

Dual N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^d	Q _g (Typ.)
30	0.0075 at V _{GS} = 10 V	45	20 nC
	0.011 at V _{GS} = 4.5 V	35	

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

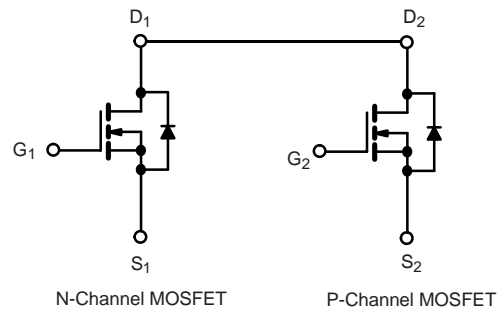
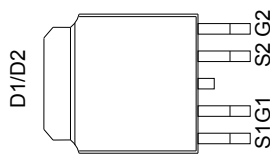


RoHS
COMPLIANT

APPLICATIONS

- 12 V Automotive systems
- Motors, lamps and solenoid control
- Transmission control
- Ultra high performance power switching

TO-252-4L



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	30	V
Gate-Source Voltage		V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	45 ^a	A
	T _C = 70 °C		36	
	T _A = 25 °C		30 ^{b, c}	
	T _A = 70 °C		21 ^{b, c}	
Pulsed Drain Current		I _{DM}	180	A
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	45	
	T _A = 25 °C		20 ^{b, c}	
Avalanche Current	L = 0.1 mH	I _{AS}	50	mJ
Single-Pulse Avalanche Energy		E _{AS}	96	
Maximum Power Dissipation	T _C = 25 °C	P _D	79	W
	T _C = 70 °C		50.5	
	T _A = 25 °C		49 ^{b, c}	
	T _A = 70 °C		31.2 ^{b, c}	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	28	45	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	2.5	6	

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under Steady State conditions is 85 °C/W.

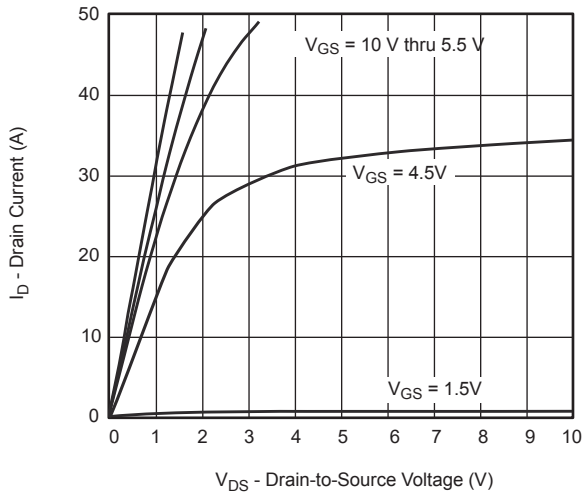
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		55		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-6.3		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	45			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$		0.0075	0.0090	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$		0.011	0.0135	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 24\text{ V}, I_D = 10\text{ A}$		50		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		2450		pF
Output Capacitance	C_{oss}			207		
Reverse Transfer Capacitance	C_{rss}			40		
Total Gate Charge	Q_g	$V_{DS} = 24\text{ V}, V_{GS} = 10\text{ V}, I_D = 10\text{ A}$		20		nC
Gate-Source Charge	Q_{gs}			5.2		
Gate-Drain Charge	Q_{gd}			11		
Gate Resistance	R_g	$f = 1\text{ MHz}$		2.5		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 24\text{ V}, R_L = 5.4\text{ }\Omega$ $I_D \cong 5\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		15		ns
Rise Time	t_r			11		
Turn-Off Delay Time	$t_{d(off)}$			42		
Fall Time	t_f			10		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 24\text{ V}, R_L = 5.4\text{ }\Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		10		
Rise Time	t_r			8		
Turn-Off Delay Time	$t_{d(off)}$			19		
Fall Time	t_f			7		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			45	A
Pulse Diode Forward Current ^a	I_{SM}				180	
Body Diode Voltage	V_{SD}	$I_S = 2\text{ A}$		0.7	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 5.5\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		28	50	ns
Body Diode Reverse Recovery Charge	Q_{rr}			26	50	nC
Reverse Recovery Fall Time	t_a			19		ns
Reverse Recovery Rise Time	t_b			6		

