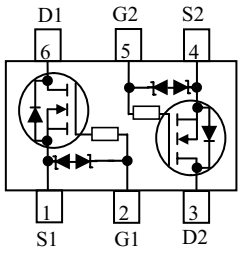
WNMD2165

Dual N-Channel, 60V, 0.32A, Power MOSFET

Http//:www.sh-willsemi.com

V_{DS} (V)	Rds(on) (Ω)
60	1.4@ V_{GS}=10V
	1.7@ V_{GS}=4.5V
ESD Rating:2000V HBM	

SOT-363



Pin configuration (Top view)

Descriptions

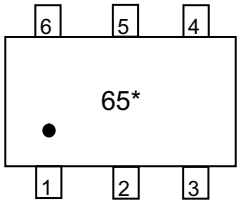
The WNMD2165 is Dual N-Channel enhancem -ent MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS\ (ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WNMD2165 is Pb-free and Halogen-free.

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-363

Applications

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



65 = Device Code

* = Month (A~Z)

Marking

Order information

Device	Package	Shipping
WNMD2165-6/TR	SOT-363	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V_{DS}	60		V
Gate-Source Voltage		V_{GS}	±20		
Continuous Drain Current [ad]	T_A=25°C	I_D	0.32	0.28	A
	T_A=70°C		0.25	0.22	
Maximum Power Dissipation [ad]	T_A=25°C	P_D	0.41	0.31	W
	T_A=70°C		0.26	0.20	
Continuous Drain Current [bd]	T_A=25°C	I_D	0.26	0.24	A
	T_A=70°C		0.21	0.19	
Maximum Power Dissipation [bd]	T_A=25°C	P_D	0.28	0.23	W
	T_A=70°C		0.17	0.15	
Pulsed Drain Current [c]		I_{DM}	1.0		A
Operating Junction Temperature		T_J	-55 to 150		°C
Lead Temperature		T_L	260		°C
Storage Temperature Range		T_{stg}	-55 to 150		°C

Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	275	305	°C/W
	Steady State		328	395	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	375	445	
	Steady State		446	532	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	260	300	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper.

b Surface mounted on FR-4 board using minimum pad size, 1oz copper.

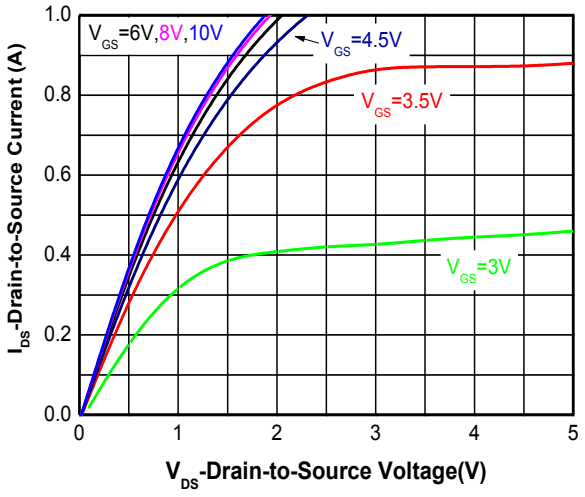
c Pulse width<380μs.

d Maximum junction temperature T_J=150°C.

