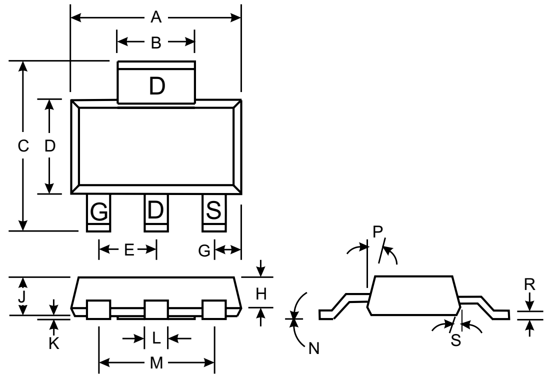
DT452AP

P-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	-5.0 -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 0.066 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 = 55°C	I_{DSS}	—	—	-1.0 -10	µA	VDS = -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	$V_{GS(th)}$ $V_{GS(th)}$	-1.0 -0.7	-1.6 -1.2	-2.8 -2.2	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance T_j = 125°C	$R_{DS\ (ON)}$ $R_{DS\ (ON)}$ $R_{DS\ (ON)}$	— — —	0.052 0.075 0.085	0.065 0.13 0.10	Ω	V_{GS} = -10V, I_D = -5.0A V_{GS} = -10V, I_D = -5.0A V_{GS} = -4.5V, I_D = -4.3A
On-State Drain Current	$I_{D(ON)}$	-15 -5.0	—	—	A	V_{GS} = -10V, V_{DS} = -5 .0V V_{GS} = -4.5V, V_{DS} = -5 .0V
Forward Transconductance	g_{FS}	—	7.0	—	m	V_{DS} = -10V, I_D = -5.0A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	—	690	—	pF	V_{DS} = -15V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{OSS}	—	430	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	160	—	pF	
SWITCHING CHARACTERISTICS (Note 2)						
Turn-On Delay Time	$t_{D(ON)}$	—	9.0	20	ns	V_{DD} = -10V, I_D = -1.0A V_{GEN} = -10V, R_{GEN} = 6.0Ω
Turn-On Rise Time	t_r	—	20	30	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	40	50	ns	
Turn-Off Fall Time	t_f	—	19	40	ns	
Total Gate Charge	Q_g	—	22	30	nC	V_{DS} = -10V. I_D = -5.0A. V_{GS} = -10V
Gate-Source Charge	Q_{gs}	—	3.2	—	nC	
Gate-Drain Charge	Q_{gd}	—	5.2	—	nC	
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Max Continuous Drain-Source Diode Forward Current	I_S	—	—	-2.5	A	
Drain-Source Diode Forward Voltage	V_{SD}	—	-0.85	-1.2	V	V_{GS} = 0V, I_S = -2.5A (Note 2)