Notes:

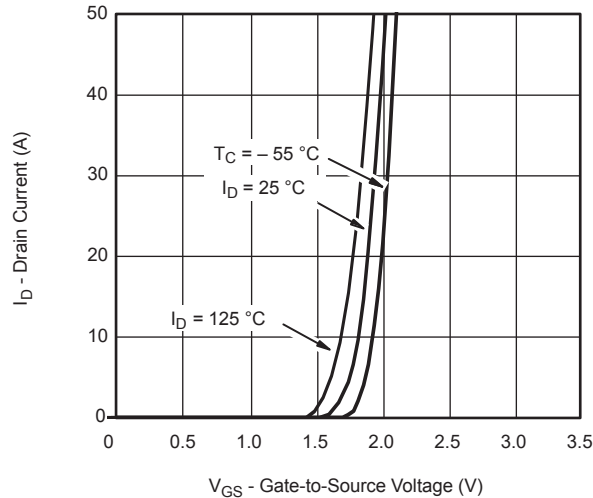
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

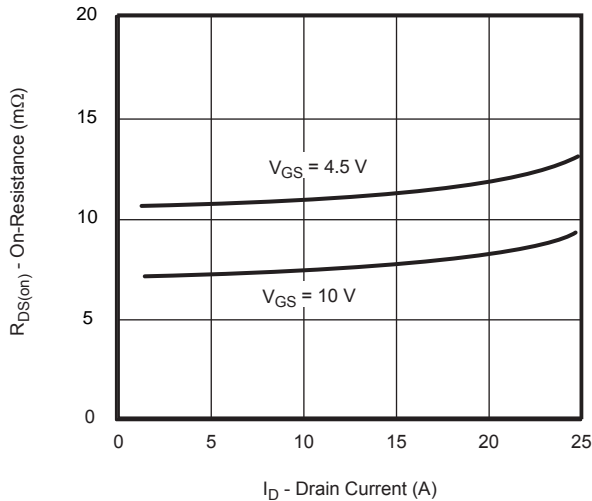
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