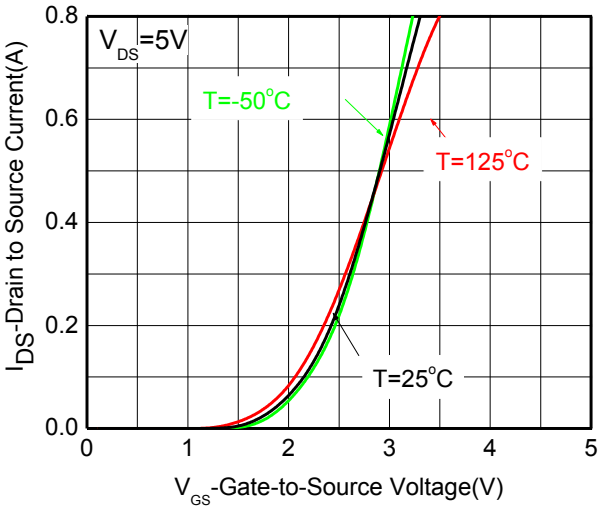
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250uA	60			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =60V, V_{GS} = 0V			1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} =±20V			± 5	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D = 250uA	0.8	1.3	2	V
Drain-to-source On-resistance [b, c]	$R_{DS(on)}$	V_{GS} = 10V, I_D = 0.32A		1.4	2.0	Ω
		V_{GS} = 4.5V, I_D = 0.2A		1.7	2.6	
Forward Transconductance	g_{FS}	V_{DS} =15V, I_D =0.25A		0.42		S
CAPACITANCES, CHARGES						
Input Capacitance	C_{ISS}	V_{GS} = 0 V,		23.37		pF
Output Capacitance	C_{OSS}	f = 1.0 MHz,		7.33		
Reverse Transfer Capacitance	C_{RSS}	V_{DS} = 25V		5.2		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V,		1.2		nC
Threshold Gate Charge	$Q_{G(TH)}$	V_{DD} = 30 V,		0.15		
Gate-to-Source Charge	Q_{GS}	I_D =0.37A		0.21		
Gate-to-Drain Charge	Q_{GD}			0.12		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td(ON)	V_{DD}=30V,R_L=150Ω		7.6		ns
Rise Time	tr	I_D=0.2A,V_{GEN}=10V,		5.1		
Turn-Off Delay Time	td(OFF)	R_G=10 Ω		24.6		
Fall Time	tf			10		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S =0.3A		0.9	1.5	V

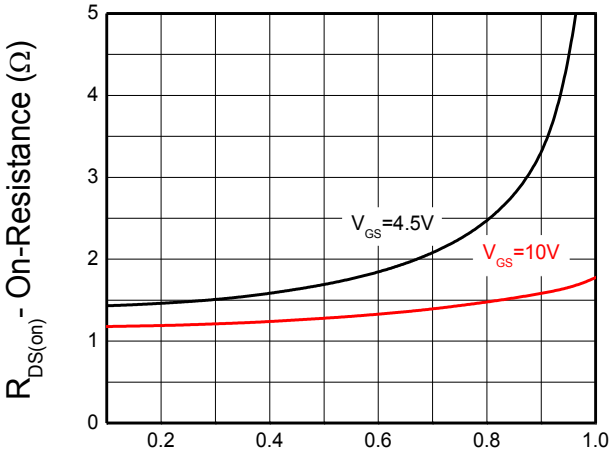
Typical Characteristics (Ta=25°C, unless otherwise noted)



