Din-Tek SEMICONDUCTOR

DTS6034

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Dual N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A)	Q_g (nC) TYP.
60	1.0 at V_{GS} = 10 V	0.55	1.5
	1.4 at V_{GS} = 4.5 V	0.37	

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g tested
- PWM Optimized
- Compliant to RoHS Directive 2002/95/EC

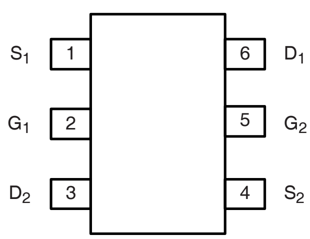
Pb-free

RoHS COMPLIANT

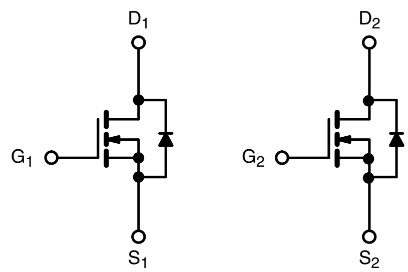
APPLICATIONS

- LED Inverter Circuits
- DC/DC Conversion Circuits
- Motor drives
- Low power load switch

SOT-323-6



Top View



N-Channel MOSFET N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	0.55	A
	T_C = 70 °C		0.42	
	T_A = 25 °C		0.34 [b, c]	
	T_A = 70 °C		0.27 [b, c]	
Pulsed Drain Current		I_{DM}	1.7	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	0.55	
	T_A = 25 °C		0.32 [b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	0.73	W
	T_C = 70 °C		0.47	
	T_A = 25 °C		0.45 [b, c]	
	T_A = 70 °C		0.29 [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 ≤ 5 s	R_{thJA}	300	400	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	210	300	

Notes

a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 5 s.
d. Maximum under steady state conditions is 400 °C/W.

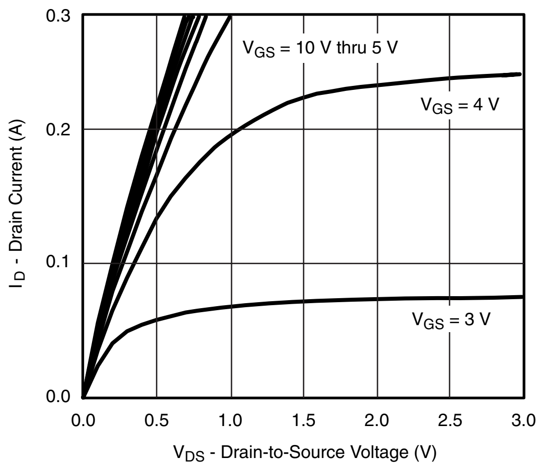
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA		56.7		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-3		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1		3	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 10 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			1	µA
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 85 °C			10	
On-State Drain Current [a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	0.55			A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.2 A		1.0	1.5	Ω
		V_{GS} = 4.5 V, I_D = 0.2 A		1.4	2.0	
Forward Transconductance	g_{fs}	V_{DS} = 10 V, I_D = 0.2 A		195		ms
Dynamic [b]						
Input Capacitance	C_{iss}	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz		48.5		pF
Output Capacitance	C_{oss}			16		
Reverse Transfer Capacitance	C_{rss}			8		
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.2 A		1.9	3.4	nC
		V_{DS} = 30 V, V_{GS} = 4.5 V, I_D = 0.2 A		1.5	2.5	
Gate-Source Charge	Q_{gs}			0.3		
Gate-Drain Charge	Q_{gd}			0.25		
Gate Resistance	R_g	f = 1 MHz		160		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 100 Ω, $I_D \cong$ 0.2 A, V_{GEN} = 10 V, R_g = 1 Ω		6.5		ns
Rise Time	t_r			12		
Turn-Off Delay Time	$t_{d(off)}$			13		
Fall Time	t_f			14		
Drain-Source Body Diode Characteristics						
Continuous Sorce-Drain Diode Current	I_S	T_C = 25 °C			0.55	A
Pulse Diode Forward Current [a]	I_{SM}				1.7	
Body Diode Voltage	V_{SD}	I_S = 0.2 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 0.2 A, dI/dt = 100 A/µs		16.5	25	ns
Body Diode Reverse Recovery Charge	Q_{rr}			13	20	nC
Reverse Recovery Fall Time	t_a			13.5		ns
Reverse Recovery Rise Time	t_b			3		

