

SOT-23-6 Plastic-Encapsulate MOSFETS

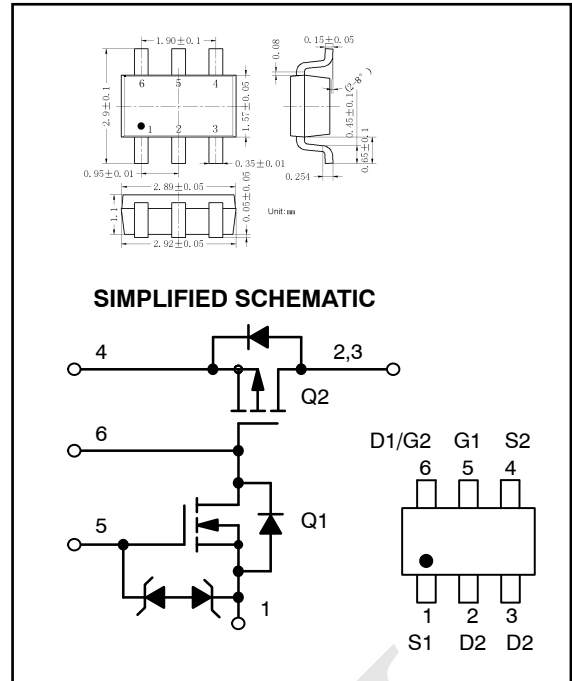
NTJD1155L

8 V, ± 1.3 A, High Side Load Switch with Level - Shift

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	I_D MAX
8.0 V	130 mΩ @ -4.5 V	±1.3 A
	170 mΩ @ -2.5 V	
	260 mΩ @ -1.8 V	

Features

- Extremely Low $R_{DS(on)}$ P-Channel Load Switch MOSFET
- Level Shift MOSFET is ESD Protected
- Low Profile, Small Footprint Package
- V_{IN} Range 1.8 to 8.0 V
- ON/OFF Range 1.5 to 8.0 V
- These Devices are Pb-Free and are RoHS Compliant



MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Rating	Value	Unit
V_{IN}	Input Voltage (V_{DSS} , P-Ch)	8.0	V
$V_{ON/OFF}$	ON/OFF Voltage (V_{GS} , N-Ch)	8.0	V
I_L	Continuous Load Current (Note 1)	Steady State $T_A = 25^\circ\text{C}$	±1.3
		$T_A = 85^\circ\text{C}$	±0.9
P_D	Power Dissipation (Note 1)	Steady State $T_A = 25^\circ\text{C}$	0.40
		$T_A = 85^\circ\text{C}$	0.20
I_{LM}	Pulsed Load Current	$t_p = 10 \mu\text{s}$	±3.9
T_J, T_{STG}	Operating Junction and Storage Temperature	-55 to 150	$^\circ\text{C}$
I_S	Source Current (Body Diode)	-0.4	A
T_L	Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	260	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Symbol	Characteristic	Max	Unit
$R_{\theta JA}$	Junction-to-Ambient - Steady State (Note 1)	320	$^\circ\text{C}/\text{W}$
$R_{\theta JF}$	Junction-to-Foot - Steady State (Note 1)	220	