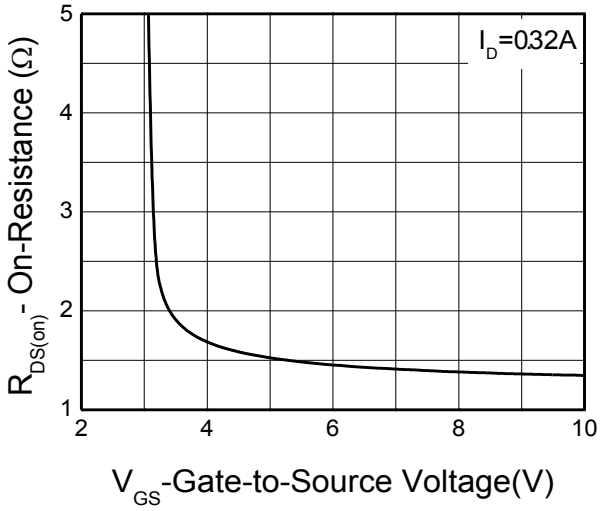
Output characteristics



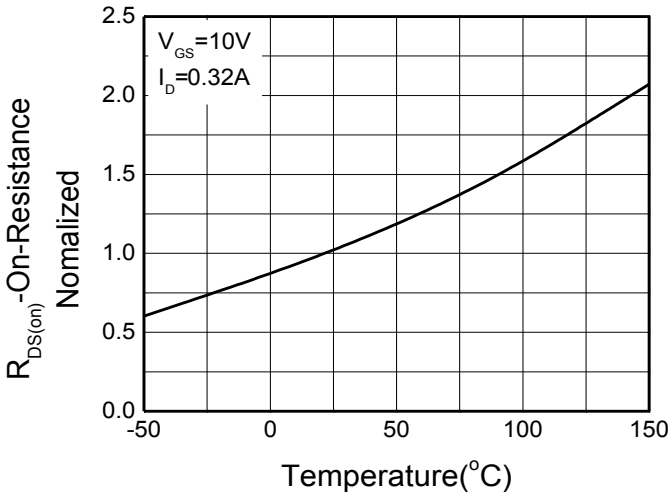
Transfer characteristics



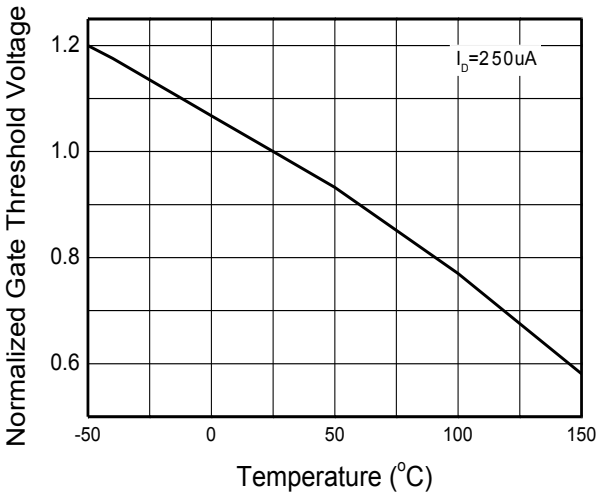
On-Resistance vs. Drain current



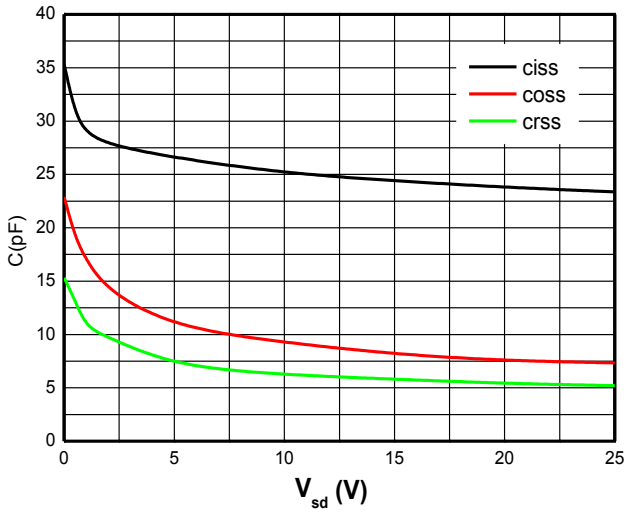
On-Resistance vs. Gate-to-Source voltage