Notes

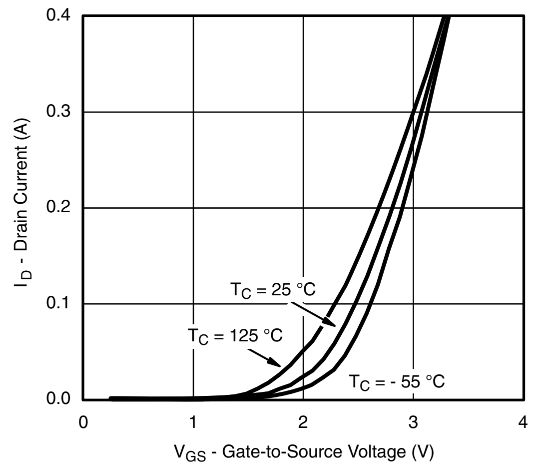
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

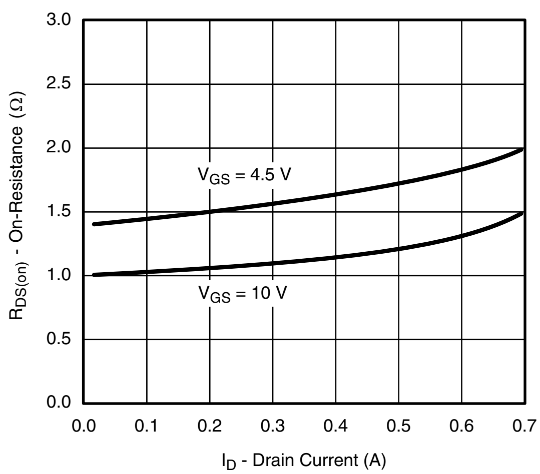
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



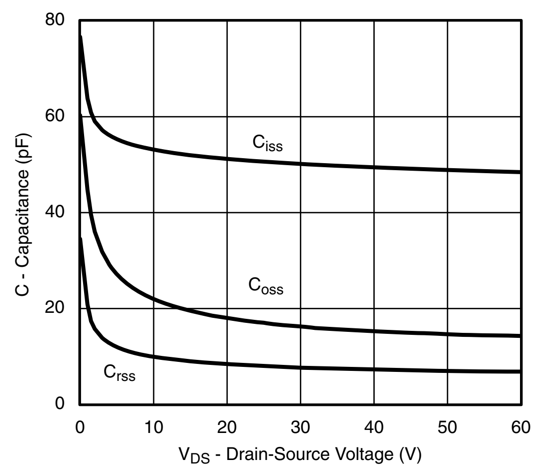
Output Characteristics



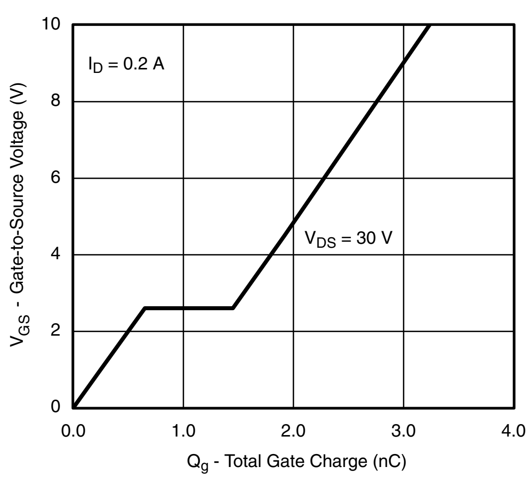
Transfer Characteristics Curves vs. Temperature



