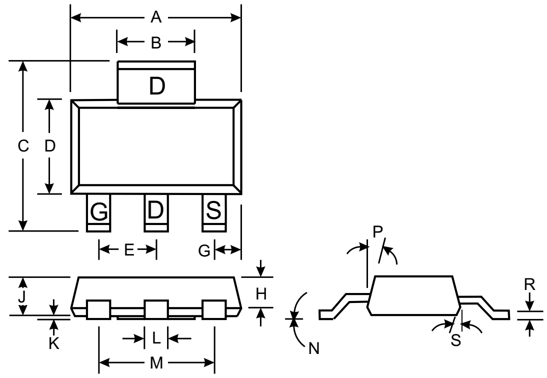
DT453N

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_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Note 1a Continuous Pulsed	I_D	±8 ±15	A
Maximum Power Dissipation	Note 1a Note 1b Note 1c	P_d	3.0 1.3 1.1	W
Operating and Storage Temperature Range		T_j, T_{STG}	-65 to +150	°C

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	Note 1	$R_{\Theta JA}$	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 in^2 oz 2 oz. copper mounting pad $R_{\Theta JA}$ = 42°C/W.

1b. With 0.0066 in^2 oz 2 oz. copper mounting pad $R_{\Theta JA}$ = 95°C/W.

1c. With 0.0123 in^2 oz 2 oz. copper mounting pad $R_{\Theta JA}$ = 110°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}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current $T_{j=125°C}$	IDSS	—	—	1.0 10	µA	V_{DS} = 24V, 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 0.7	2.0 1.5	3.0 2.2	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance T_j = 125°C	$R_{DS\ (ON)}$	—	0.022 0.03 0.035 0.047	0.028 0.045 0.042 0.075	Ω	V_{GS} = 10V, I_D = 8.0A V_{GS} = 4.5V, I_D = 6.7A
On-State Drain Current	$I_{D(ON)}$	15 10	—	—	A	VGS = 10V, VDS = 5.0V VGS = 4.5V, VDS = 5.0V
Forward Transconductance	g_{FS}	—	14	—	m	V_{DS} = 15V, I_D = 8.0A
DYNAMIC CHACTERISTICS						
Input Capacitance	C_{ISS}	—	890	—	pF	V_{DS} = 15V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{OSS}	—	560	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	190	—	pF	
SWITCHING CHARACTERISTICS (Note 2)						
Turn-On Delay Time	$t_{D(ON)}$	—	10	15	ns	V_{DD} = 25V, I_D = 1.0A V_{GEN} = 10V, R_{GEN} = 6.0Ω
Turn-On Rise Time	t_r	—	20	35	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	40	50	ns	
Turn-Off Fall Time	t_f	—	35	50	ns	
Total Gate Charge	Q_g	—	28	35	nC	V_{DS} = 15V, I_D = 8.0A. V_{GS} = 10V
Gate-Source Charge	Q_{gs}	—	4.5	—	nC	
Gate-Drain Charge	Q_{gd}	—	9.5	—	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	V_{SD}	—	0.8	1.3	V	V_{GS} = 0V, I_S = -8.0A (Note 2)
Reverse Recovery Time	t_{rr}	—	—	100	ns	V_{GS} = 0V, I_F = 2.0A dI_p/dt = 100 A/µs

Notes: 2. Pulse Test: Pulse width ≤ 300µs, duty cycle ≤ 2.0%.