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Characteristic	Test Condition	Min	Typ	Max	Unit	
OFF CHARACTERISTICS							
V_{IN}	Q2 Drain-to-Source Breakdown Voltage	$V_{GS2} = 0\text{ V}, I_{D2} = 250\ \mu\text{A}$	-8.0			V	
I_{FL}	Forward Leakage Current	$V_{GS1} = 0\text{ V}, V_{DS2} = -8.0\text{ V}$	$T_J = 25^\circ\text{C}$		1.0	μA	
			$T_J = 125^\circ\text{C}$		10		
I_{GSS}	Q1 Gate-to-Source Leakage Current	$V_{DS1} = 0\text{ V}, V_{GS1} = \pm 8.0\text{ V}$			± 100	nA	
V_{SD}	Q1 Diode Forward On-Voltage	$I_S = -0.4\text{ A}, V_{GS1} = 0\text{ V}$		-0.8	-1.1	V	
ON CHARACTERISTICS							
$V_{ON/OFF}$	ON/OFF Voltage		1.5		8.0	V	
$V_{GS1(th)}$	Q1 Gate Threshold Voltage	$V_{GS1} = V_{DS1}, I_D = 250\ \mu\text{A}$	0.4		1.0	V	
V_{IN}	Input Voltage	$V_{GS1} = V_{DS1}, I_D = 250\ \mu\text{A}$	1.8		8.0	V	
$R_{DS(on)}$	Q2 Drain-to-Source On Resistance	$V_{ON/OFF} = 1.5\text{ V}$	$V_{IN} = 4.5\text{ V}, I_L = 1.2\text{ A}$		130	175	m Ω
			$V_{IN} = 2.5\text{ V}, I_L = 1.0\text{ A}$		170	220	
			$V_{IN} = 1.8\text{ V}, I_L = 0.7\text{ A}$		260	320	
I_L	Load Current	$V_{DROP} \leq 0.2\text{ V}, V_{IN} = 5.0\text{ V}, V_{ON/OFF} = 1.5\text{ V}$	1.0			A	
		$V_{DROP} \leq 0.3\text{ V}, V_{IN} = 2.5\text{ V}, V_{ON/OFF} = 1.5\text{ V}$	1.0				

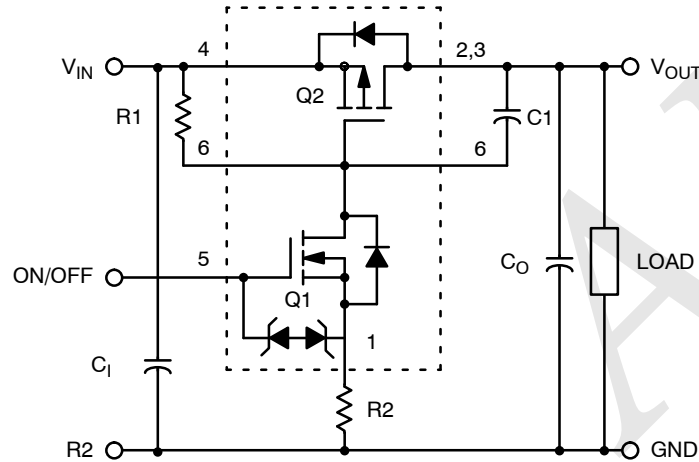


Figure 1. Load Switch Application

Components	Description	Values
R1	Pullup Resistor	Typical 10 k Ω to 1.0 M Ω *
R2	Optional Slew-Rate Control	Typical 0 to 100 k Ω *
C_0, C_1	Output Capacitance	Usually < 1.0 μF
C1	Optional In-Rush Current Control	Typical $\leq 1000\text{ pF}$

*Minimum R1 value should be at least 10 x R2 to ensure Q1 turn-on.

