

Features

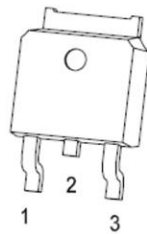
- $V_{DS} = -60V, I_D = -35A$
 $R_{DS(ON)} = 28m\Omega @ V_{GS} = -10V (Typ)$

Application

- Load/Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

Package and Pin Configuration

TO-252



1. GATE
2. DRAIN
3. SOURCE



Marking:



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-60	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = -10V$	Steady State	$T_C = +25^\circ C$ $T_C = +100^\circ C$	I_D	-35 -27	A
	Steady State	$T_A = +25^\circ C$ $T_A = +70^\circ C$	I_D	-7.3 -6.1	A
Pulsed Drain Current (380 μs pulse, duty cycle = 1%)			I_{DM}	-60	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	-2.2	A
Avalanche Current (Note 7) $L = 0.1mH$			I_{AS}	-35	A
Avalanche Energy (Note 7) $L = 0.1mH$			E_{AS}	60	mJ

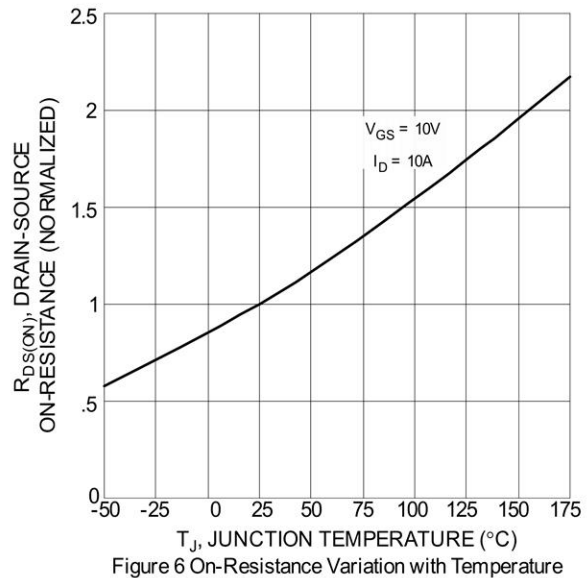
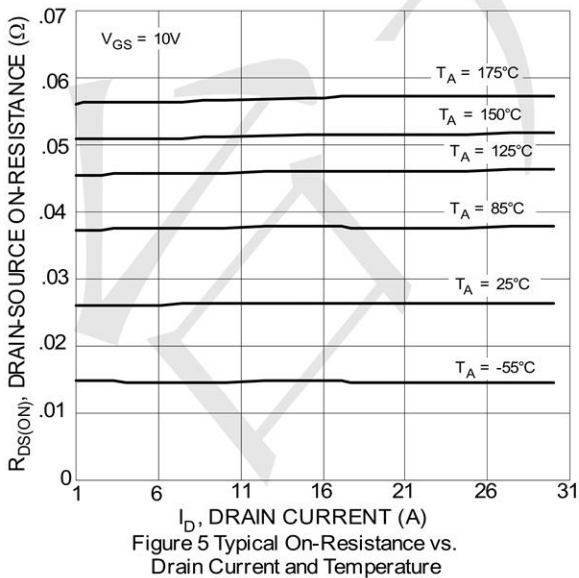
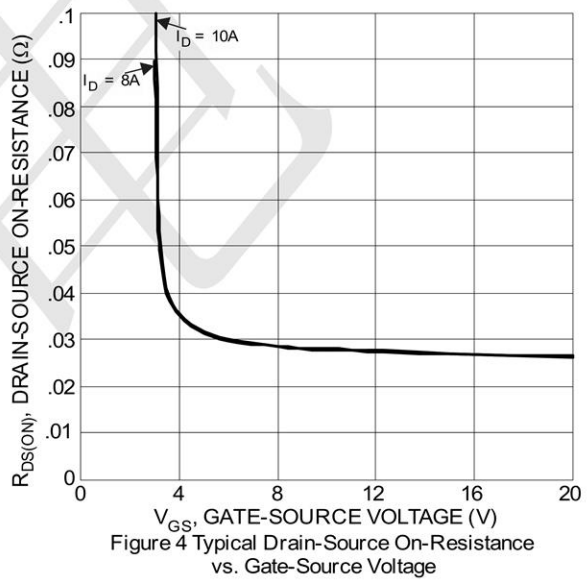
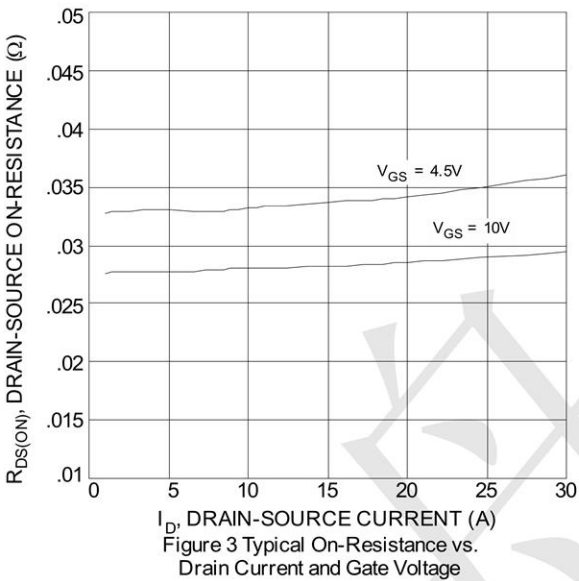
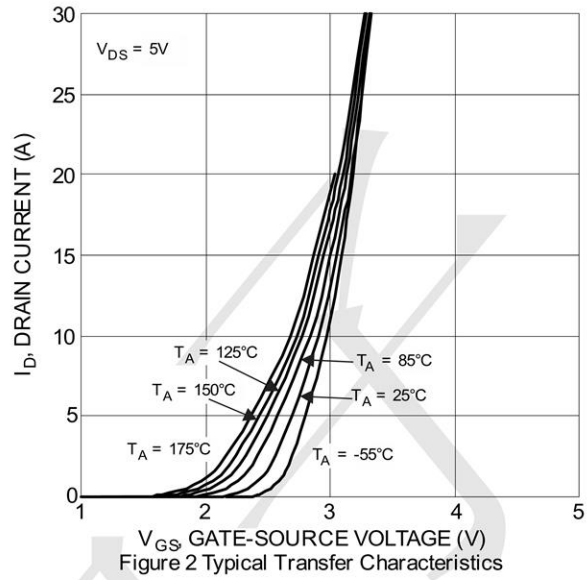
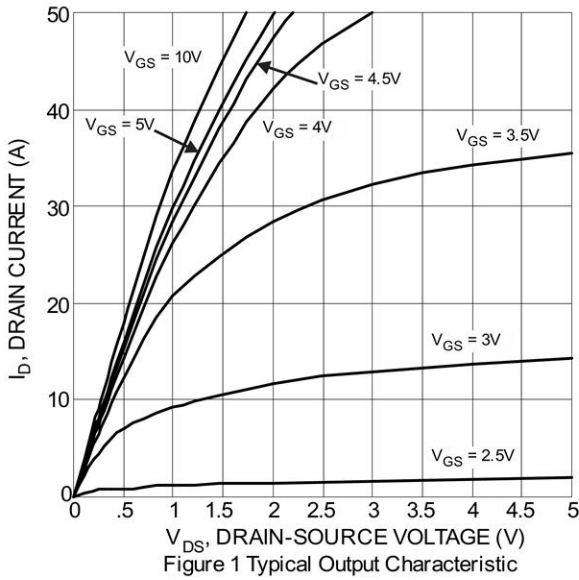
Thermal Characteristic

