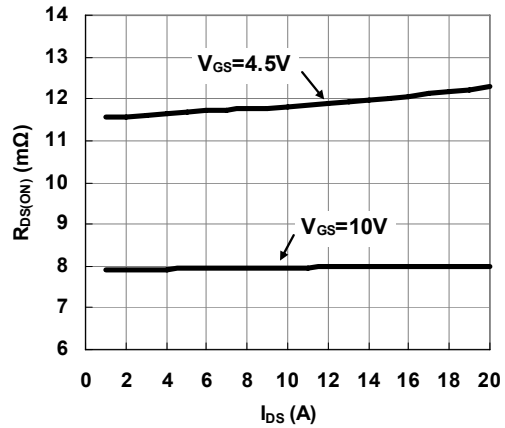


Figure 3. On-Resistance Normalized versus Temperature

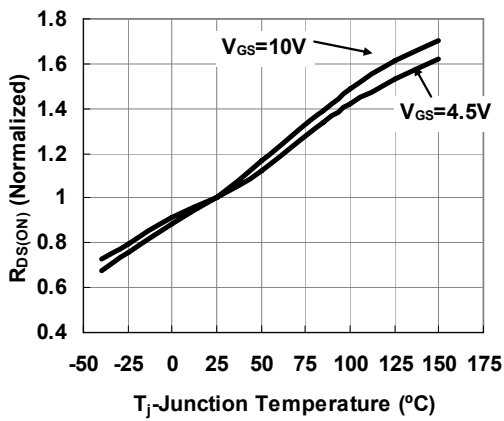


Figure 4. On-Resistance versus Gate to Source Voltage

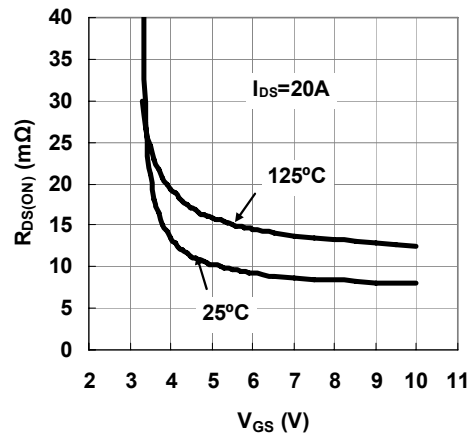


Figure 5. Transfer Characteristics

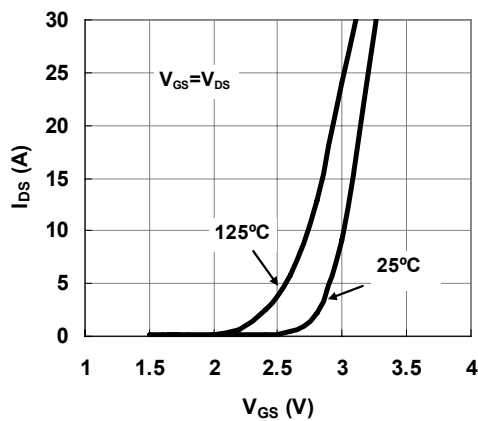
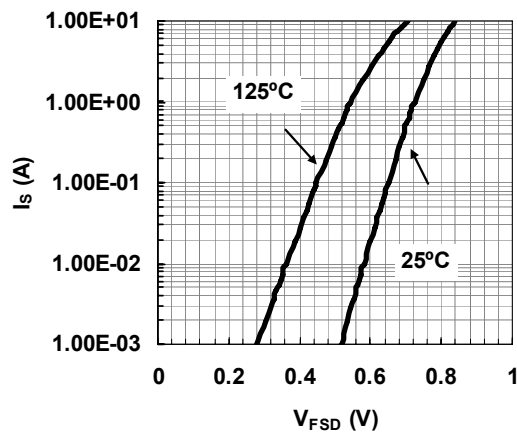


