

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	0.006 at V _{GS} = 10 V	50	20 nC

FEATURES

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

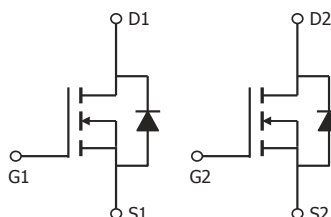
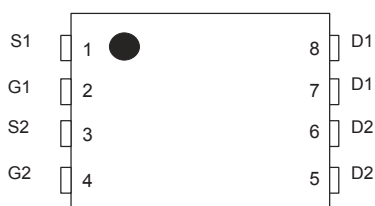


RoHS
COMPLIANT

APPLICATIONS

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

Top View



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)	I _D	T _C = 25 °C	50 ^a	A
		T _C = 70 °C	41	
		T _A = 25 °C	35 ^{b, c}	
		T _A = 70 °C	27 ^{b, c}	
Pulsed Drain Current	I _{DM}	200		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	50	
		T _A = 25 °C	25 ^{b, c}	
Avalanche Current	I _{AS}	55		
Single-Pulse Avalanche Energy	E _{AS}	105	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	83	W
		T _C = 70 °C	57	
		T _A = 25 °C	59 ^{b, c}	
		T _A = 70 °C	45 ^{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}	R _{thJA}	30	45	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	2.8	6	

Notes:

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

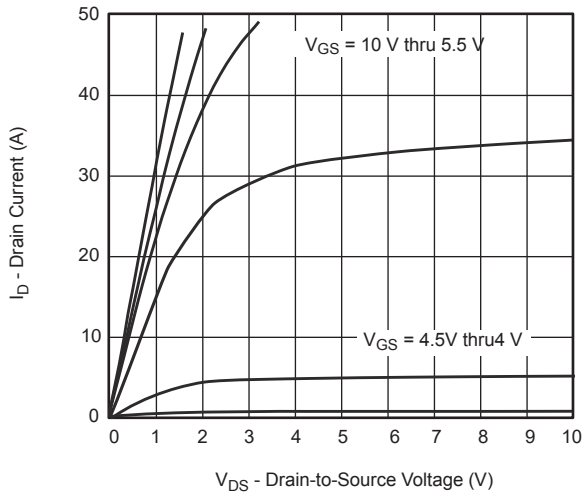
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		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	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$		0.006	0.0075	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$		0.008	0.010	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 24\text{ V}, I_D = 10\text{ A}$		50		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 24\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1250		pF
Output Capacitance	C_{oss}			127		
Reverse Transfer Capacitance	C_{rss}			41		
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}			5.5		
Gate-Drain Charge	Q_{gd}			12		
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			10		
Turn-Off Delay Time	$t_{d(off)}$			45		
Fall Time	t_f			11		
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	$T_C = 25\text{ }^\circ\text{C}$			50	A
Pulse Diode Forward Current ^a	I_{SM}				200	
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:

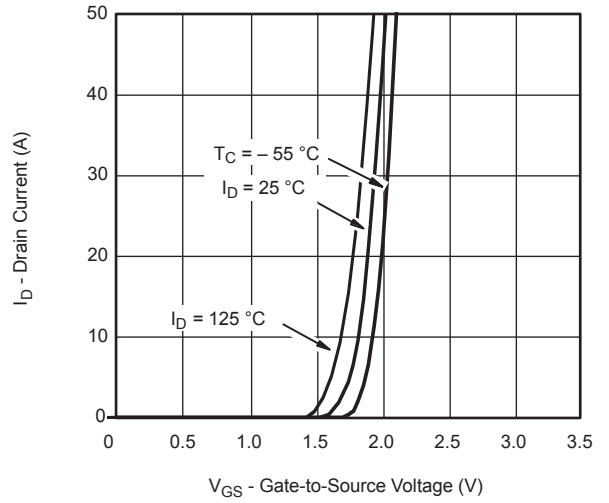
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.

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.