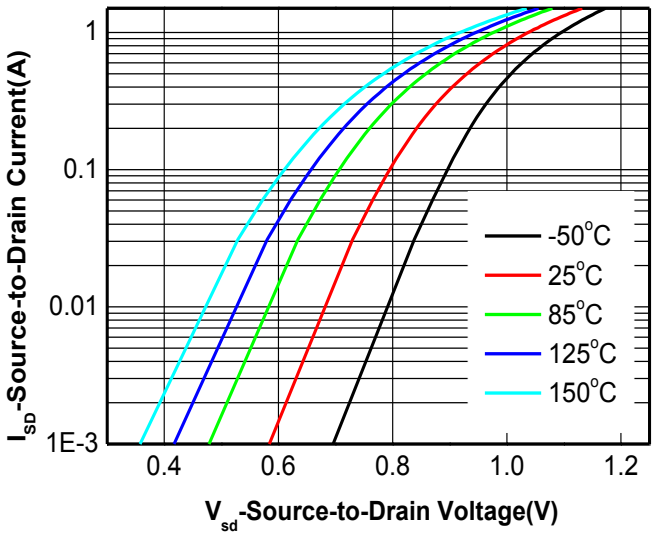
On-Resistance vs. Junction temperature



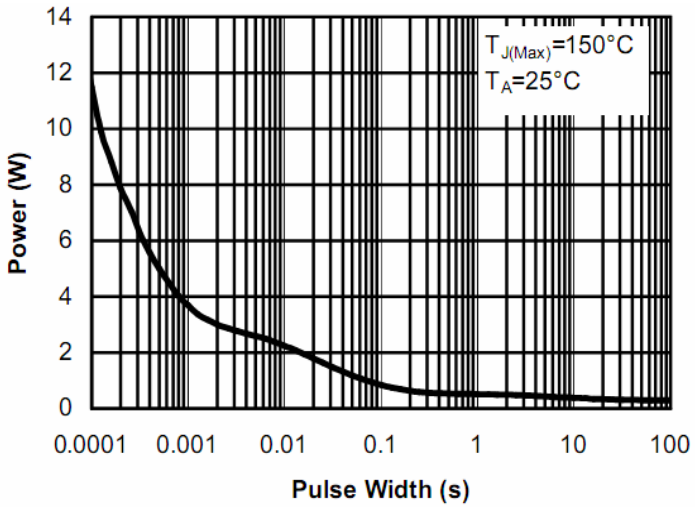
Threshold voltage vs. Temperature



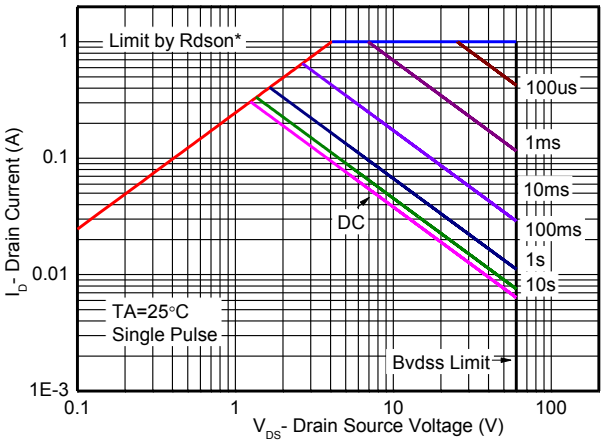
Capacitance



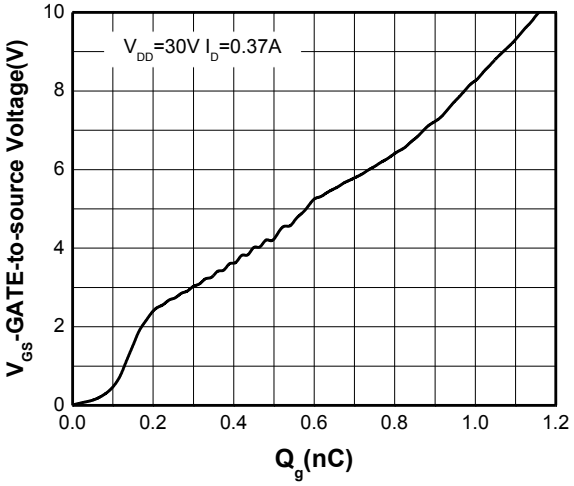
Body diode forward voltage



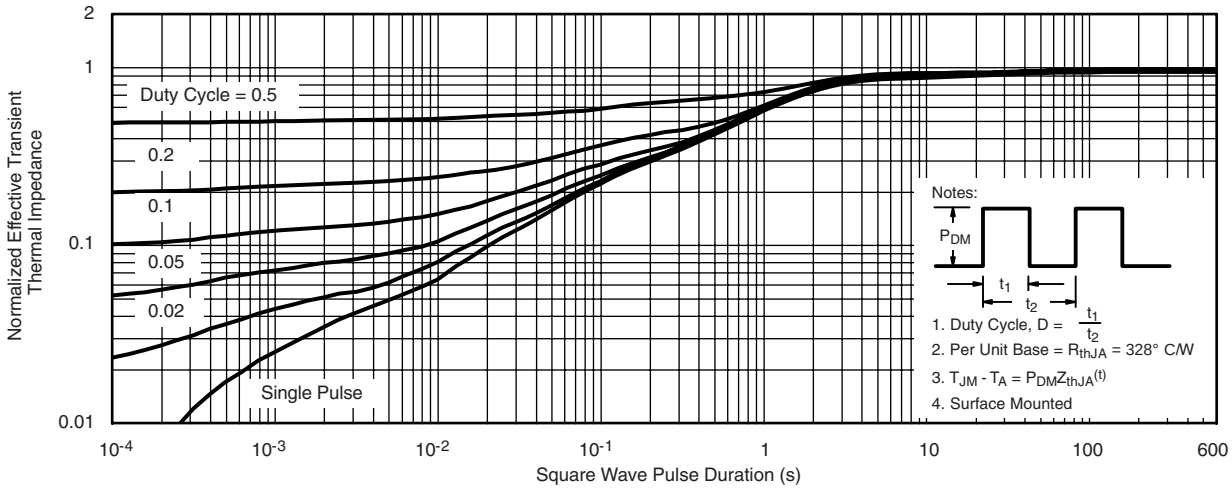