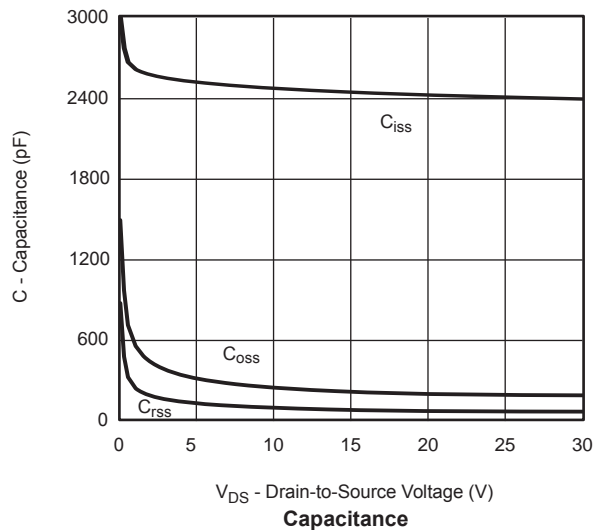
Output Characteristics



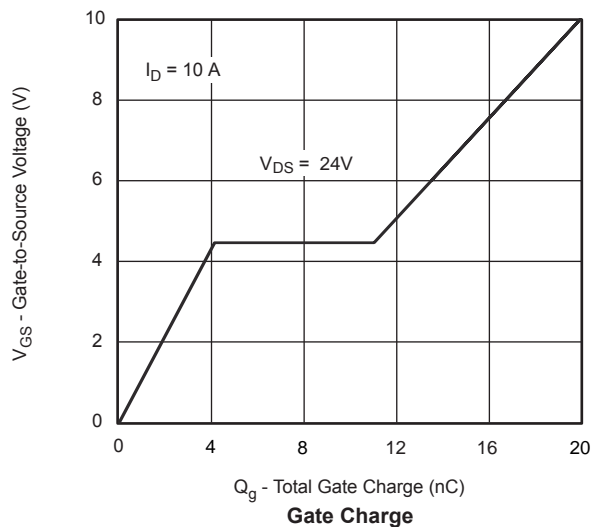
Transfer Characteristics



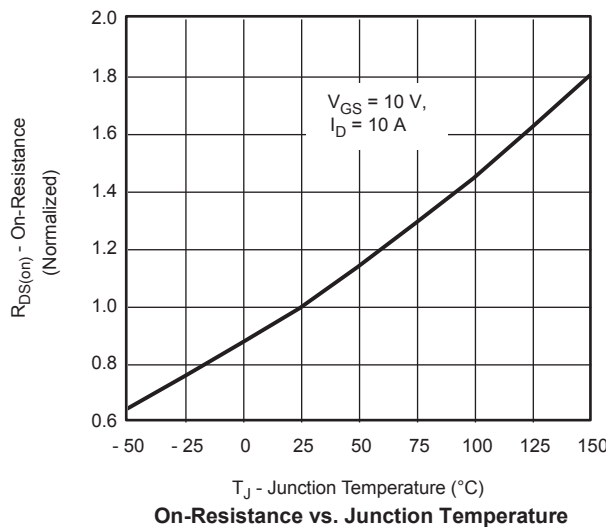
On-Resistance vs. Drain Current



Capacitance

