

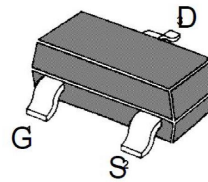
## N-Channel Enhancement Mode MOSFET

### Features

$R_{DS(ON)} \leq 2.3 \Omega @ V_{GS}=10V$

$R_{DS(ON)} \leq 2.7 \Omega @ V_{GS}=4.5V$

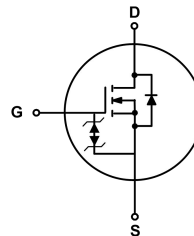
### SOT-23



### Applications

Portable appliances

### N-CHANNEL MOSFET



### Maximum ratings ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DS}$	Drain-Source Voltage	$T_A = 25^\circ\text{C}$	-	60	V
$V_{GS}$	Gate-Source Voltage	$T_A = 25^\circ\text{C}$	-	$\pm 20$	V
$I_D^*$	Drain Current	$T_A = 25^\circ\text{C}, V_{GS} = 10\text{V}$	-	0.5	A
$I_{DM}^{*,**}$	Pulsed Drain Current	$T_A = 25^\circ\text{C}, V_{GS} = 10\text{V}$	-	2.0	A
$P_{tot}^*$	Total Power Dissipation	$T_A = 25^\circ\text{C}$	-	0.83	W
		$T_A = 100^\circ\text{C}$	-	0.33	
$T_{stg}$	Storage Temperature		-55	150	$^\circ\text{C}$
$T_J$	Junction Temperature		-	150	$^\circ\text{C}$
$I_S^*$	Diode Forward Current	$T_A = 25^\circ\text{C}$	-	0.5	A
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	150	$^\circ\text{C} / \text{W}$

Notes :

\* Surface Mounted on 1 in<sup>2</sup> pad area,  $t \leq 10\text{ sec}$

\*\* Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$

**Electrical Characteristics ( TA = 25 °C Unless Otherwise Noted )**

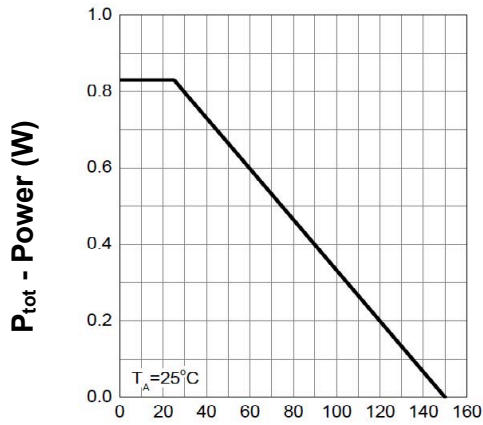
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = 250\ \mu\text{A}$	60	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{DS} = 250\ \mu\text{A}$	0.5	-	1.5	V
$I_{DSS}$	Drain Leakage Current	$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	$\mu\text{A}$
		$T_J = 85\text{ }^\circ\text{C}$	-	-	30	$\mu\text{A}$
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$	-	-	$\pm 10$	$\mu\text{A}$
$R_{DS(ON)}^a$	On-State Resistance	$V_{GS} = 10\text{ V}, I_{DS} = 0.5\text{ A}$	-	-	1.6	$\Omega$
		$V_{GS} = 4.5\text{ V}, I_{DS} = 0.1\text{ A}$	-	-	2.5	
<b>Diode Characteristics</b>						
$V_{SD}^a$	Diode Forward Voltage	$I_{SD} = 0.5\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 0.5\text{ A}, dI_{SD}/dt = 100\text{ A}/\mu\text{s}$	-	42	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	41	-	nC
<b>Dynamic Characteristics<sup>b</sup></b>						
$R_G$	Gate Resistance	$V_{GS} = V_{DS} = 0\text{ V}, F = 1\text{ MHz}$	-	100	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}$ Frequency = 1 MHz	-	22.8	-	pF
$C_{oss}$	Output Capacitance		-	3.5	-	
$C_{rss}$	Reverse Transfer Capacitance		-	2.9	-	
$t_d(on)$	Turn-on Delay Time	$V_{DS} = 30\text{ V}, V_{GEN} = 10\text{ V},$ $R_G = 25\ \Omega, R_L = 60\ \Omega,$ $I_{DS} = 0.5\text{ A}$	-	3.8	-	ns
$t_r$	Turn-on Rise Time		-	3.4	-	
$t_d(off)$	Turn-off Delay Time		-	19	-	
$t_f$	Turn-off Fall Time		-	12	-	
$Q_g$	Total Gate Charge	$V_{GS} = 4.5\text{ V}, V_{DS} = 10\text{ V},$ $I_{DS} = 0.5\text{ A}$	-	280	-	pC
$Q_{gs}$	Gate-Source Charge		-	82	-	
$Q_{gd}$	Gate-Drain Charge		-	201	-	

