

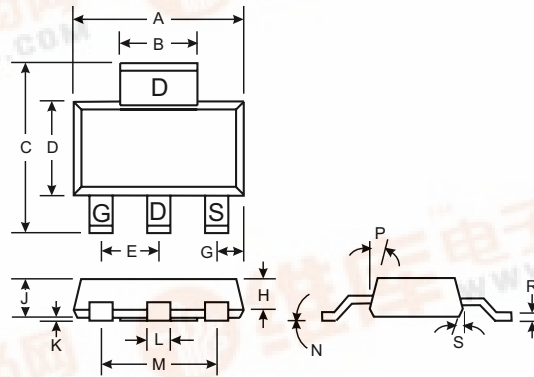


DT014L

N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Features

- High Cell Density DMOS Technology
- Low On-State Resistance
- High Power and Current Capability
- Fast Switching Speed
- High Transient Tolerance



SOT-223		
Dim	Min	Max
A	6.30	6.71
B	2.90	3.10
C	6.71	7.29
D	3.30	3.71
E	2.22	2.35
G	0.92	1.00
H	1.10	1.30
J	1.55	1.80
K	0.025	0.102
L	0.66	0.79
M	4.55	4.70
N	—	10°
P	10°	16°
R	0.254	0.356
S	10°	16°
All Dimensions in mm		

Mechanical Data

- SOT-223 Plastic Case
- Terminal Connections: See Outline Drawing and Internal Circuit Diagram Above

Maximum Ratings

25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	± 2.6	A
Note 1a Continuous		± 10	
Maximum Power Dissipation	P_d	3.0	W
Note 1 a		1.3	
Note 1 b		1.1	
Operating and Storage Temperature Range	T_j, T_{STG}	-65 to +150	°C

Thermal Characteristics

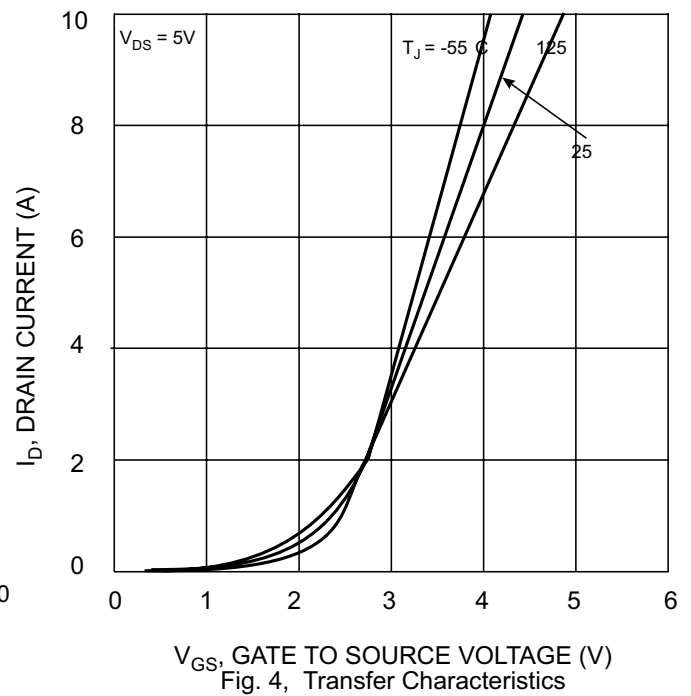
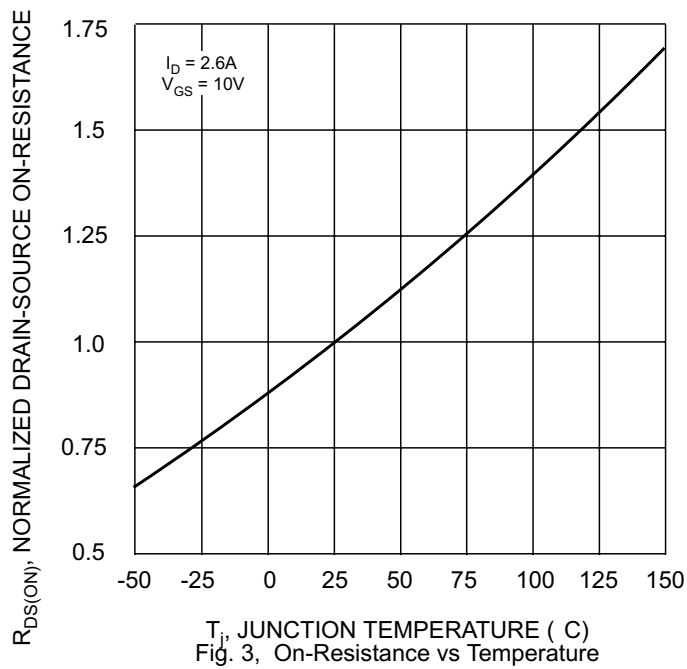
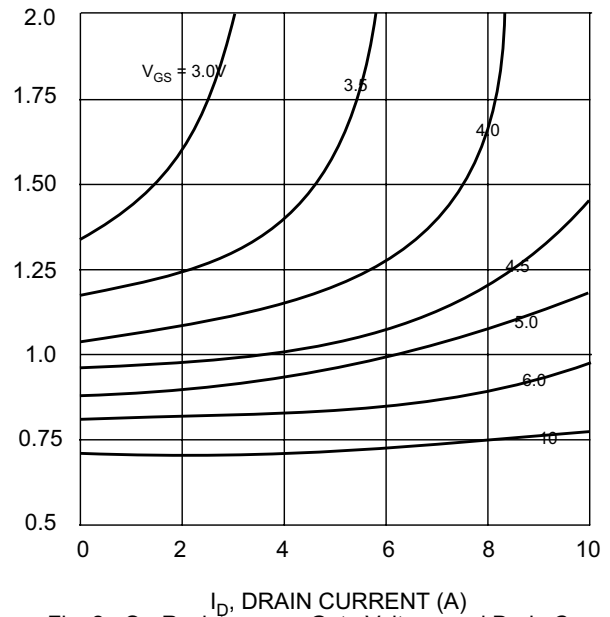
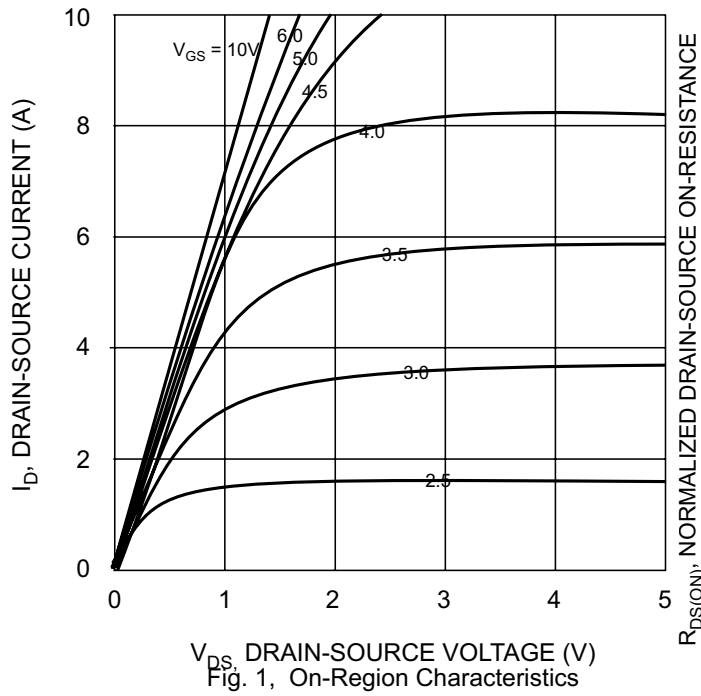
Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	42	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	12	°C/W

