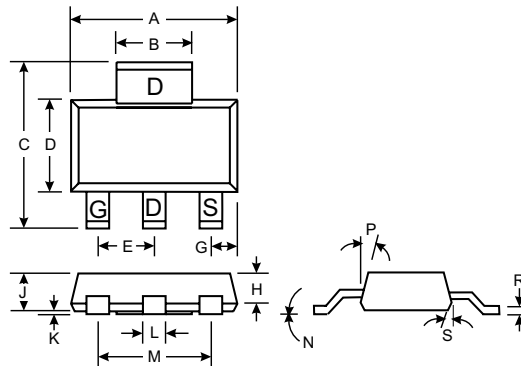


N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

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}	30	V
Gate-Source Voltage	V_{GS}	20	V
Drain Current	I_D	± 11.5 ± 40	A
Maximum Power Dissipation	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	$R_{\theta JA}$	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 Conditions
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current $T_j = 55^{\circ}C$	$IDSS$	—	—	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 $T_j = 125^{\circ}C$	$V_{GS(th)}$	1.0 0.7	1.5 0.9	3.0 2.2	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance $T_j = 125^{\circ}C$	$R_{DS(ON)}$	—	0.013 0.019 0.018	0.015 0.03 0.02	Ω	$V_{GS} = 10V, I_D = 11.5A$ $V_{GS} = 10V, I_D = 11.5A$ $V_{GS} = 4.5V, I_D = 10A$
On-State Drain Current	$I_{D(ON)}$	30 15	—	—	A	$V_{GS} = 10V, V_{DS} = 5.0V$ $V_{GS} = 4.5V, V_{DS} = 5.0V$
Forward Transconductance	g_{FS}	—	26	—	m	$V_{DS} = 10V, I_D = 11.5A$
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	—	1220	—	pF	$V_{DS} = 15V, V_{GS} = 0V$ $f = 1.0MHz$
Output Capacitance	C_{OSS}	—	715	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	280	—	pF	
SWITCHING CHARACTERISTICS (Note 2)						
Turn-On Delay Time	$t_{D(ON)}$	—	11	20	ns	$V_{DD} = 15V, I_D = 1.0A$ $V_{GEN} = 10V, R_{GEN} = 6.0\Omega$
Turn-On Rise Time	t_r	—	16	30	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	48	80	ns	
Turn-Off Fall Time	t_f	—	40	70	ns	
Total Gate Charge	Q_g	—	46	61	nC	$V_{DS} = 10V, I_D = 11.5A.$ $V_{GS} = 10V$
Gate-Source Charge	Q_{gs}	—	4.0	—	nC	
Gate-Drain Charge	Q_{gd}	—	11	—	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}	—	0.845	1.2	V	$V_{GS} = 0V, I_S = 2.5A$ (Note 2)
Reverse Recovery Time	t_{rr}	—	—	140	ns	$V_{GS} = 0V, I_F = 2.5A$ $di_F/dt = 100 A/\mu s$