**Notes :**

- a : Pulse test ; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$   
b : Guaranteed by design, not subject to production testing

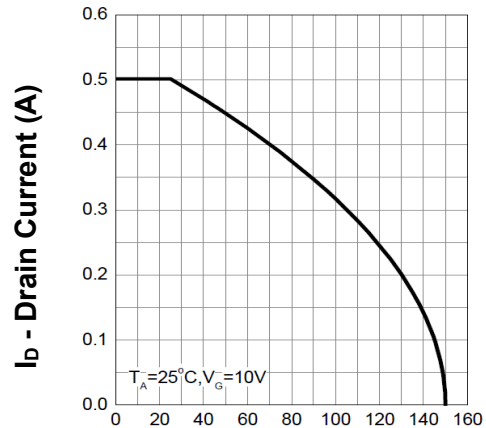
## Typical Characteristics

### Power Dissipation



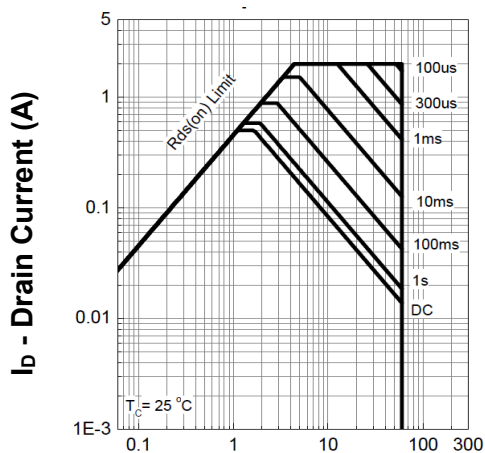
T<sub>j</sub> - Junction Temperature (°C)

### Drain Current



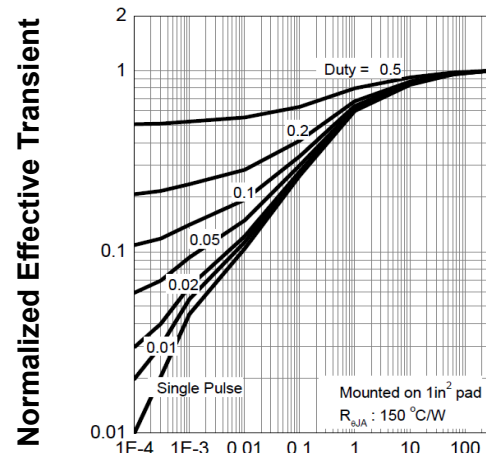
T<sub>j</sub> - Junction Temperature (°C)

### Safe Operation Area



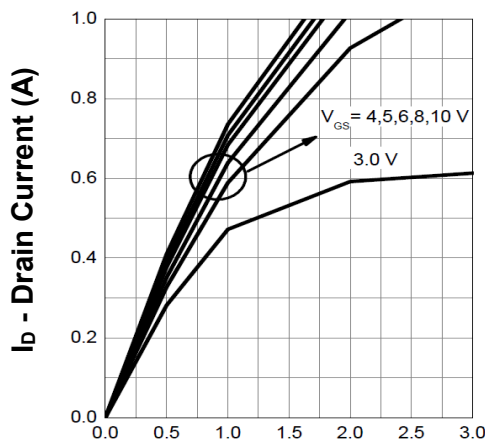
V<sub>DS</sub> - Drain-Source Voltage (V)