Single pulse power



Safe operating power



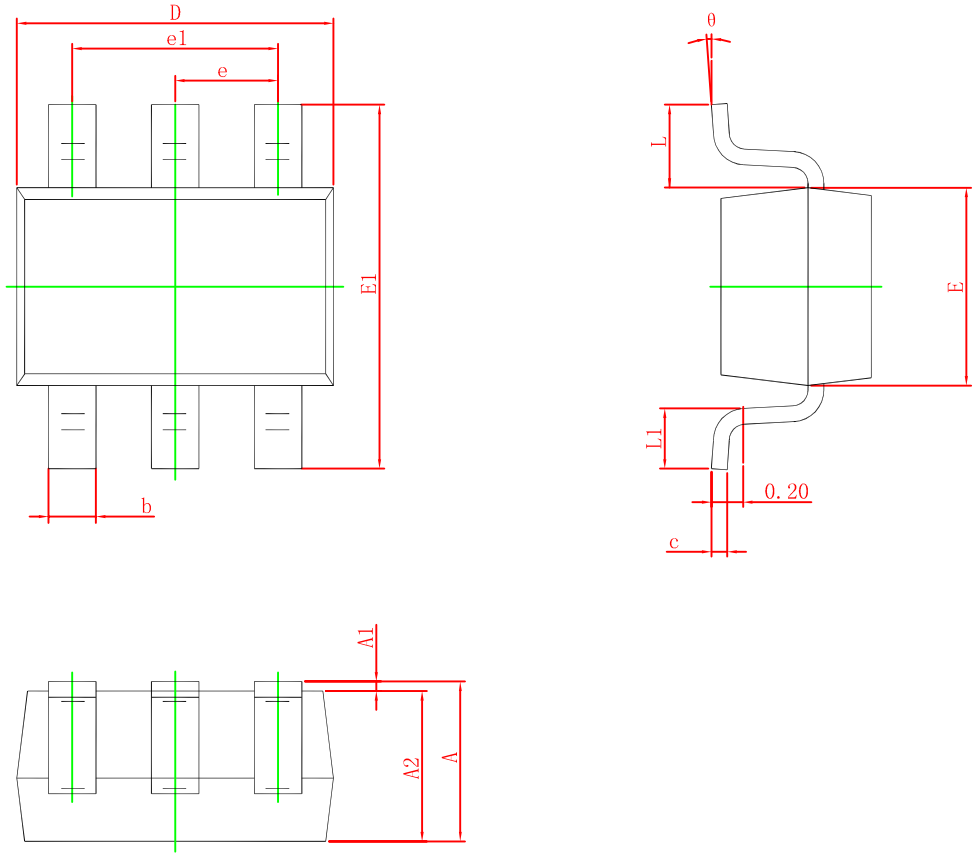
Gate Charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package outline dimensions

SOT-363



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.525 REF.		0.021 REF.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°