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

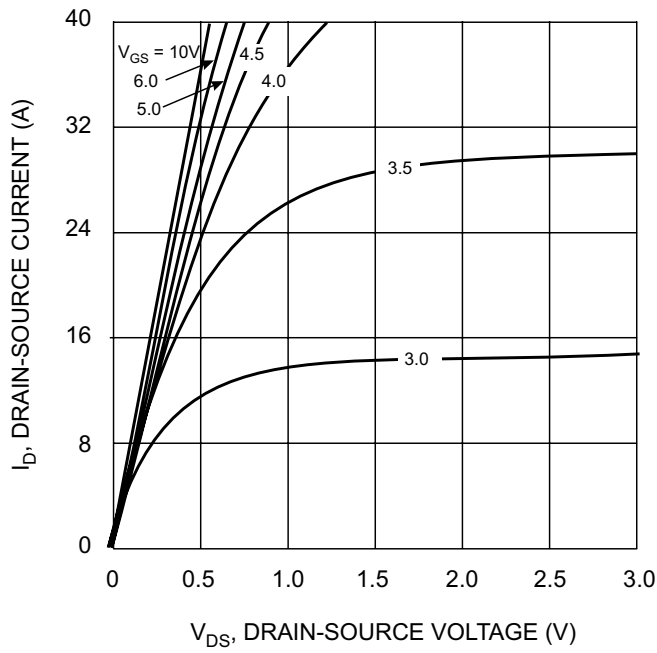


Fig. 1, On-Region Characteristics

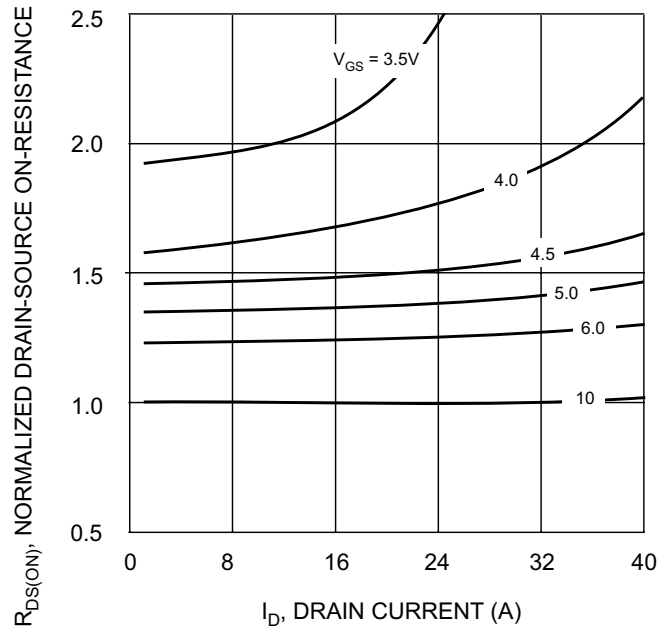


Fig. 2, On-Resistance vs Gate Voltage and Drain Current

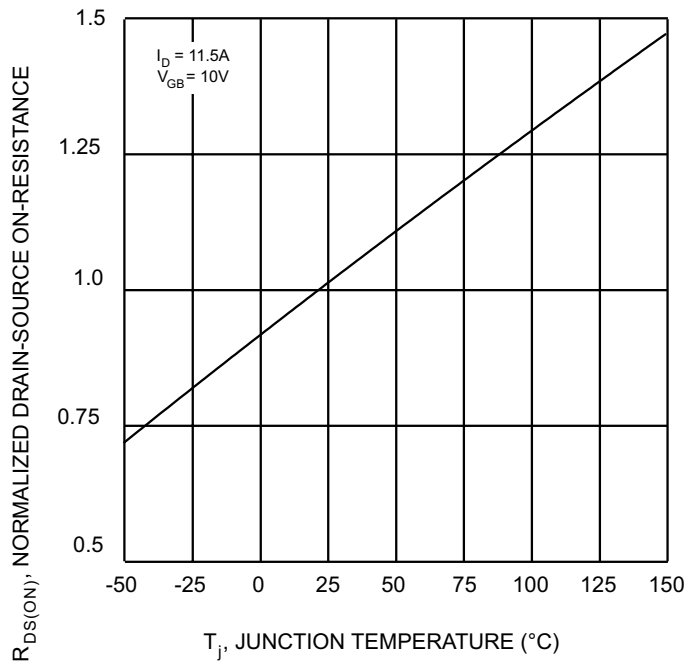