### Thermal Transient Impedance



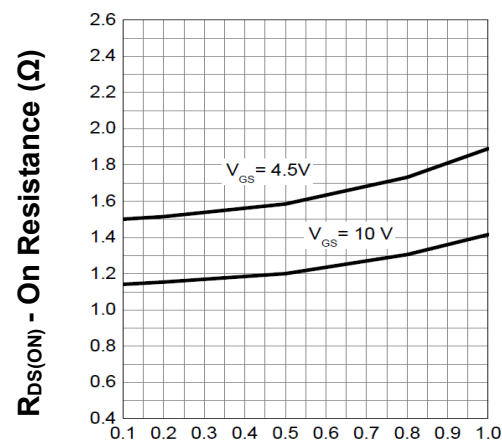
Square Wave Pulse Duration (sec)

### Output Characteristics



V<sub>DS</sub> - Drain-Source Voltage (V)

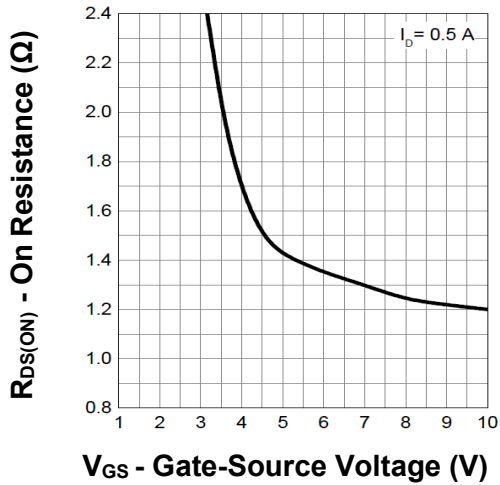
### Drain-Source On Resistance



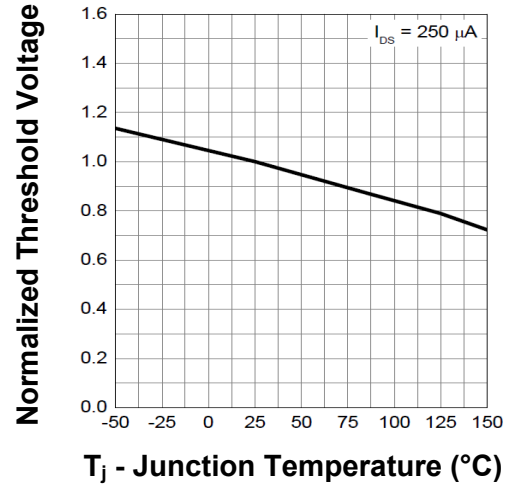
I<sub>D</sub> - Drain Current (A)