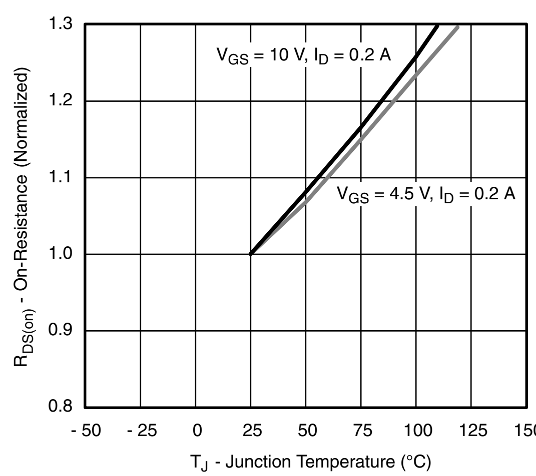
On-Resistance vs. Drain Current



Capacitance

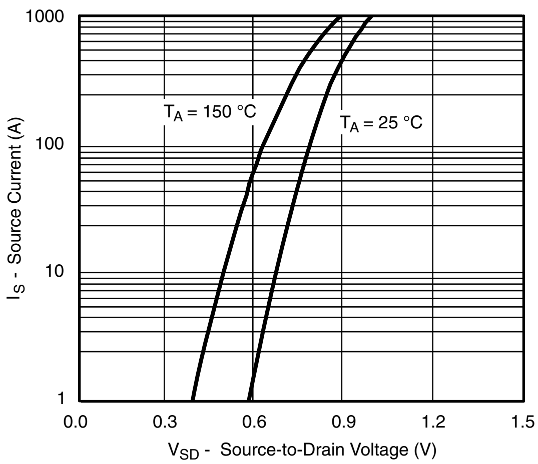


Gate Charge

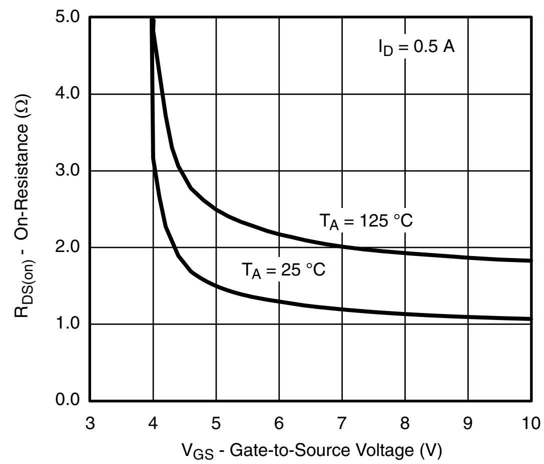


On-Resistance vs. Junction Temperature

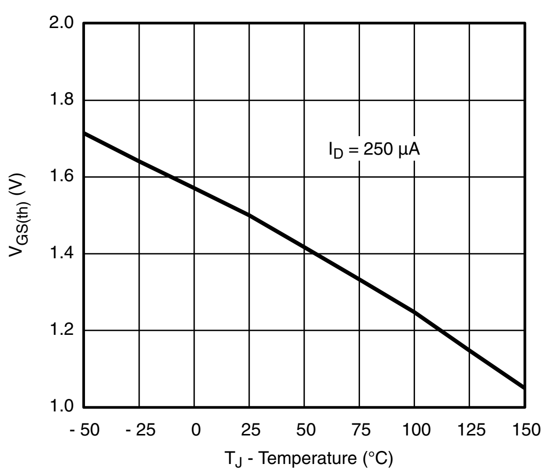
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