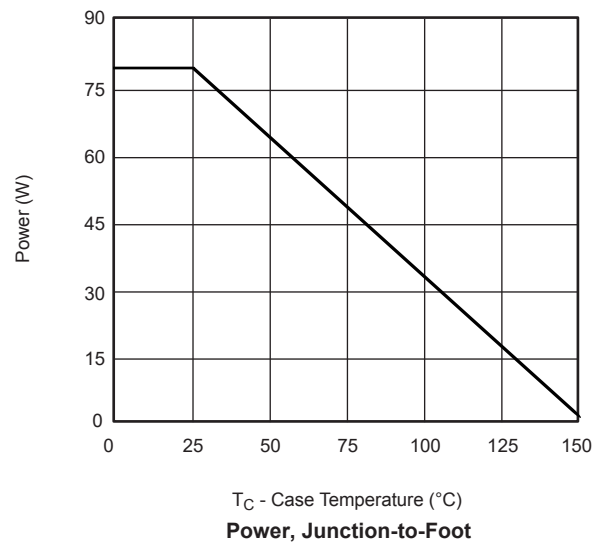
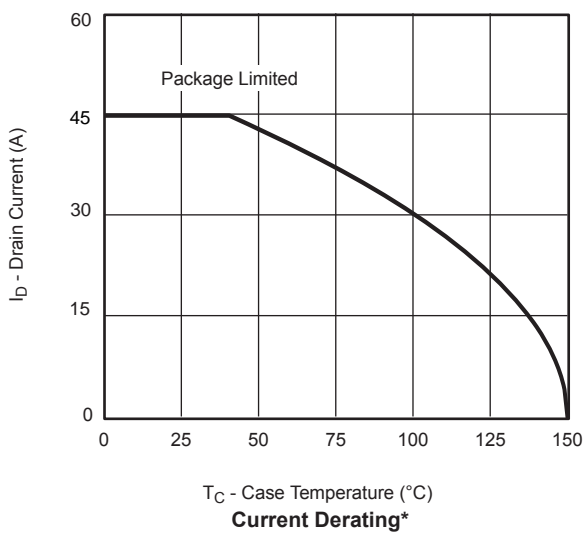
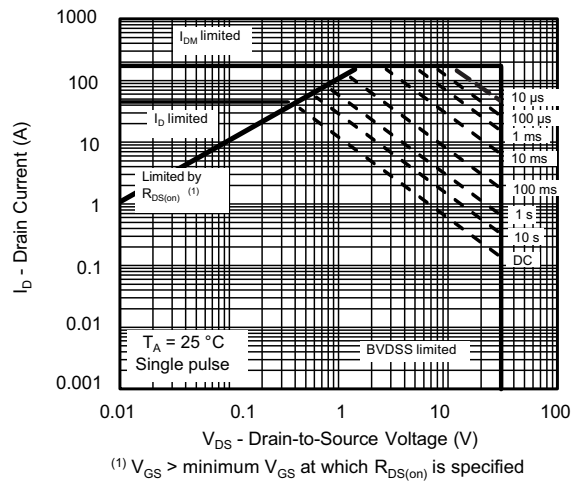
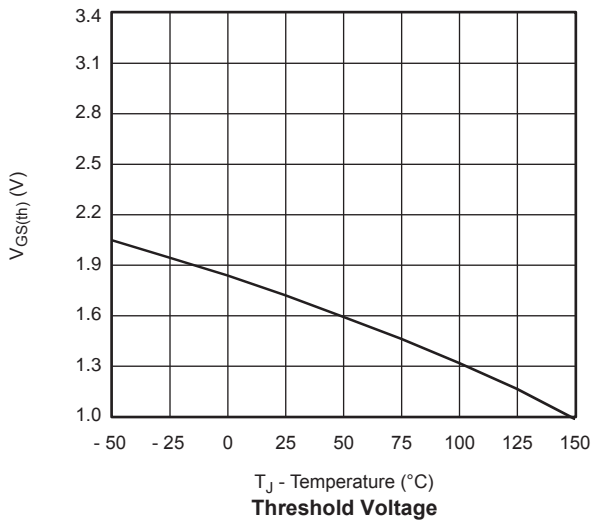
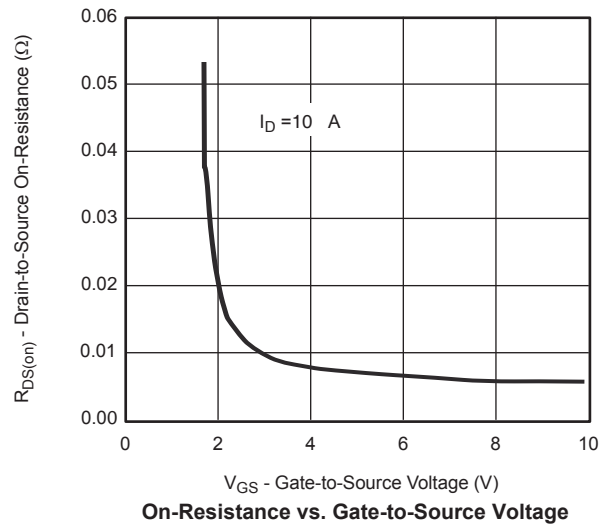
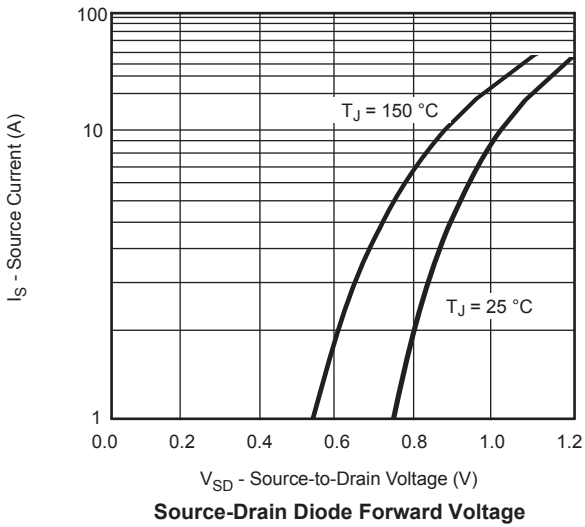