## Typical Characteristics (cont.)

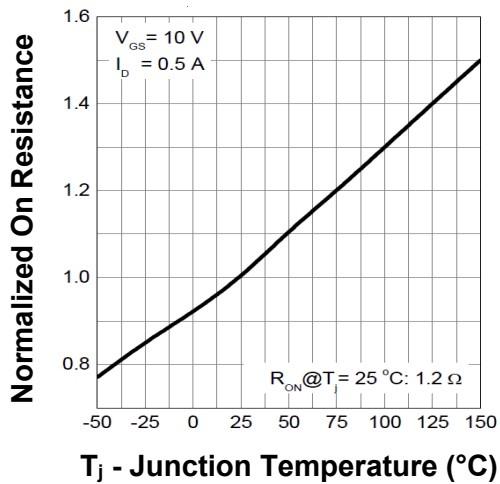
### Transfer Characteristics



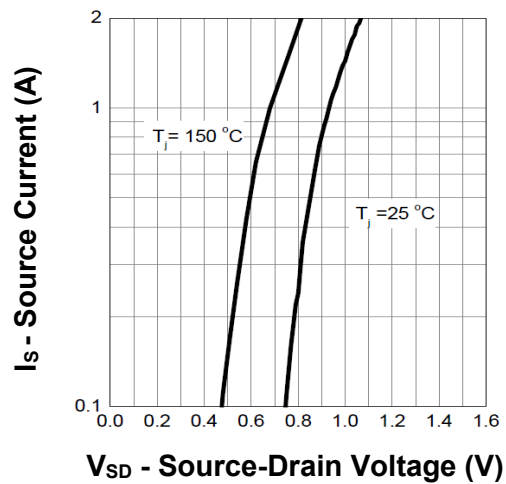
### Gate Threshold Voltage



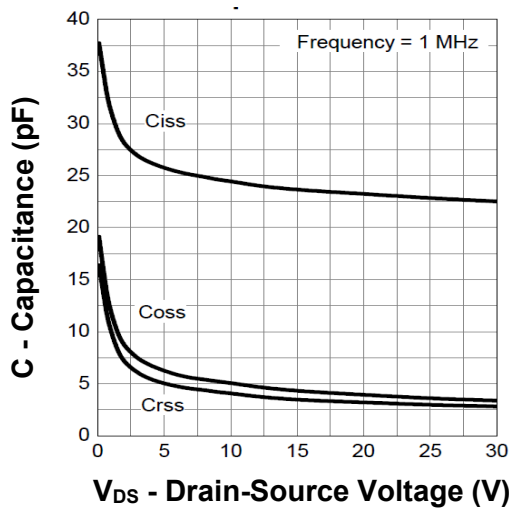
### Drain-Source On Resistance



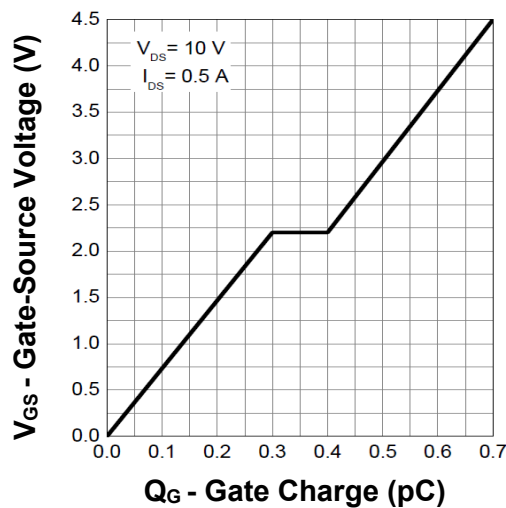
### Source-Drain Diode Forward



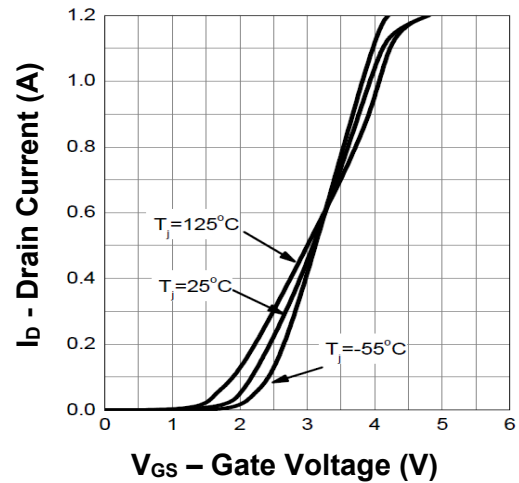
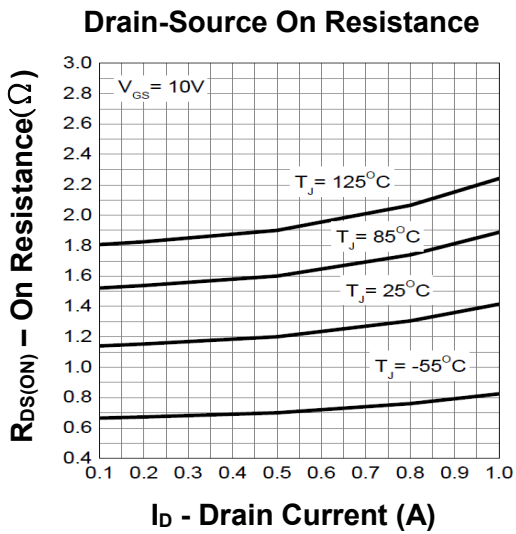
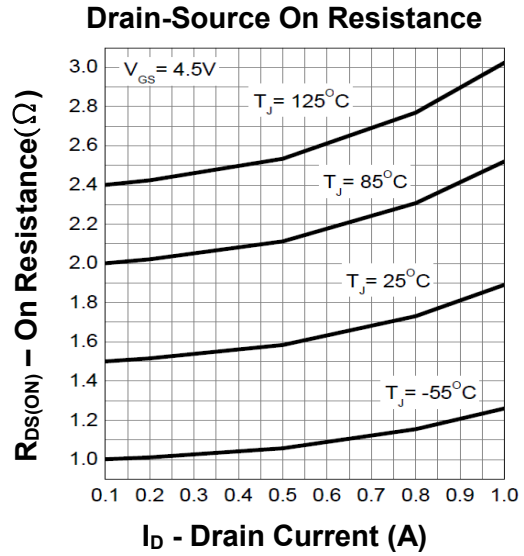
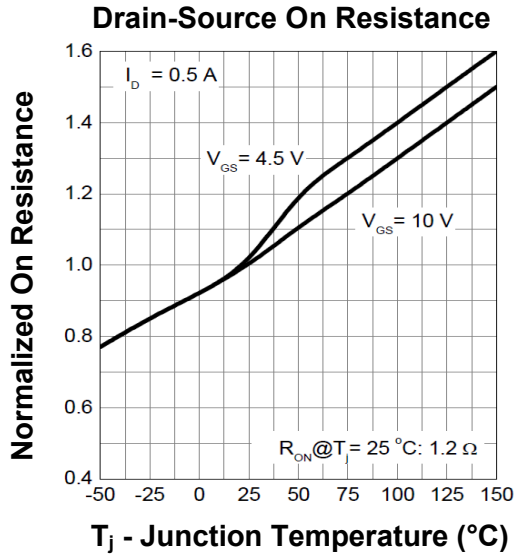
### Capacitance