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

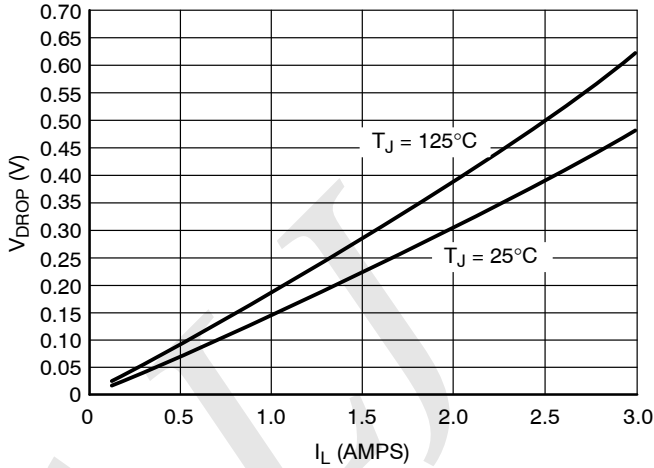


Figure 2. V_{drop} vs. I_L @ $V_{\text{in}} = 2.5 \text{ V}$

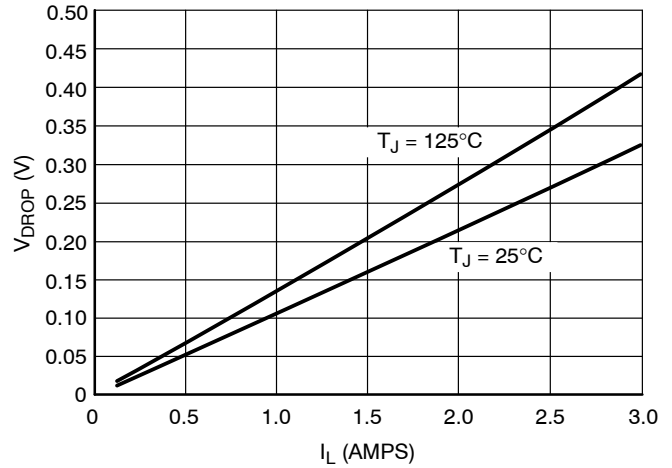


Figure 3. V_{drop} vs. I_L @ $V_{\text{in}} = 4.5 \text{ V}$

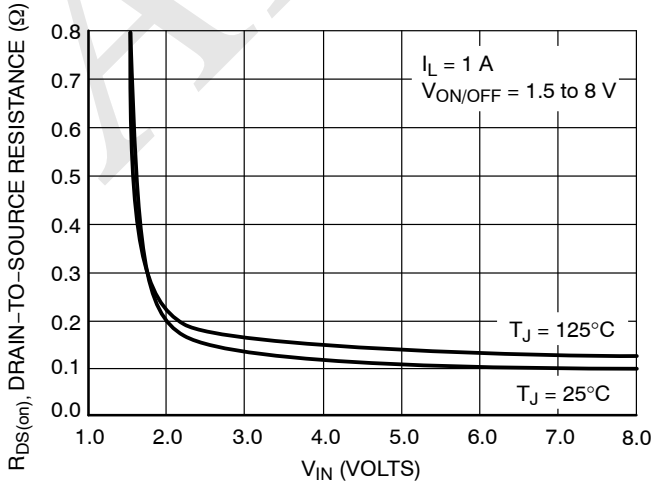


Figure 4. On-Resistance vs. Input Voltage

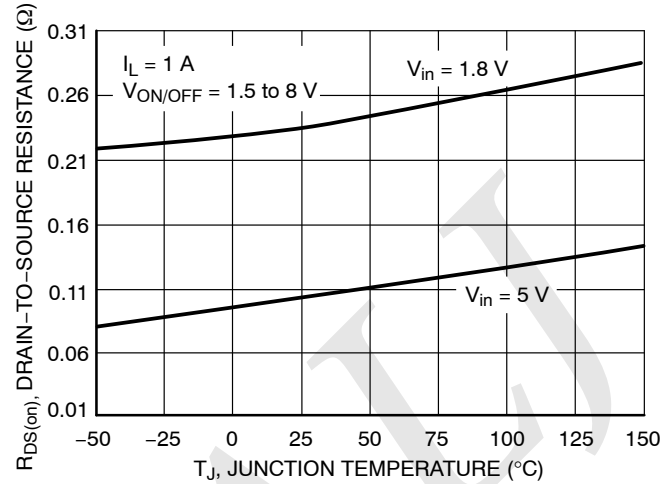


Figure 5. On-Resistance Variation with Temperature

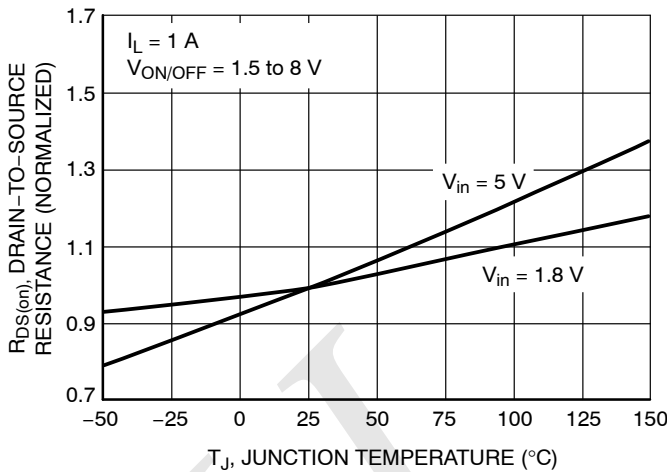