Gate Charge



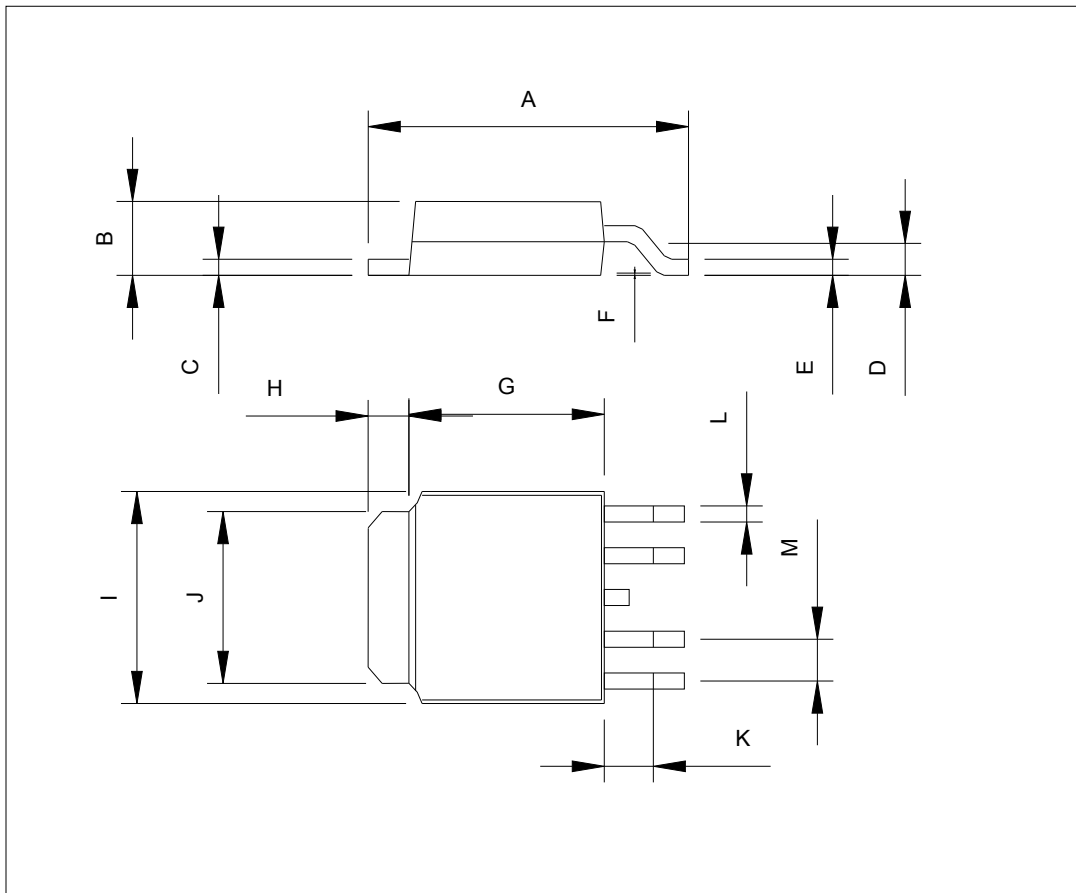
On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



TO-252 (DPAK): 4-LEAD

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.0	9.5	10.0	H	1.3	1.5	1.7
B	2.1	2.3	2.5	I	6.3	6.5	6.7
C	0.4	0.5	0.6	J	4.8	5.0	5.2
D	1.1	1.2	1.3	K	0.8	1.3	1.8
E	0.4	0.5	0.6	L	0.3	0.5	0.7
F	0.00		0.3	M	1.1	1.3	1.5
G	5.3	5.5	5.7	N			



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