Fig. 3, On-Resistance vs Temperature

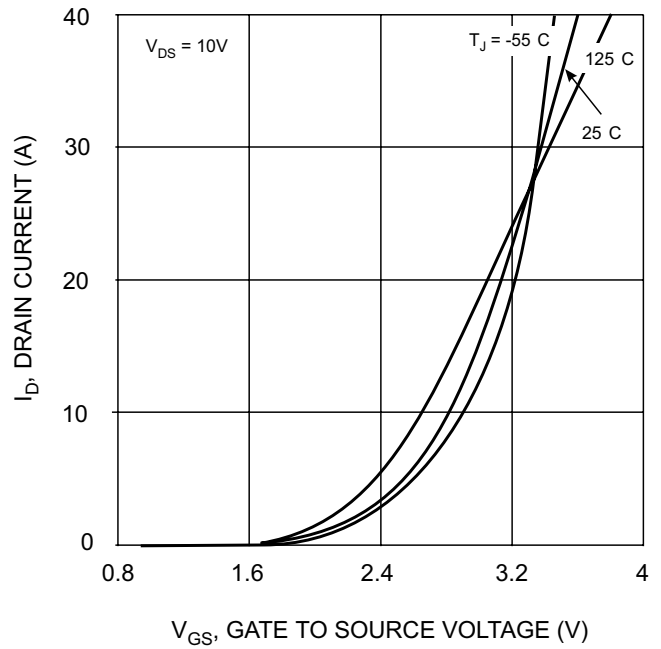


Fig. 4, Transfer Characteristics

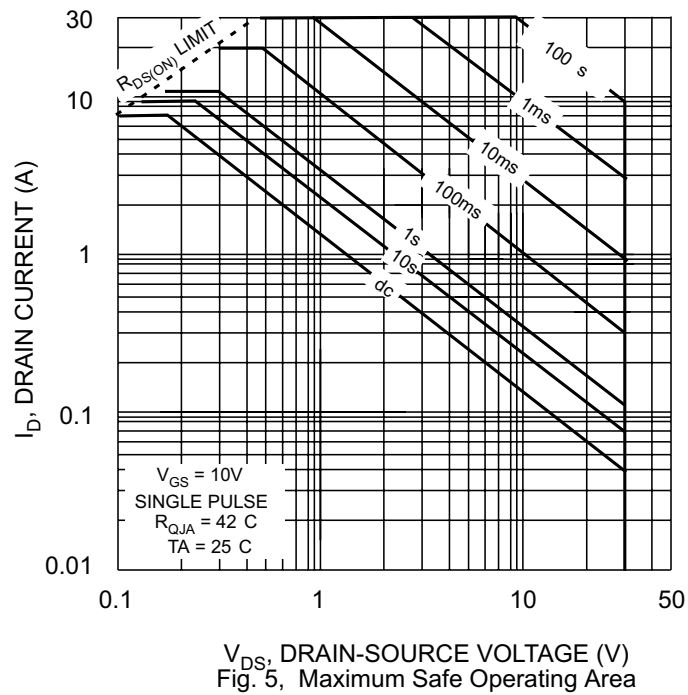


Fig. 5, Maximum Safe Operating Area

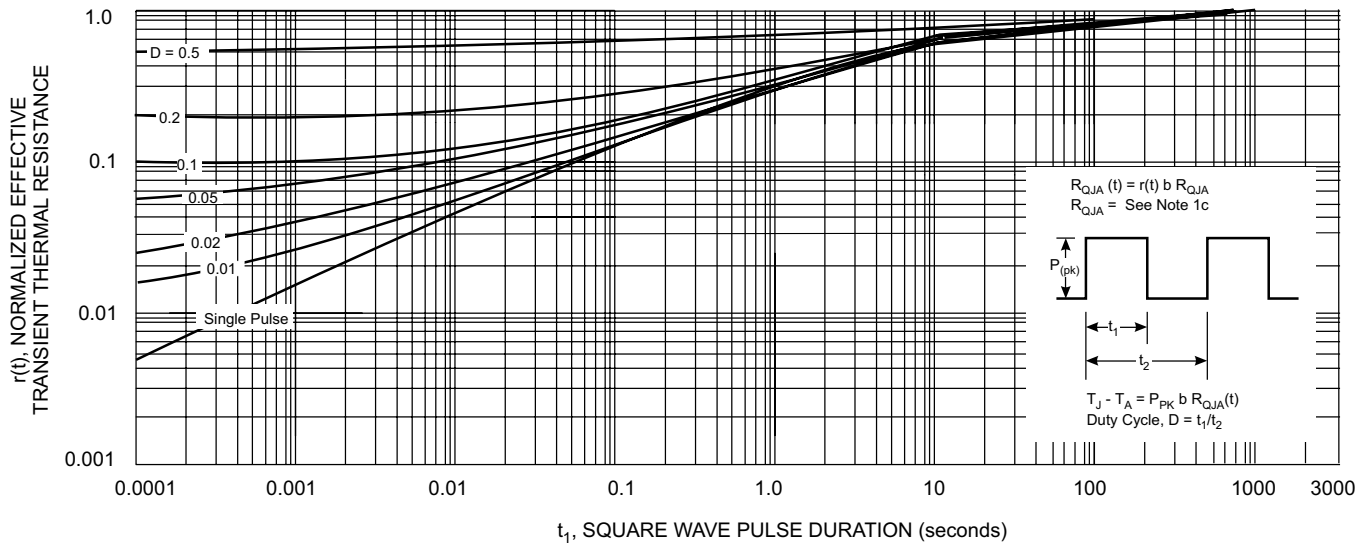


Fig. 6, Typical Normalized Transient Thermal Impedance Curves