Figure 6. Normalized On-Resistance Variation with Temperature

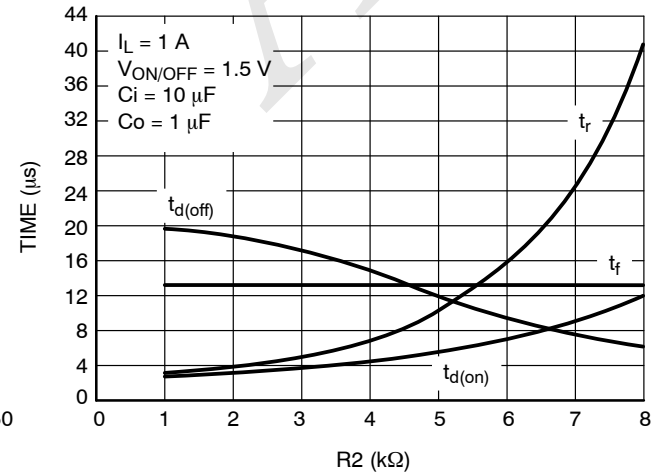


Figure 7. Switching Variation R_2 @ $V_{\text{in}} = 4.5 \text{ V}$, $R_1 = 20 \text{ k}\Omega$

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

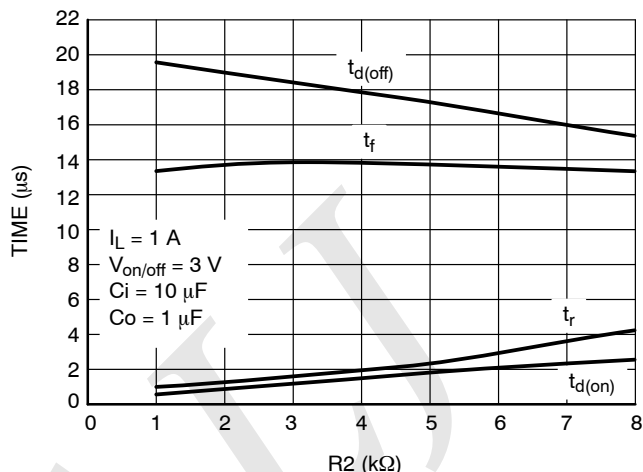


Figure 8. Switching Variation
 R_2 @ $V_{in} = 4.5\text{ V}$, $R_1 = 20\ \text{k}\Omega$

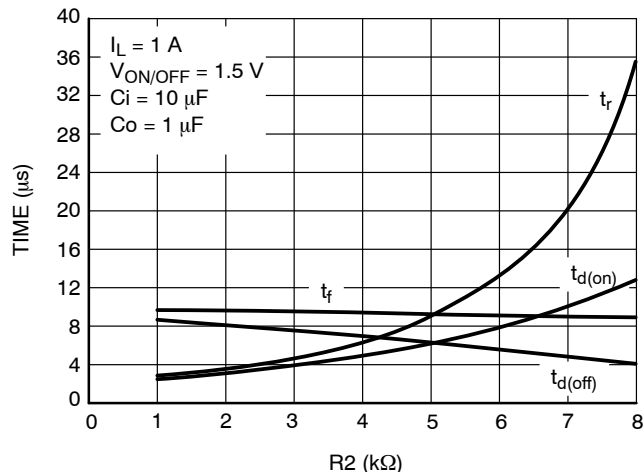


Figure 9. Switching Variation
 R_2 @ $V_{in} = 2.5\text{ V}$, $R_1 = 20\ \text{k}\Omega$