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

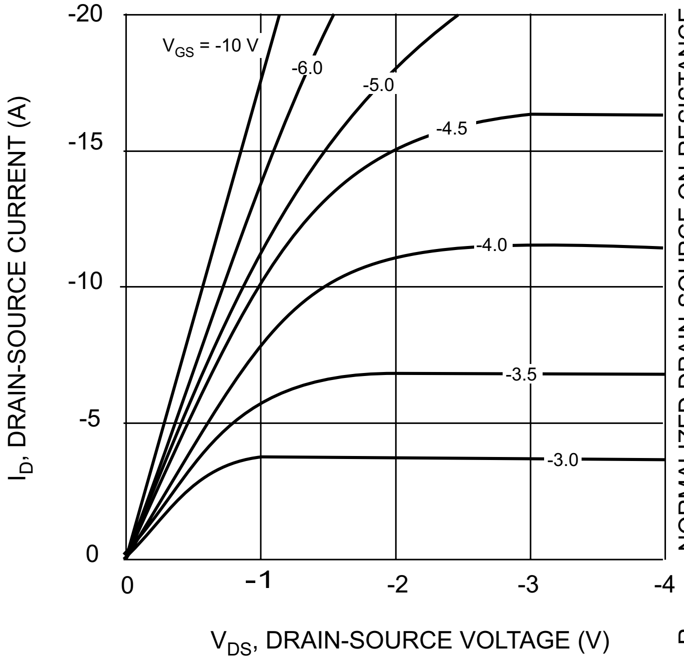


Fig. 1, On-Region Characteristics

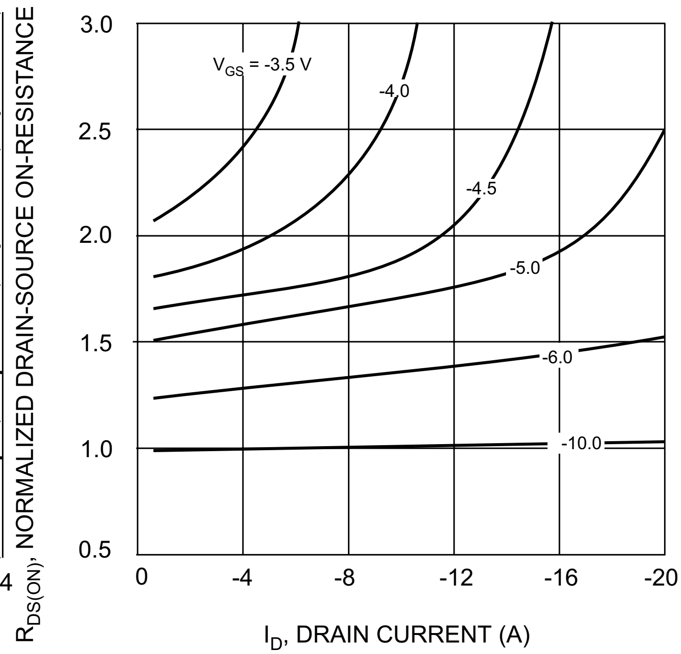


Fig. 2, On-Resistance vs Gate Voltage & Drain Current

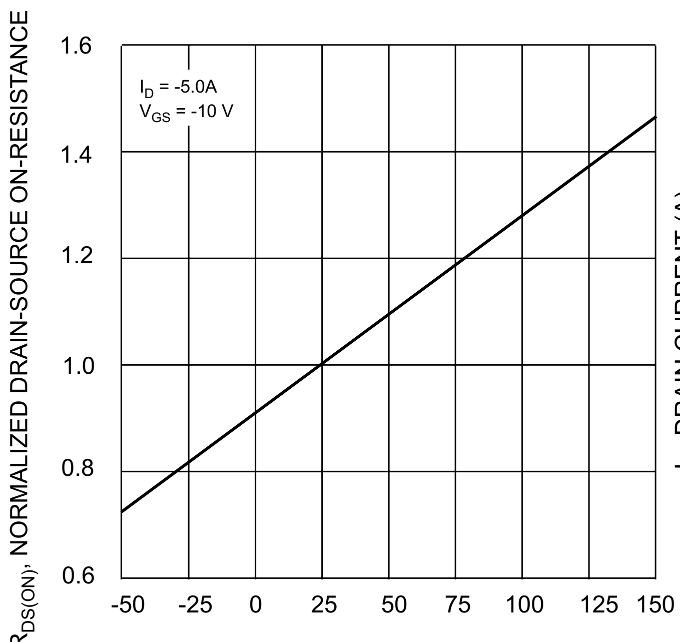


Fig. 3, On-Resistance vs Junction Temperature