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P_D	2.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	80	$^\circ C/W$
Total Power Dissipation (Note 6)		P_D	3.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	41	$^\circ C/W$
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.6	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	$^\circ C$

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	-1	μA	$V_{DS} = -60V, V_{GS} = 0V$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	-3.0	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	28	35	m Ω	$V_{GS} = -10V, I_D = -10A$
		—	36	45		$V_{GS} = -4.5V, I_D = -8A$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$V_{GS} = 0V, I_S = -1A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2,569	—	pF	$V_{DS} = -30V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	179	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	143	—	pF	
Gate Resistance	R_g	—	5	—	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = -4.5V$)	Q_g	—	26.5	—	nC	$V_{DS} = -30V, I_D = -5A$
Total Gate Charge ($V_{GS} = -10V$)	Q_g	—	53.1	—	nC	
Gate-Source Charge	Q_{gs}	—	7.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	12.6	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	6	—	nS	$V_{GS} = -10V, V_{DS} = -30V,$ $R_G = 3\Omega, I_D = -5A$
Turn-On Rise Time	t_r	—	7.1	—	nS	
Turn-Off Delay Time	$t_{D(off)}$	—	110	—	nS	
Turn-Off Fall Time	t_f	—	62	—	nS	
Body Diode Reverse Recovery Time	t_{rr}	—	20	—	nS	$I_F = -5A, di/dt = 100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	—	14	—	nC	

