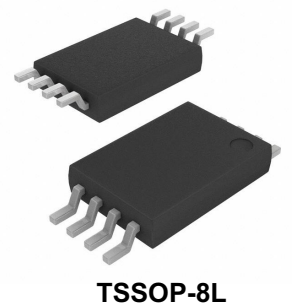
WNMD2156

Dual N-Channel, 20V, 6.5A, Power MOSFET

Http//:www.willsemi.com

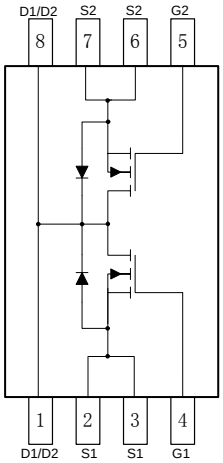
V_{DS} (V)	Rds(on) (Ω)
20	0.019@ VGS=10V
	0.021@ VGS=4.5V
	0.025@ VGS=2.5V
	0.033@ VGS=1.8V



TSSOP-8L

Descriptions

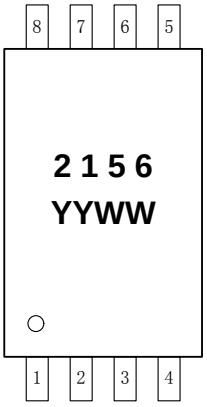
The WNMD2156 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNMD2156 is Pb-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package TSSOP-8L



2156 = Device Code
YY = Year
WW =Week

Marking

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

Device	Package	Shipping
WNMD2156-8/TR	TSSOP-8L	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	20		V
Gate-Source Voltage		V_{GS}	±8		
Continuous Drain Current [a]	T_A=25°C	I_D	6.5	5.7	A
	T_A=70°C		5.2	4.5	
Maximum Power Dissipation [a]	T_A=25°C	P_D	1.3	1.0	W
	T_A=70°C		0.8	0.6	
Continuous Drain Current [b]	T_A=25°C	I_D	5.9	5.2	A
	T_A=70°C		4.7	4.2	
Maximum Power Dissipation [b]	T_A=25°C	P_D	1.1	0.8	W
	T_A=70°C		0.7	0.5	
Pulsed Drain Current [c]		I_{DM}	25		A
Operating Junction Temperature		T_J	150		°C
Lead Temperature		T_L	260		°C
Storage Temperature Range		T_{stg}	-55 to 150		°C

Thermal resistance ratings

Single Operation					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	68	90	°C/W
	Steady State		92	120	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	85	110	
	Steady State		112	140	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	52	68	
Dual Operation					
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	72	95	°C/W
	Steady State		98	125	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	90	115	
	Steady State		116	145	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	55	70	

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR4 board using minimum pad size, 1oz copper

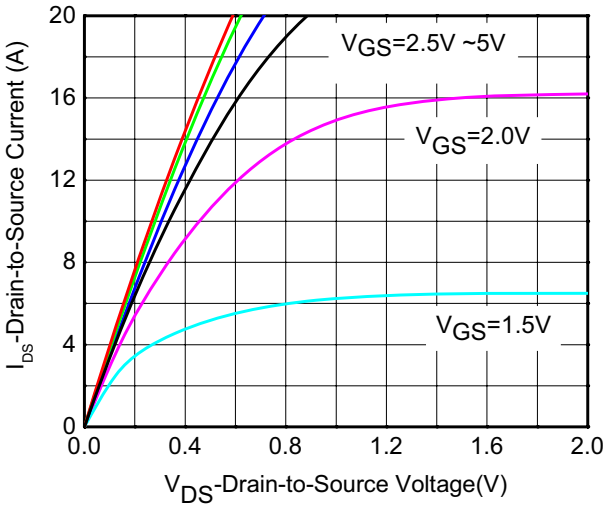
c Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%

d Repetitive rating, pulse width limited by junction temperature T_J=150°C.