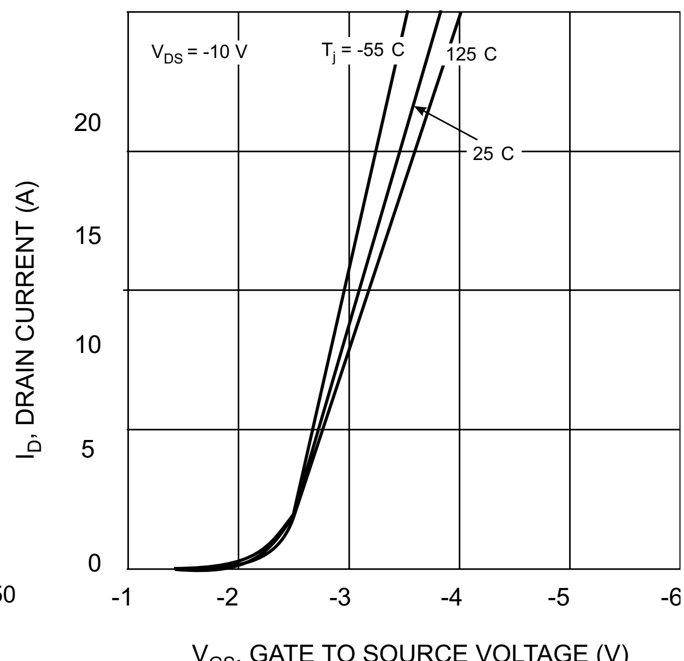


Fig. 4, Transfer Characteristics

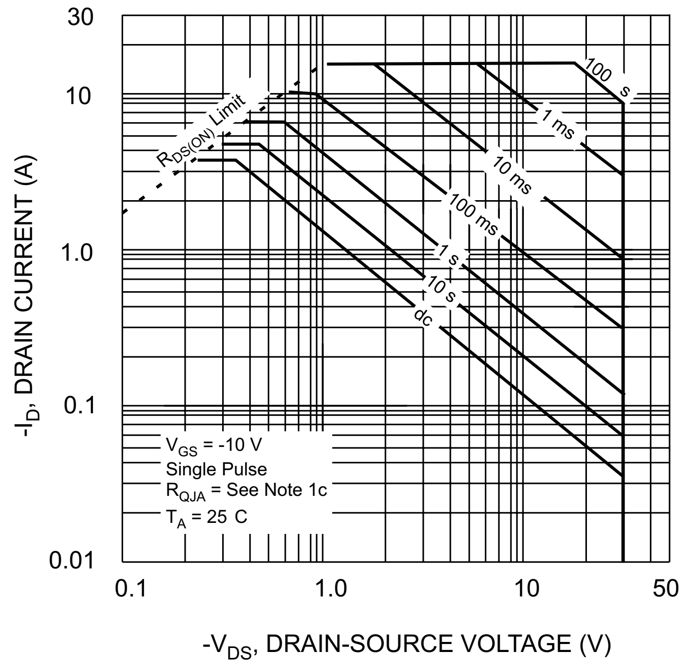


Fig. 5, Maximum Safe Operating Area

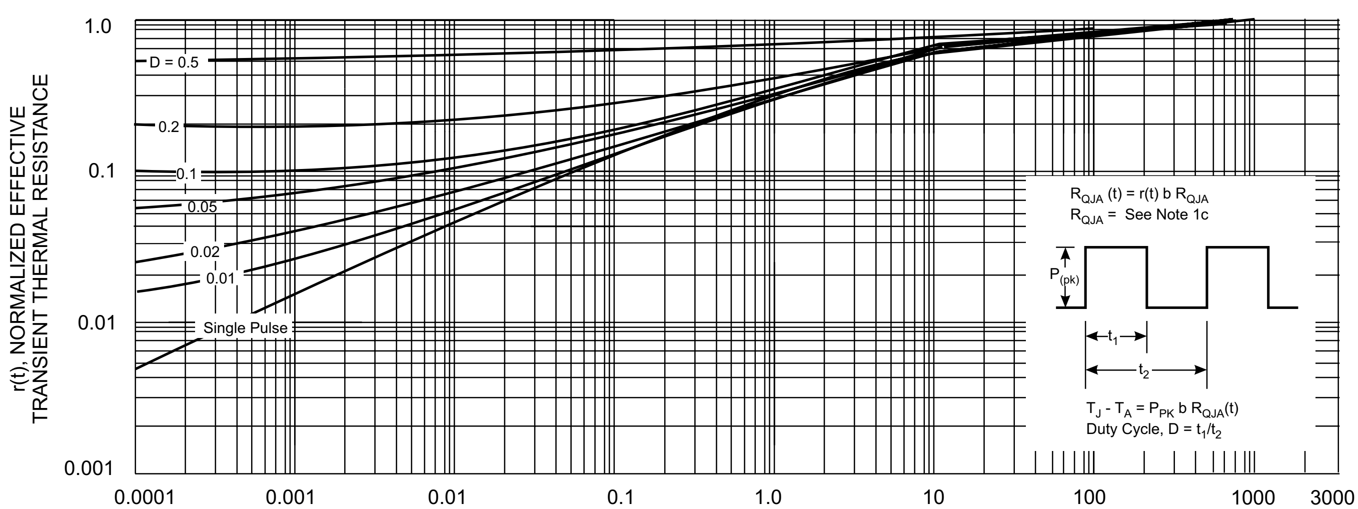


Fig. 6, Typical Normalized Transient Thermal Impedance Curves

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