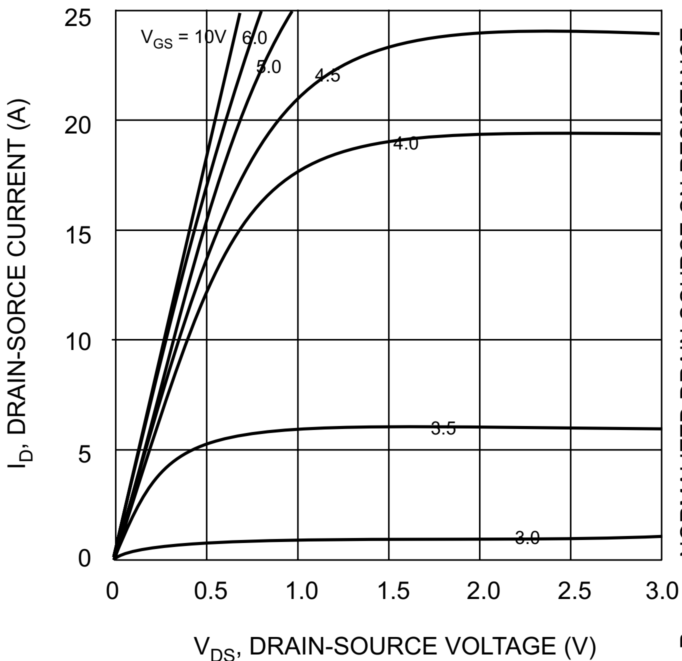


Fig. 1, On-Region Characteristics

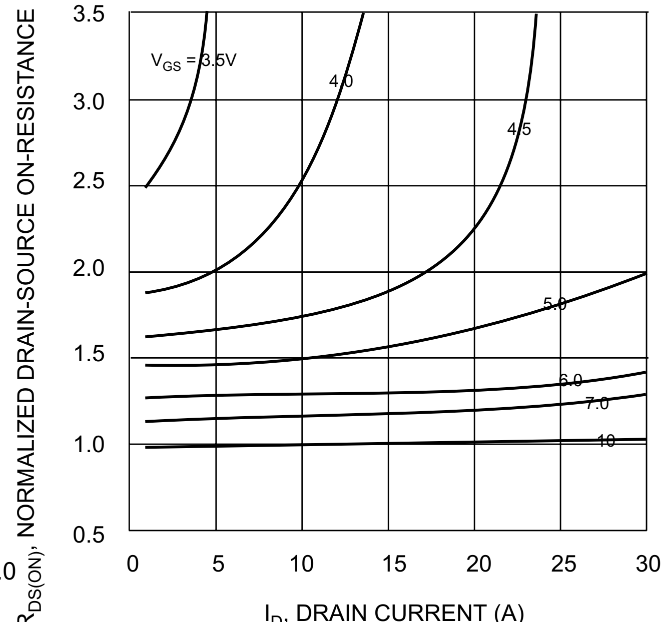


Fig. 2, On-Resistance vs Gate Voltage and Drain Current

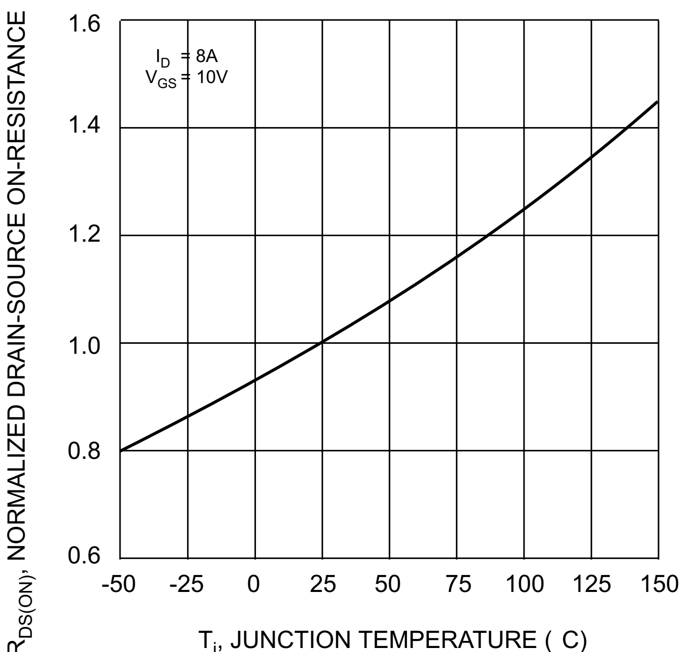


Fig. 3, On-Resistance vs Temperature

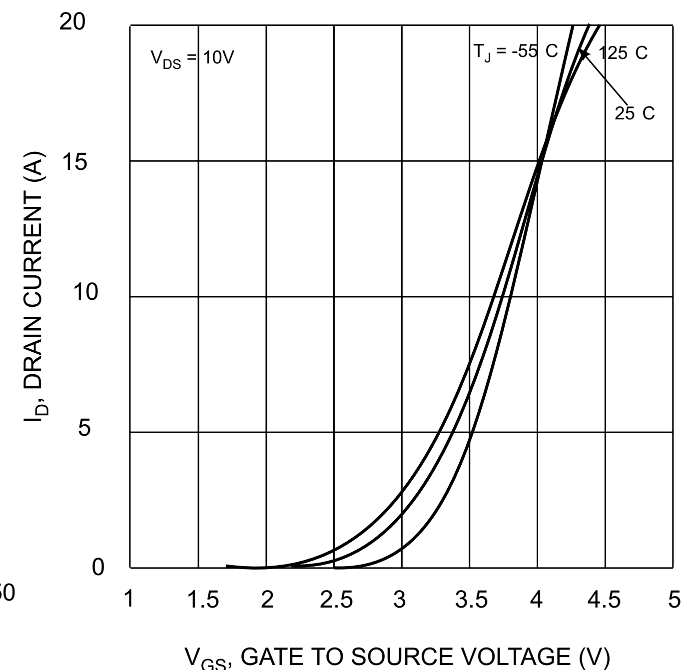