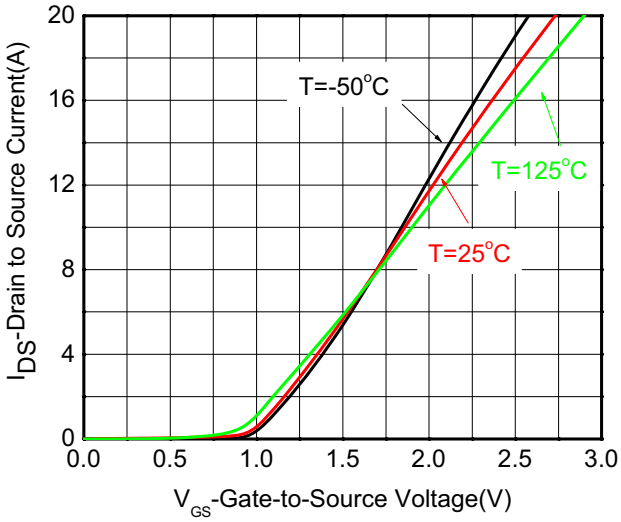
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250uA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =16 V, V_{GS} = 0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	0.4	0.6	1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 6.5A	13	19	27	mΩ
		V_{GS} = 4.5V, I_D = 6.0A	16	21	27	
		V_{GS} = 2.5V, I_D = 5.5 A	19	25	31	
		V_{GS} = 1.8V, I_D = 2.0 A	25	33	49	
Forward Transconductance	g_{FS}	V_{DS} = 5 V, I_D =6.5A		15		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = 10 V		995		pF
Output Capacitance	C_{OSS}			125		
Reverse Transfer Capacitance	C_{RSS}			120		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 4.5 V, V_{DS} = 10 V, I_D = 6.5A		12.1		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.66		
Gate-to-Source Charge	Q_{GS}			1.0		
Gate-to-Drain Charge	Q_{GD}			3.3		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{GS} = 4.5 V, V_{DS} = 6 V, I_D=2.0A, R_G=6 Ω		6.5		ns
Rise Time	tr			11		
Turn-Off Delay Time	td(OFF)			48		
Fall Time	Tf			20		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 1.0A		0.65	1.5	V

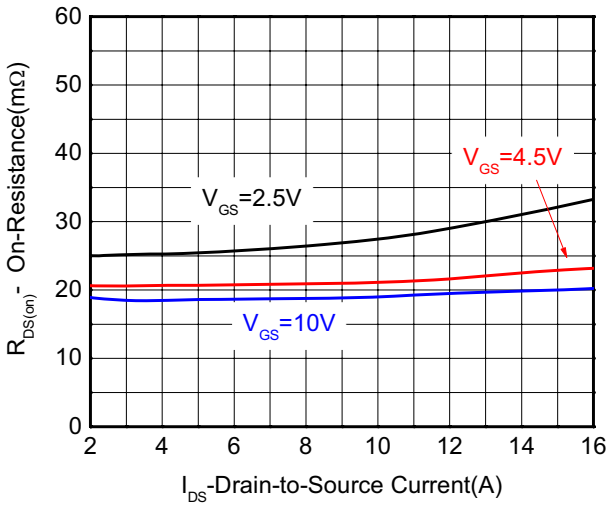
Typical Characteristics (Ta=25°C, unless otherwise noted)