Typical Characteristics



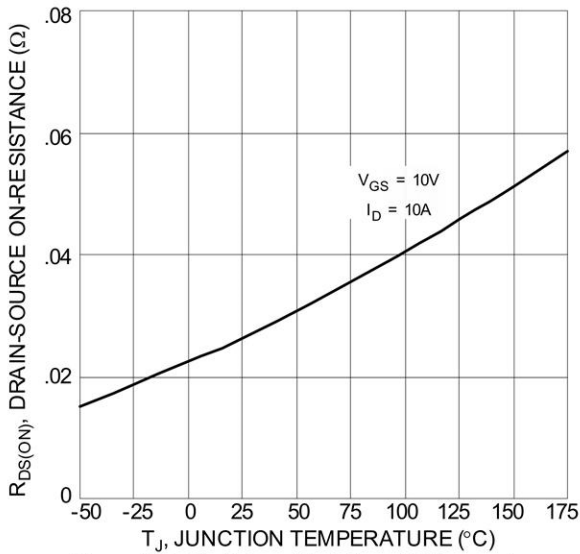


Figure 7 On-Resistance Variation with Temperature

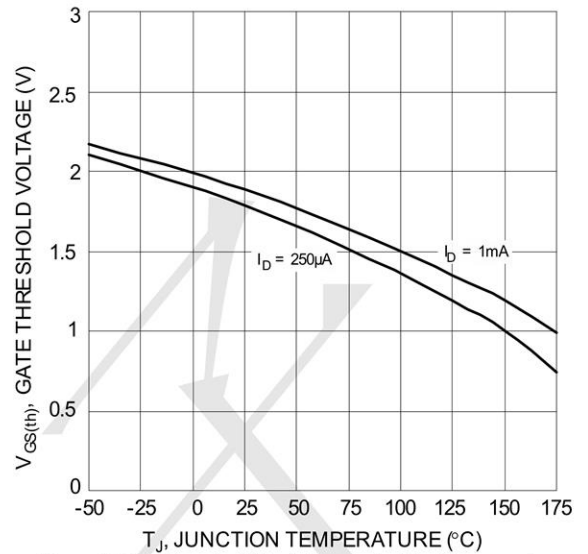


Figure 8 Gate Threshold Variation vs. Ambient Temperature

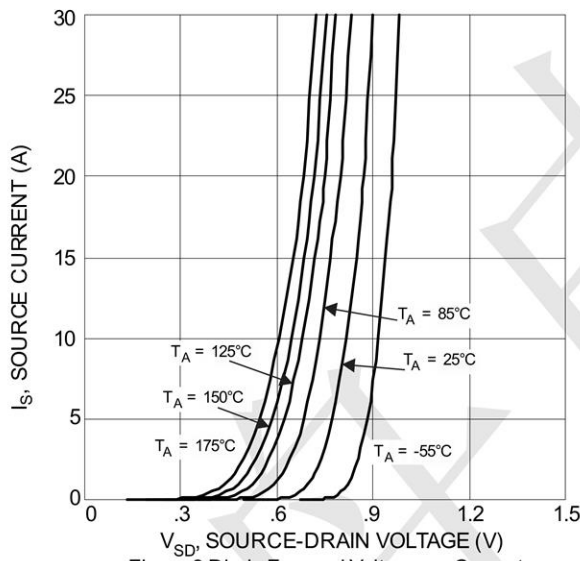


Figure 9 Diode Forward Voltage vs. Current

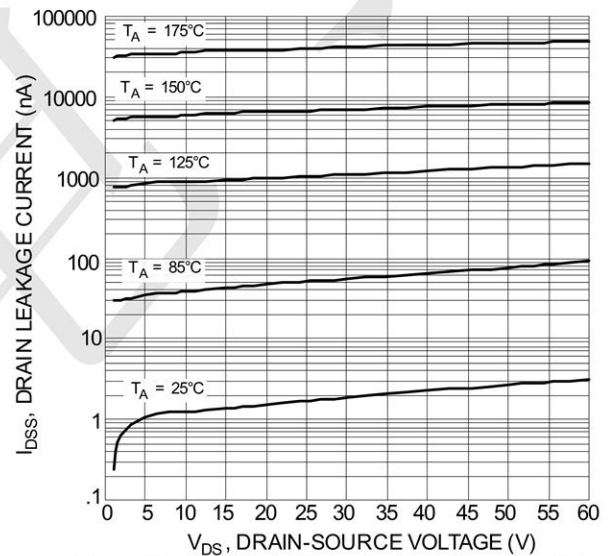


Figure 10 Typical Drain-Source Leakage Current vs. Voltage

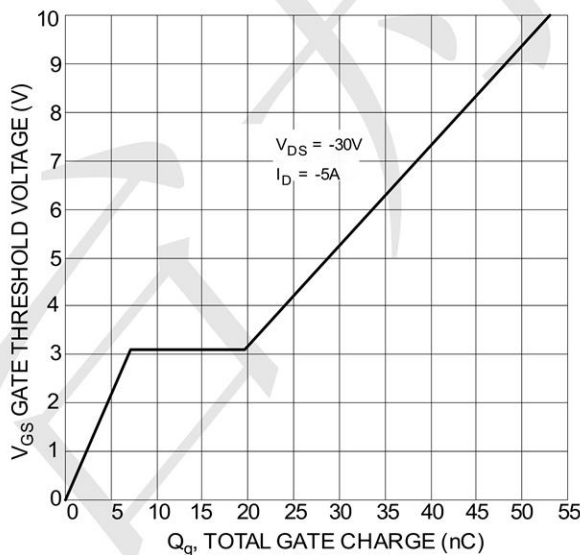


Figure 11 Gate Charge

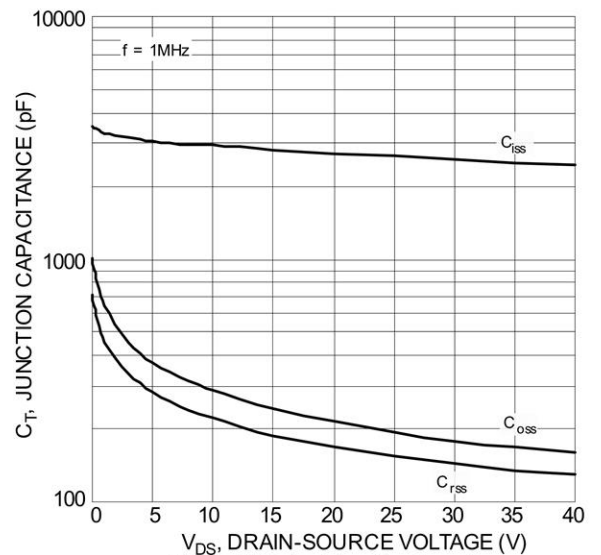
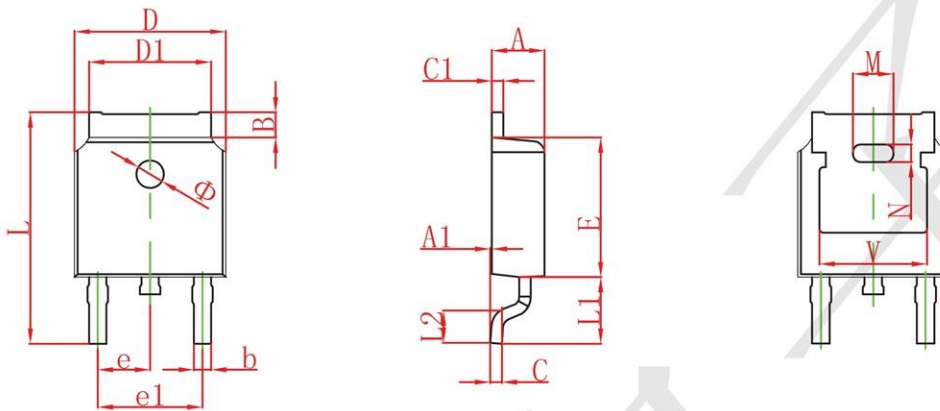


Figure 12 Typical Junction Capacitance

TO252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.100	0.000	0.004
B	0.800	1.400	0.031	0.055
b	0.710	0.810	0.028	0.032
c	0.460	0.560	0.018	0.022
c1	0.460	0.560	0.018	0.022
D	6.500	6.700	0.256	0.264
D1	5.130	5.460	0.202	0.215
E	6.000	6.200	0.236	0.244
e	2.286 TYP.		0.090 TYP.	
e1	4.327	4.727	0.170	0.186
M	1.778REF.		0.070REF.	
N	0.762REF.		0.018REF.	
L	9.800	10.400	0.386	0.409
L1	2.9REF.		0.114REF.	
L2	1.400	1.700	0.055	0.067
V	4.830 REF.		0.190 REF.	
Φ	1.100	1.300	0.043	0.051