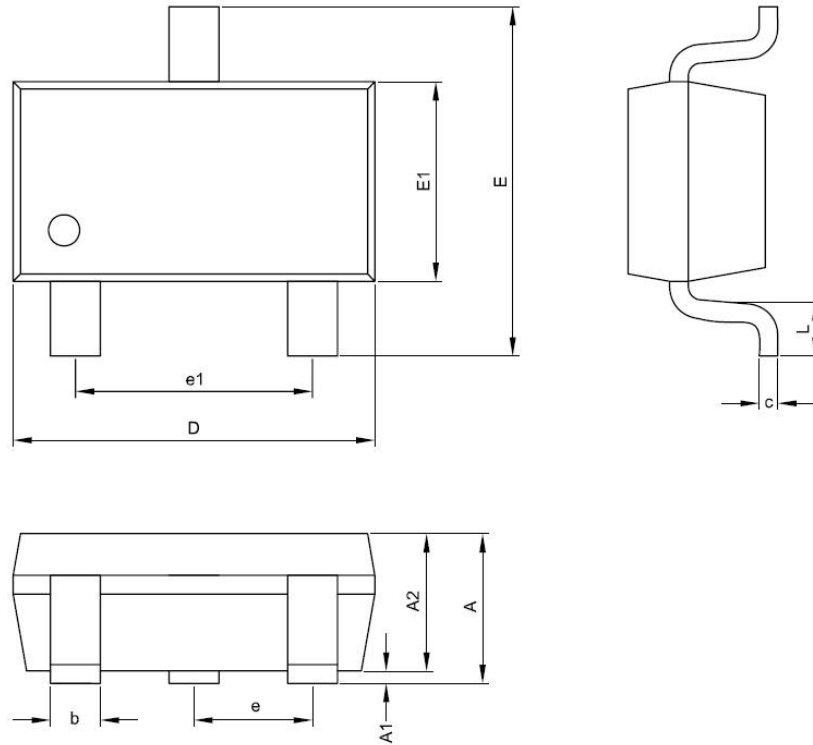
### Gate Charge



## Typical Characteristics (cont.)



**SOT-23 Package Dimensions**



Symbol	MIN.	MAX.
A	—	1.12
A1	0.00	0.1
A2	0.90	1.02
D	2.90 BSC	
E	2.40 BSC	
E1	1.20	1.40
c	0.08	0.25
b	0.30	0.50
e	0.95 BSC	
e1	1.90 BSC	
L	0.20	0.60

Unit: mm