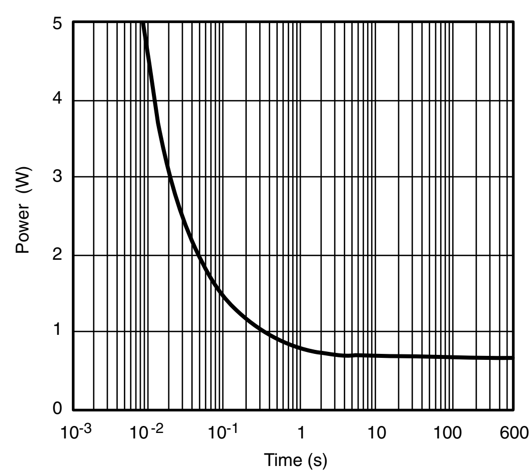
Source-Drain Diode Forward Voltage



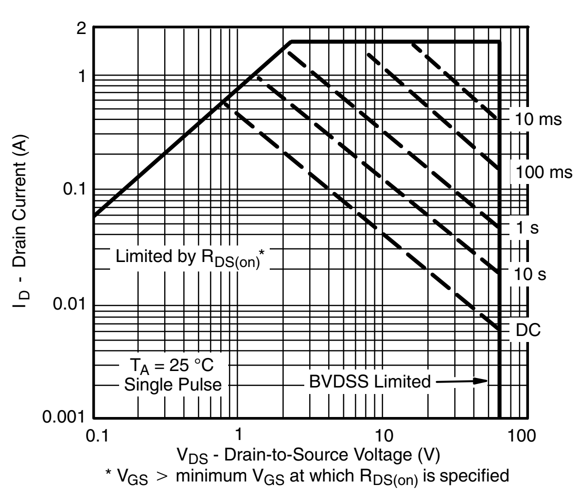
$R_{DS(on)}$ vs. V_{GS} vs. Temperature



Threshold Voltage

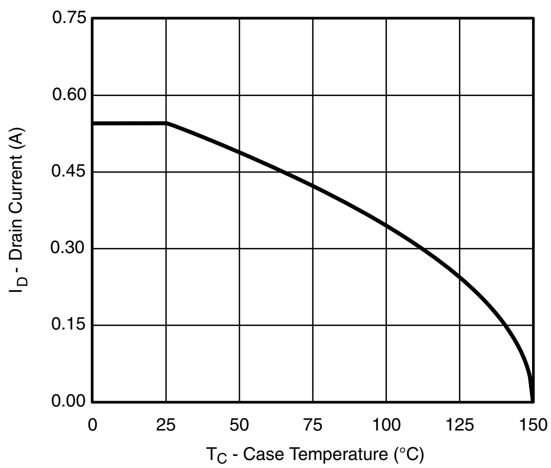


Single Pulse Power

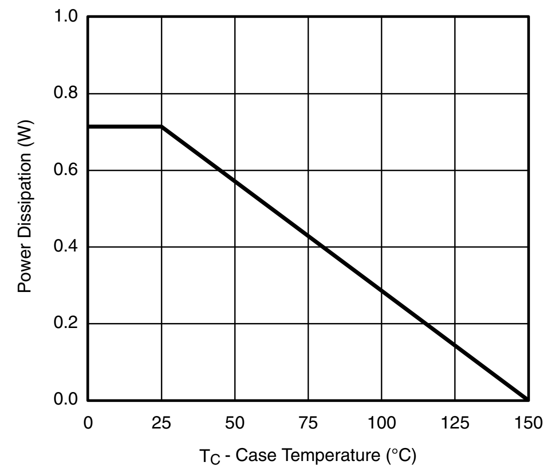


Safe Operating Area

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



Current Derating [a]

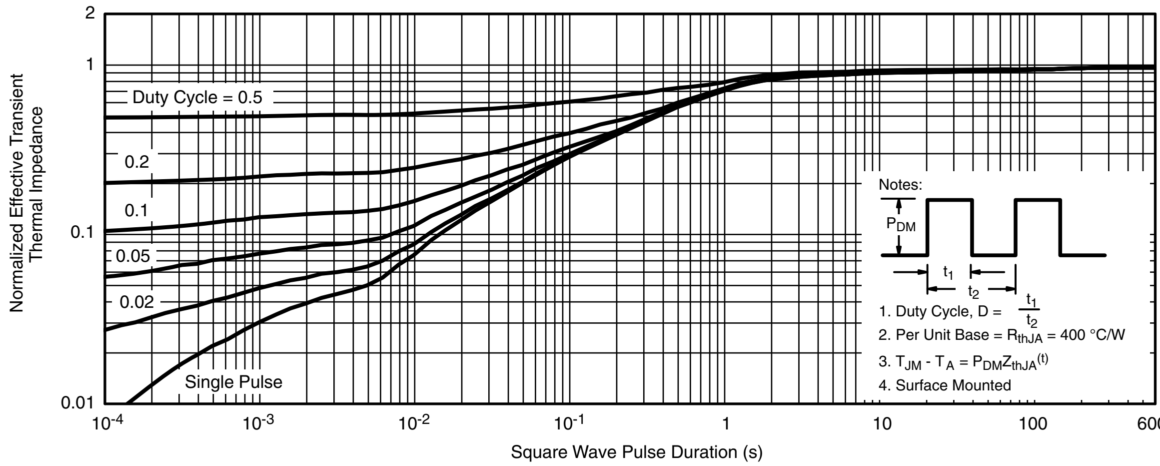


Power Derating

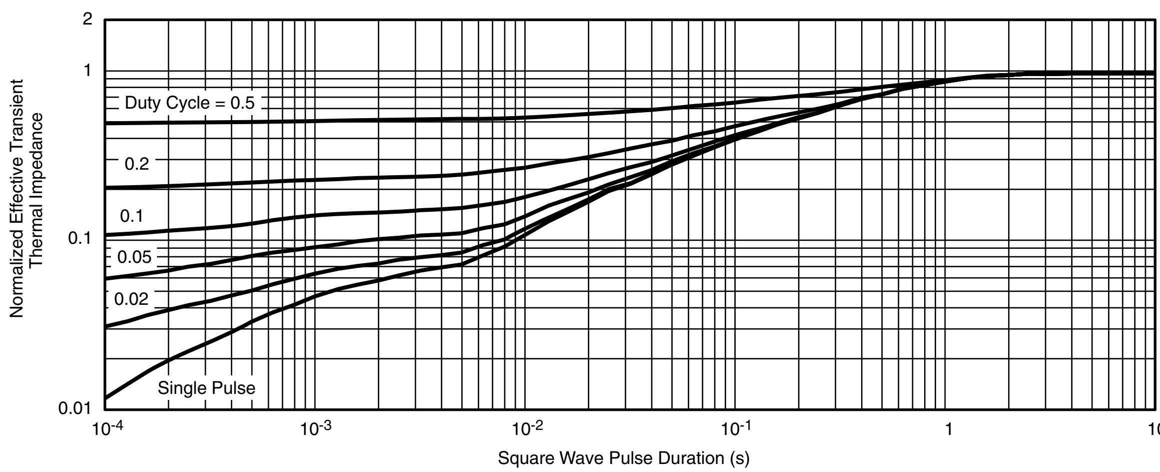
Note

a. 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 (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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