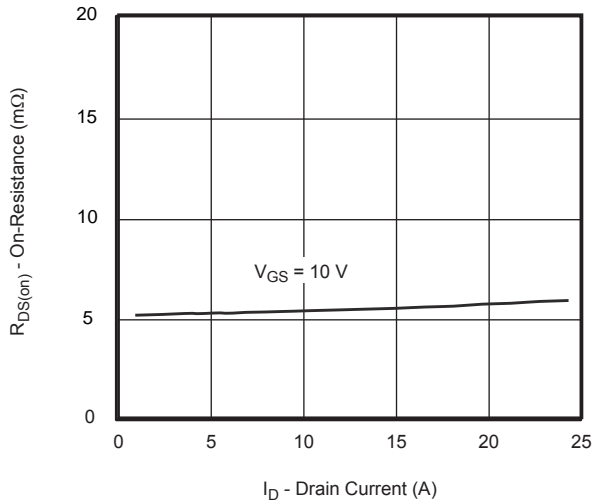
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



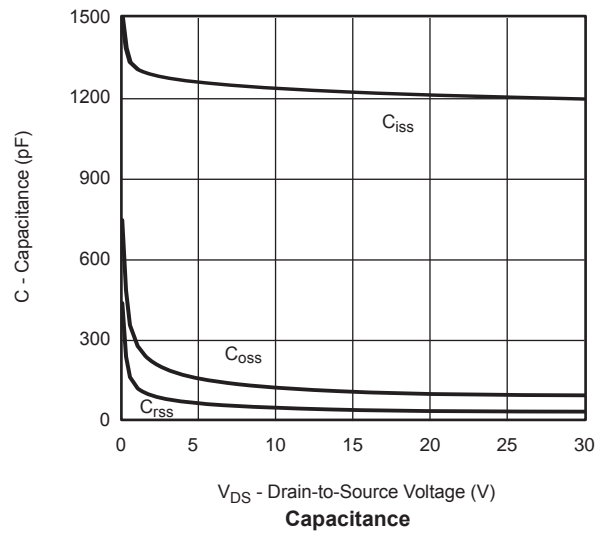
Output Characteristics



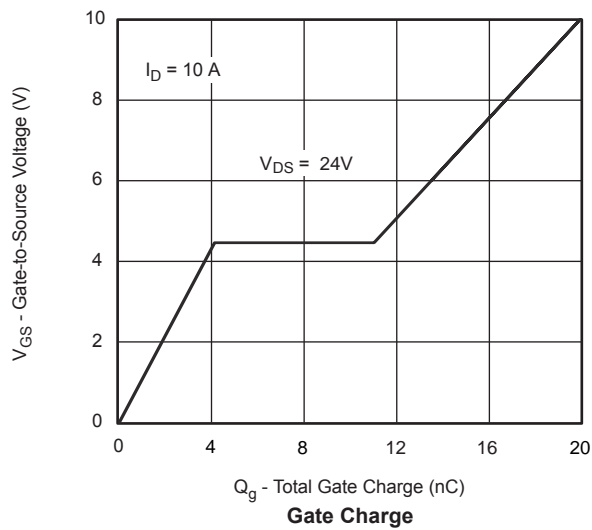
Transfer Characteristics



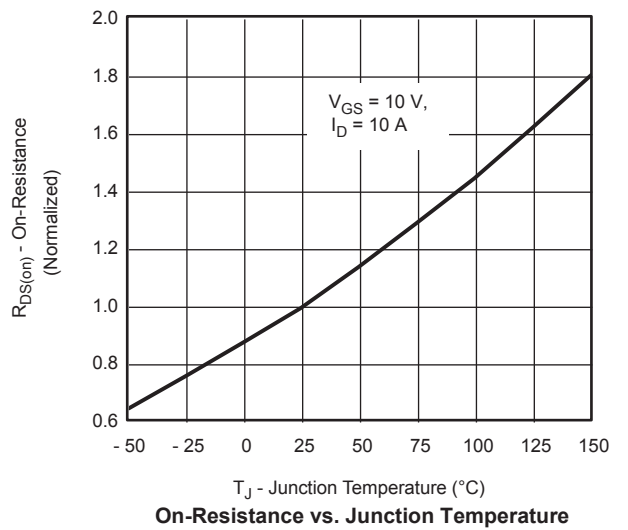