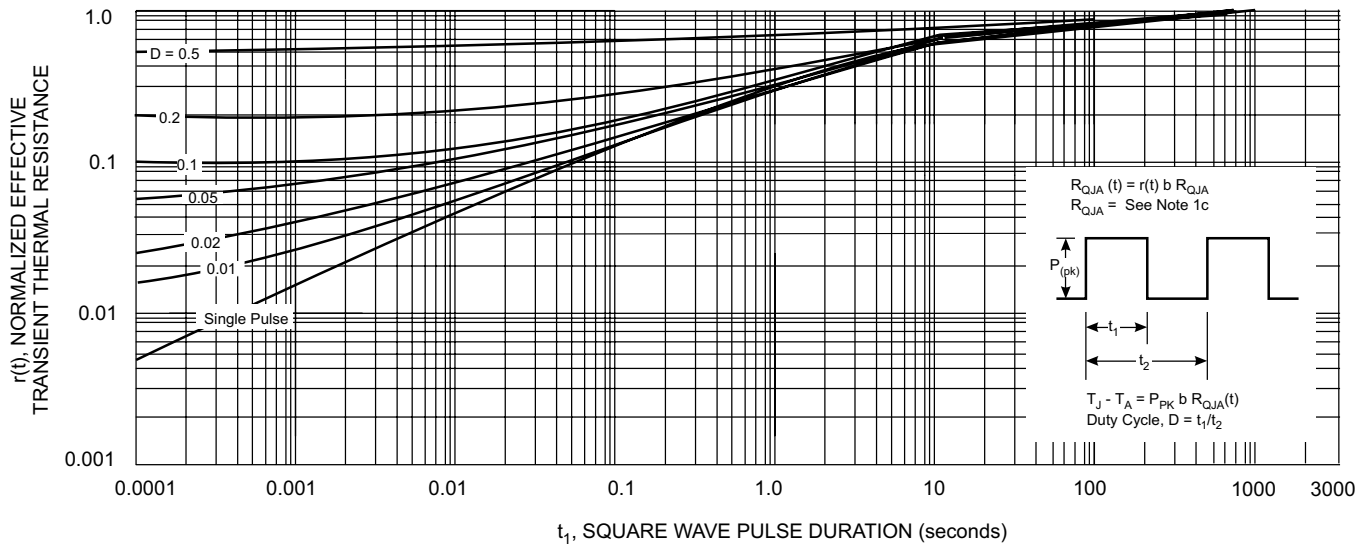
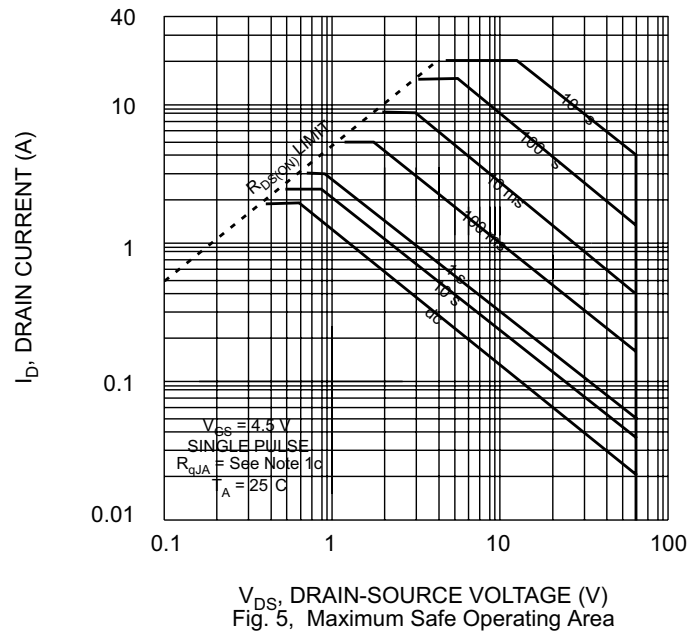
- Notes:
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.
 - 1a. With 1 in² oz 2 oz. copper mounting pad $R_{\theta JA} = 42^\circ\text{C/W}$.
 - 1b. With 0.0066 in² oz 2 oz. copper mounting pad $R_{\theta JA} = 95^\circ\text{C/W}$.
 - 1c. With 0.0123 in² oz 2 oz. copper mounting pad $R_{\theta JA} = 110^\circ\text{C/W}$.