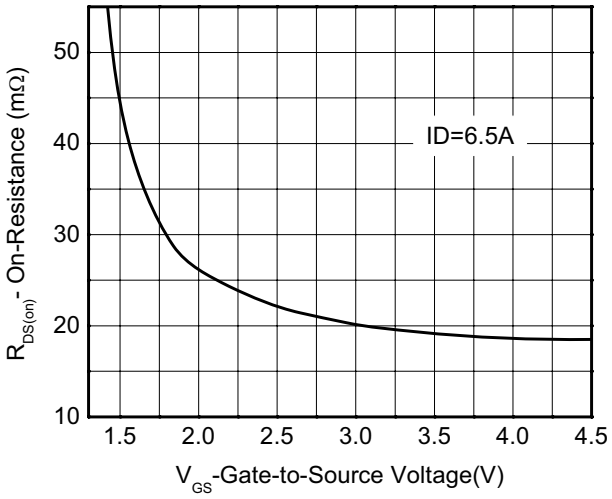
Output characteristics



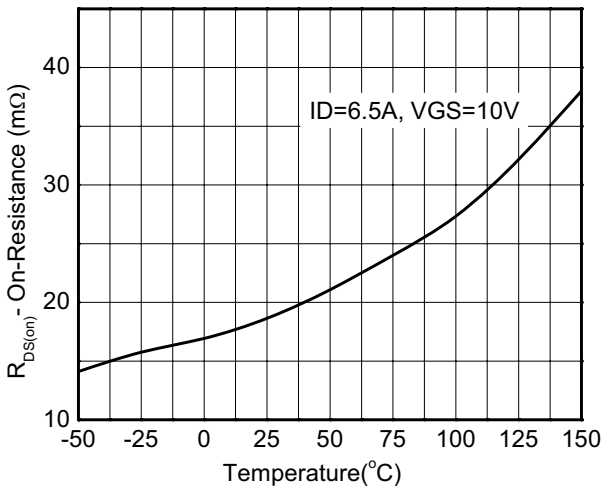
Transfer characteristics



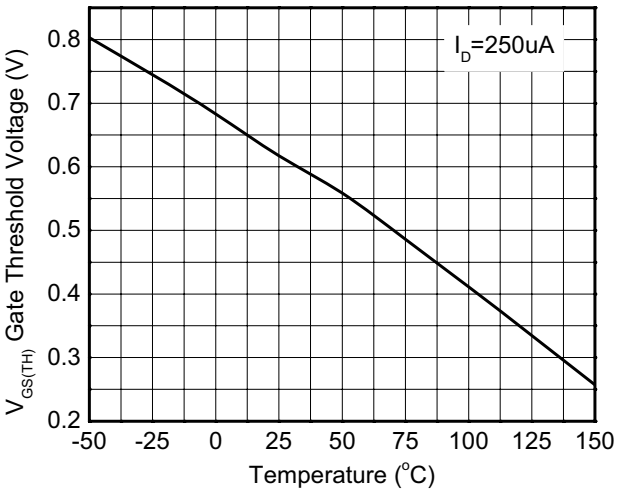
On-Resistance vs. Drain current



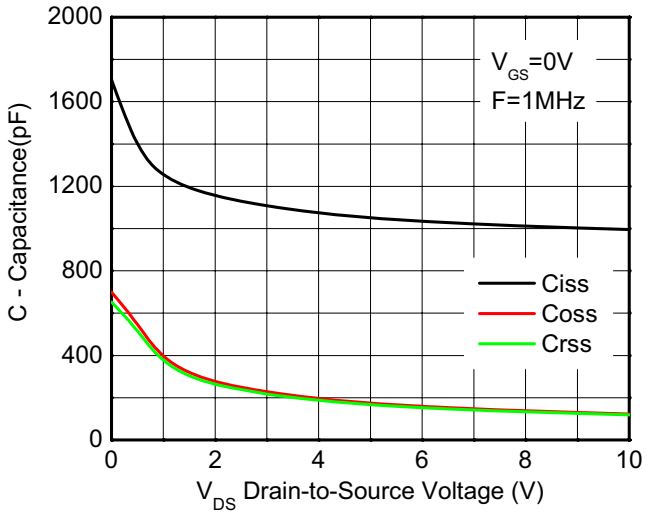
On-Resistance vs. Gate-to-Source voltage