On-Resistance vs. Drain Current



Capacitance

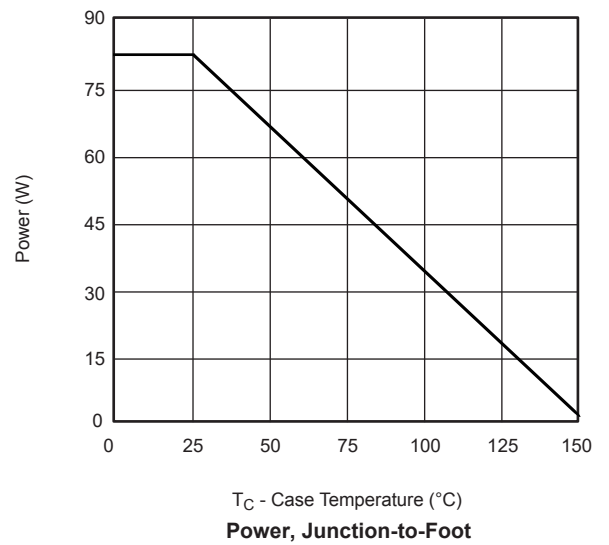
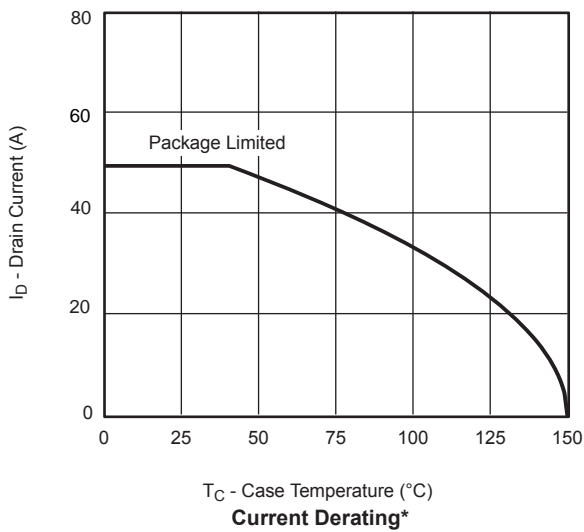
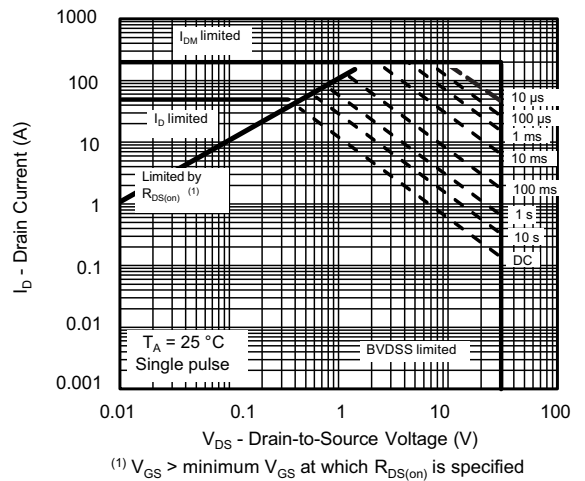
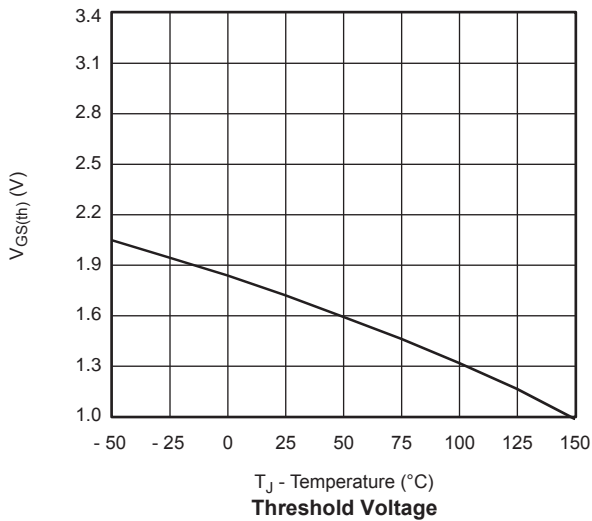
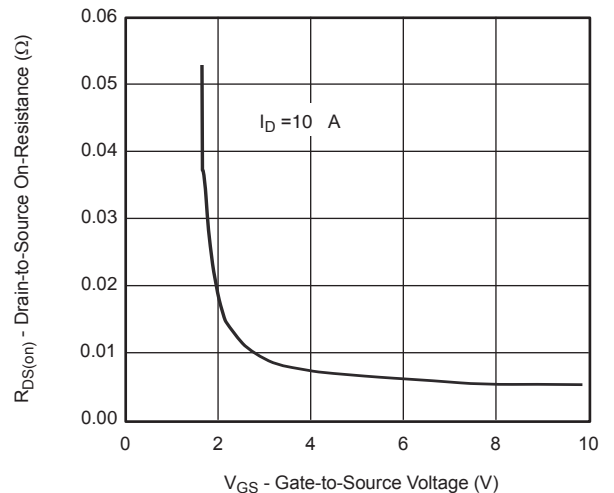
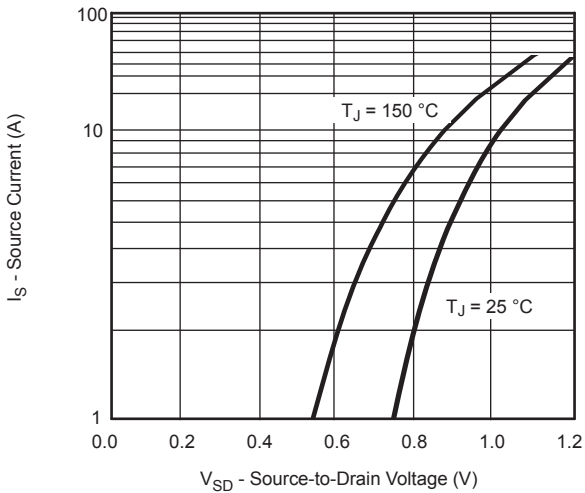