Electrical Characteristics 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _j = 55°C	I _{DSS}	—	—	25 250	μA	V _{DS} = 60V, V _{GS} = 0V
Gate-Body Leakage, Forward	I _{GSSF}	—	—	100	nA	V _{GS} = 20V, V _{DS} = 0V
Gate-Body Leakage, Reverse	I _{GSSR}	—	—	-100	nA	V _{GS} = -20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage T _j = 125°C	V _{GS(th)}	1.0 0.8	1.5 1.2	3.0 2.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance T _j = 125°C	R _{DS (ON)}	—	0.17 0.25 0.12	0.2 0.36 0.16	Ω	V _{GS} = 4.5V, I _D = 2.6A V _{GS} = 4.5V, I _D = 2.6A V _{GS} = 10V, I _D = 3.4A
On-State Drain Current	I _{D(ON)}	5.0 10	—	—	A	V _{GS} = 4.5, V _{DS} = 5.0V V _{GS} = 10V, V _{DS} = 5.0V
Forward Transconductance	g _{FS}	—	4.0	—	m	V _{GS} = 5.0V, I _D = 2.6A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	—	214	—	pF	V _{DS} = 30V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{OSS}	—	70	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	27	—	pF	
SWITCHING CHARACTERISTICS (Note 2)						
Turn-On Delay Time	t _{D(ON)}	—	6.0	12	ns	V _{DD} = 30V, I _D = 3.0A V _{GEN} = 10V, R _{GEN} = 12Ω
Turn-On Rise Time	t _r	—	14	25	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	15	28	ns	
Turn-Off Fall Time	t _f	—	10	18	ns	
Total Gate Charge	Q _g	—	3.6	5.0	nC	V _{DS} = 10V, I _D = 2.6A. V _{GS} = 4.5V
Gate-Source Charge	Q _{gs}	—	0.8	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.4	—	nC	
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Max Continuous Drain-Source Diode Forward Current	I _S	—	—	2.3	A	
Drain-Source Diode Forward Voltage (Note 2)	V _{SD}	—	0.85	1.3	V	V _{GS} = 0V, I _S = 2.3A
Reverse Recovery Time	t _{rr}	—	—	140	ns	V _{GS} = 0V, I _F = 2.3A, dI _F / dt = 100 A/μs

Notes: 2. Pulse Test: Pulse width $\geq 300\mu s$, duty cycle $\leq 2.0\%$.





Remark: Thermal characterization performed under conditions described in note 1c. Transient thermal response will change depending on the circuit board design.