Figure 6. Body Diode Forward Voltage versus Source Current





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

Figure 7. Threshold versus Temperature

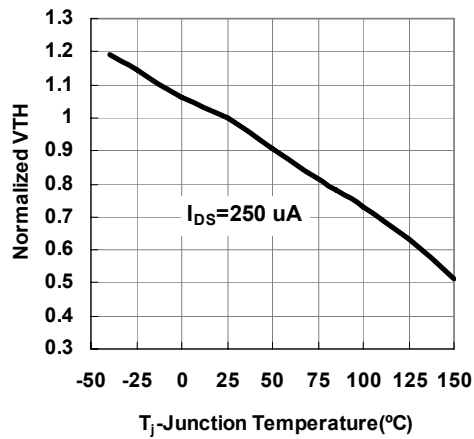


Figure 8. Body Diode Forward Voltage versus Temperature

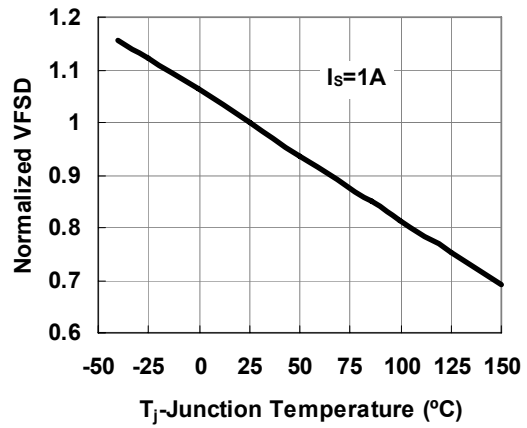


Figure 9. Gate Charge Characteristics

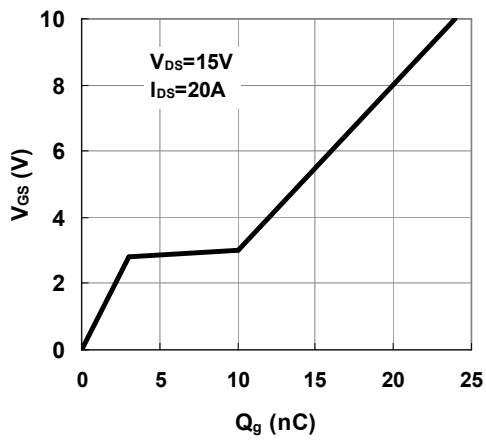
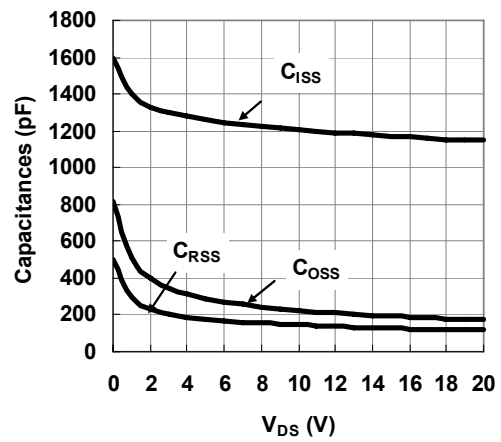
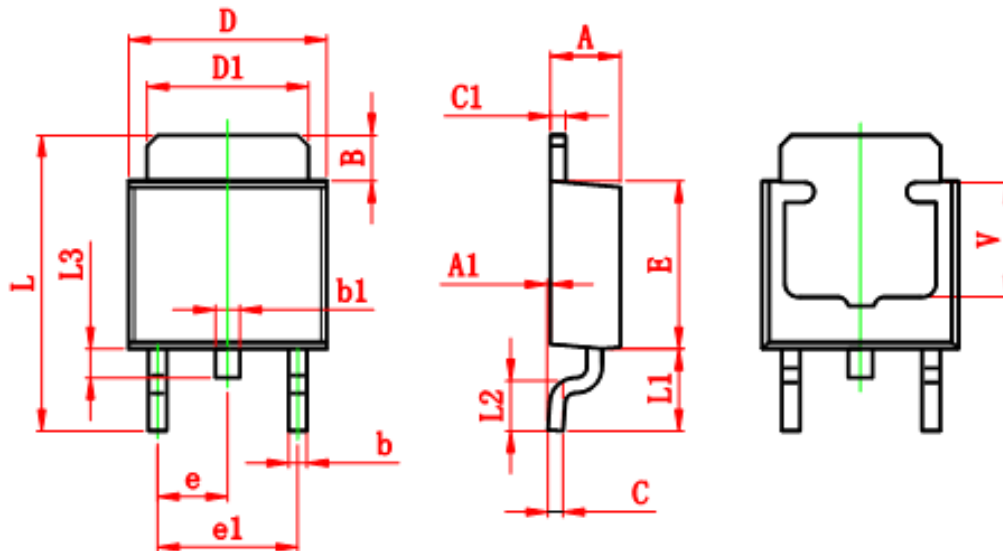


Figure 10. Capacitance Characteristics





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.	