Gate Charge

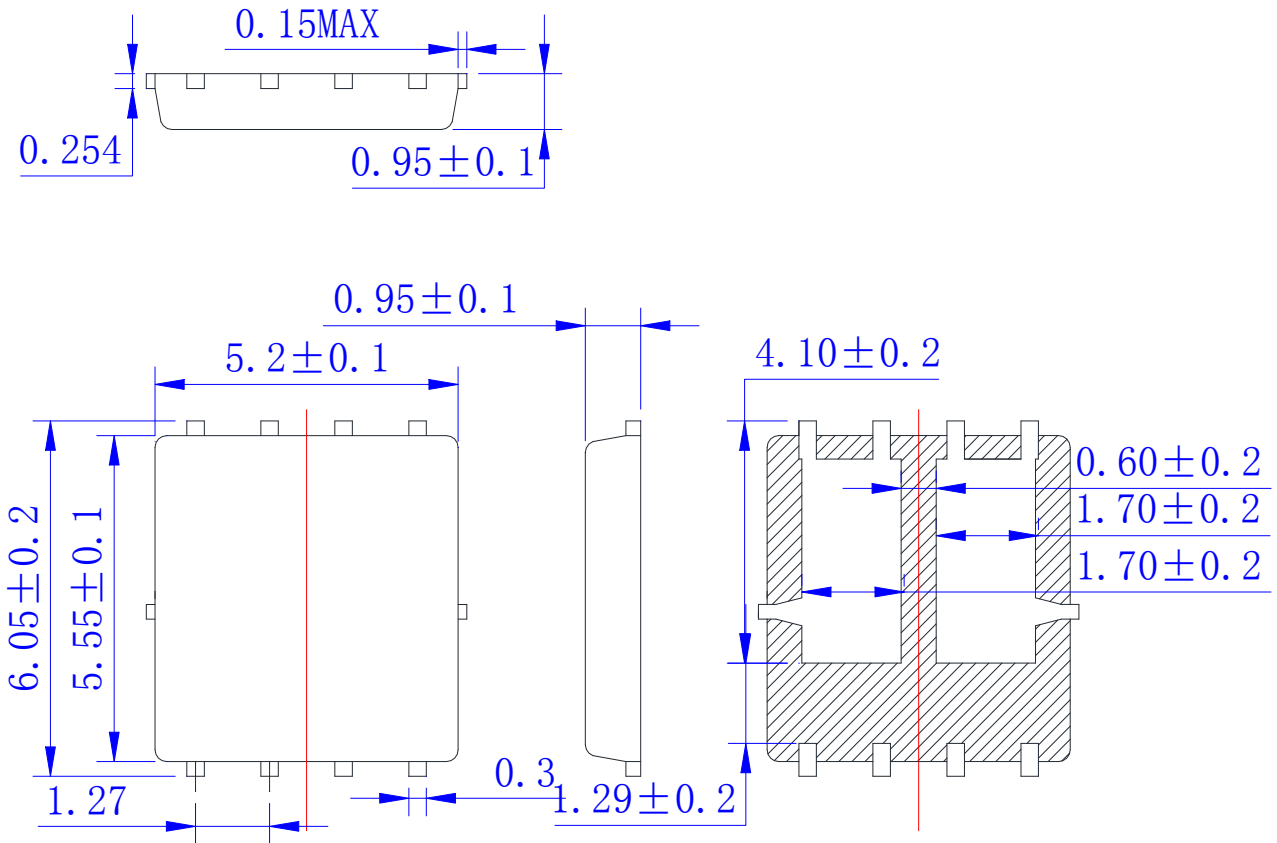


On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



DFN5X6 PACKAGE OUTLINE DIMENSIONS



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