Fig. 4, Transfer Characteristics

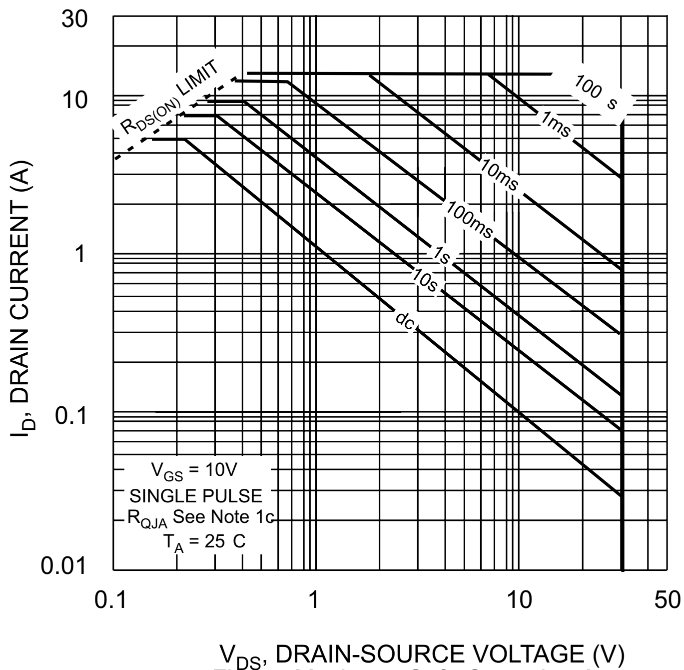


Fig. 5, Maximum Safe Operating Area

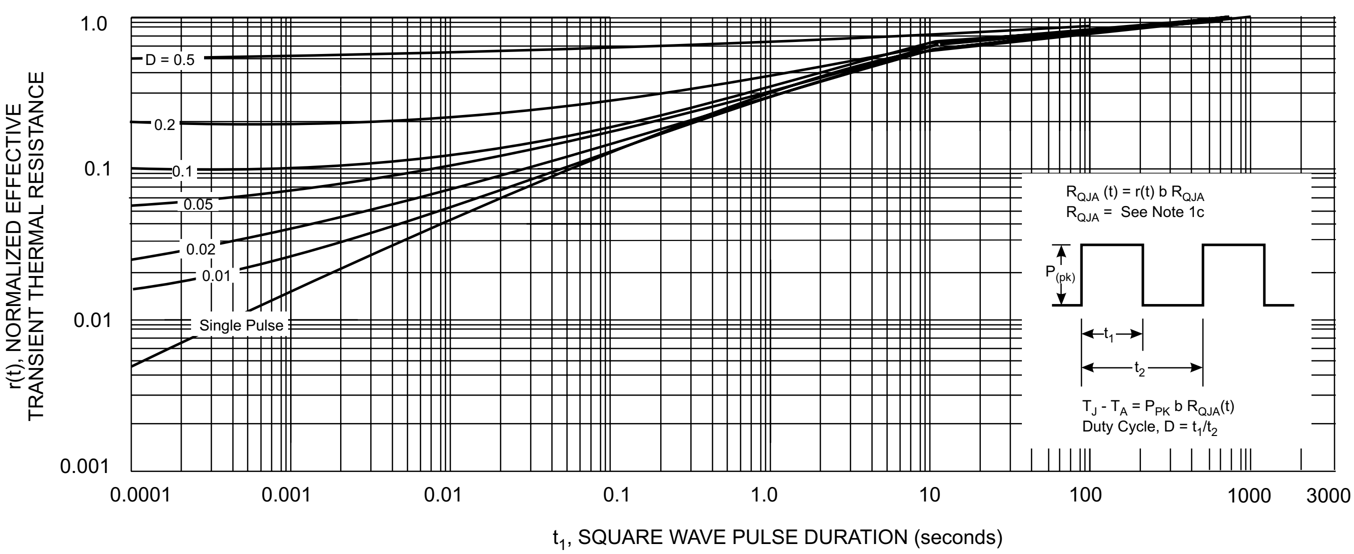


Fig. 6, Typical Normalized Transient Thermal Impedance Curves

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