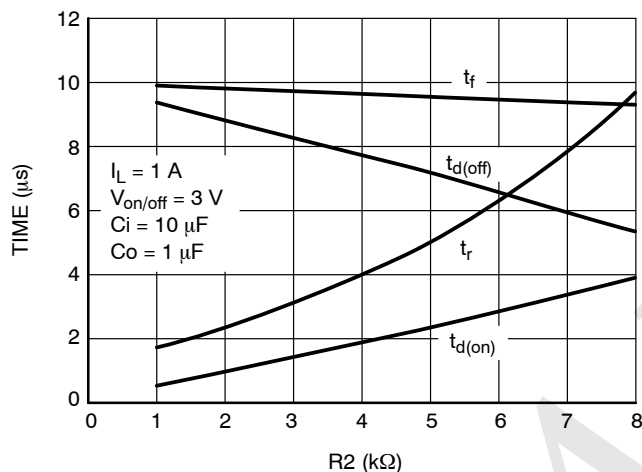


Figure 10. Switching Variation
 R_2 @ $V_{in} = 2.5\text{ V}$, $R_1 = 20\ \text{k}\Omega$

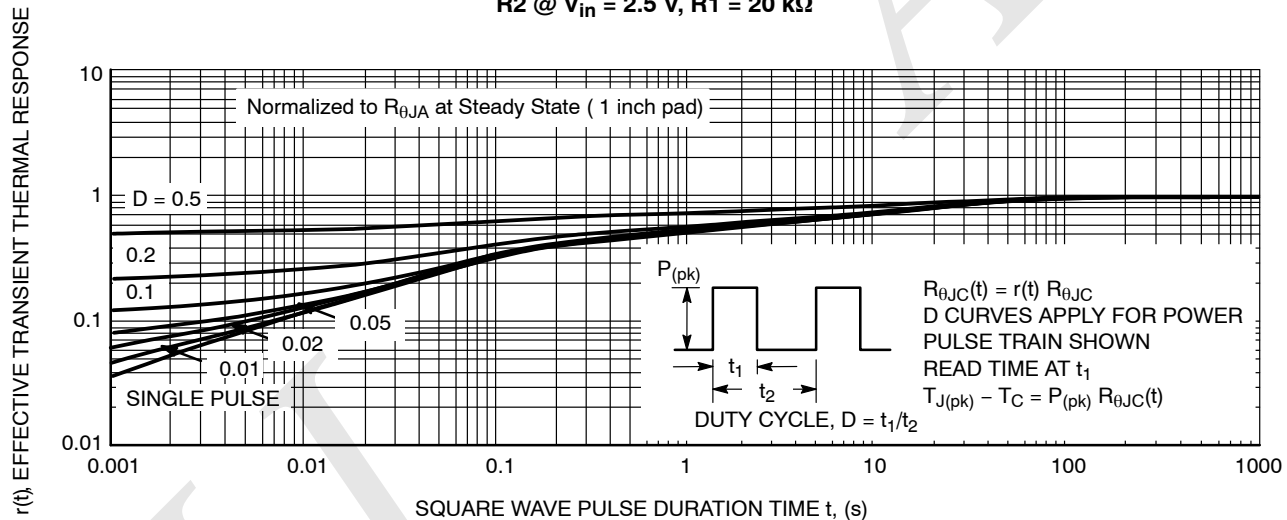


Figure 11. FET Thermal Response