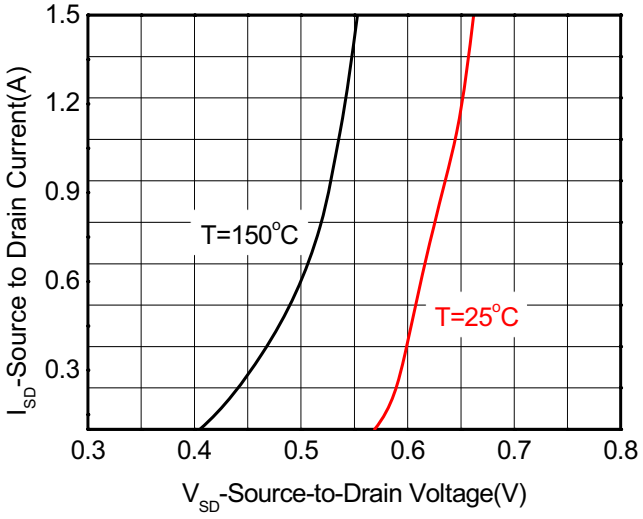
On-Resistance vs. Junction temperature



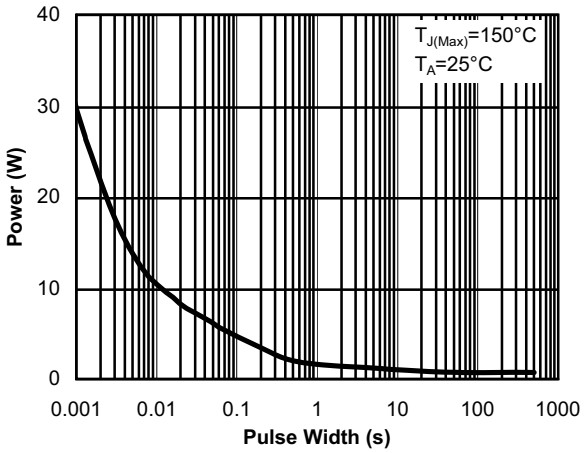
Threshold voltage vs. Temperature



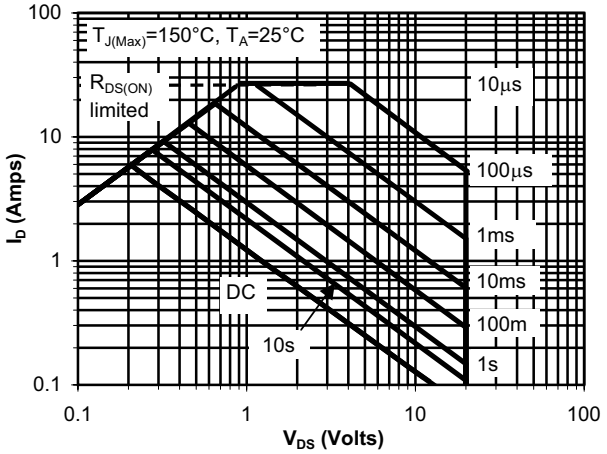
Capacitance



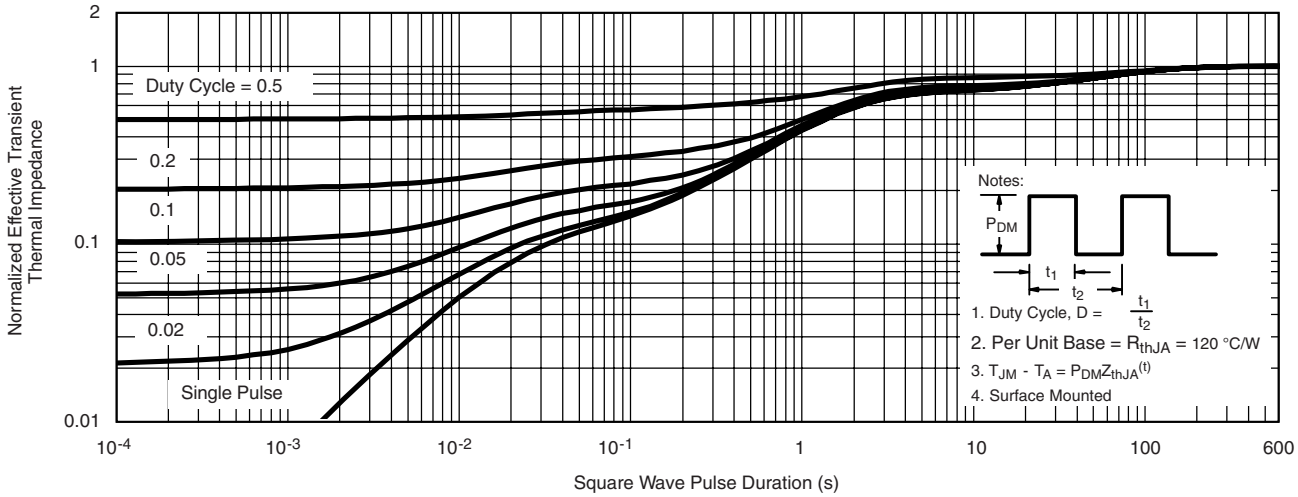
Body diode forward voltage



Single pulse power



Safe operating power

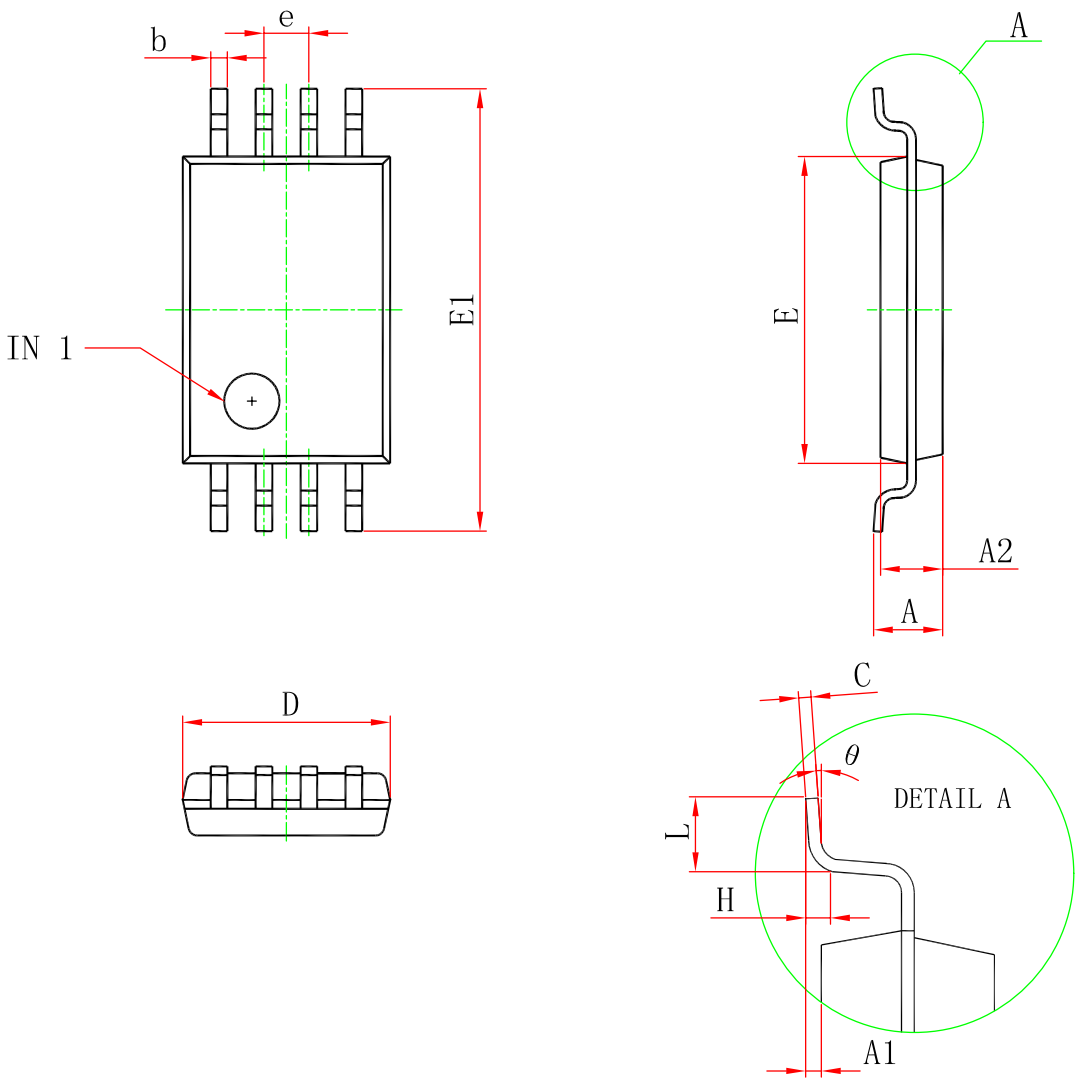


Normalized Thermal Transient Impedance, Junction-to-Ambient

Transient thermal response (Junction-to-Ambient)

Package outline dimensions

TSSOP-8L



Symbol	Dimensions in millimeter	
	Min.	Max.
D	2.900	3.100
E	4.300	4.500
b	0.190	0.300
c	0.090	0.200
E1	6.250	6.550
A		1.200
A2	0.800	1.000
A1	0.050	0.150
e	0.65(BSC)	
L	0.500	0.700
H	0.25(TYP)	
θ	1°	7°