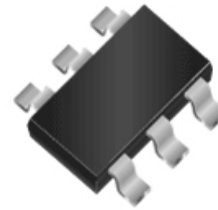
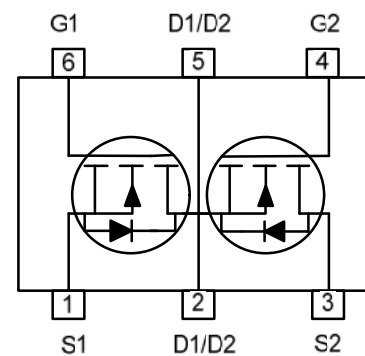


WNMD2167
Dual N-Channel, 20V, 6.3A, Power MOSFET
[Http://www.willsemi.com](http://www.willsemi.com)

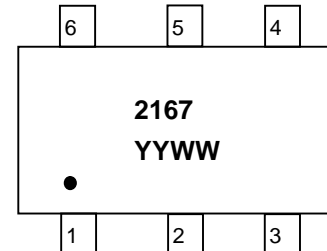
V_{DS} (V)	Typical $R_{ds(on)}$ ()
20	0.016@ $V_{GS}=4.5V$
	0.018@ $V_{GS}=3.1V$
	0.020@ $V_{GS}=2.5V$


SOT-23-6L
Descriptions

The WNMD2167 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 WNMD2167 is Pb-free.


Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-23-6L

Pin configuration (Top view)


2167 = Device Code
 YY = Year
 WW = Week

Applications

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

Marking
Order information

Device	Package	Shipping
WNMD2167-6/TR	SOT-23-6L	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}	± 10			
Continuous Drain Current ^{a d}	I_D	$T_A=25^{\circ}C$	6.3	5.7	A
		$T_A=70^{\circ}C$	5.0	4.6	
Maximum Power Dissipation ^{a d}	P_D	$T_A=25^{\circ}C$	1.1	0.9	W
		$T_A=70^{\circ}C$	0.7	0.6	
Continuous Drain Current ^b	I_D	$T_A=25^{\circ}C$	5.8	5.2	A
		$T_A=70^{\circ}C$	4.6	4.1	
Maximum Power Dissipation ^b	P_D	$T_A=25^{\circ}C$	0.9	0.7	W
		$T_A=70^{\circ}C$	0.6	0.5	
Pulsed Drain Current ^c	I_{DM}	30		A	
Operating Junction Temperature	T_J	150		$^{\circ}C$	
Lead Temperature	T_L	260		$^{\circ}C$	
Storage Temperature Range	T_{stg}	-55 to 150		$^{\circ}C$	

Thermal resistance ratings

Single Operation					
Parameter	Symbol	Typical	Maximum	Unit	
Junction-to-Ambient Thermal Resistance ^a	R_{JA}	t 10 s	76	94	$^{\circ}C/W$
		Steady State	115	145	
Junction-to-Ambient Thermal Resistance ^b	R_{JA}	t 10 s	92	115	
		Steady State	135	175	
Junction-to-Case Thermal Resistance	R_{JC}	63	78		
Dual Operation					
Junction-to-Ambient Thermal Resistance ^a	R_{JA}	t 10 s	79	97	$^{\circ}C/W$
		Steady State	118	148	
Junction-to-Ambient Thermal Resistance ^b	R_{JA}	t 10 s	96	118	
		Steady State	138	180	
Junction-to-Case Thermal Resistance	R_{JC}	66	81		

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

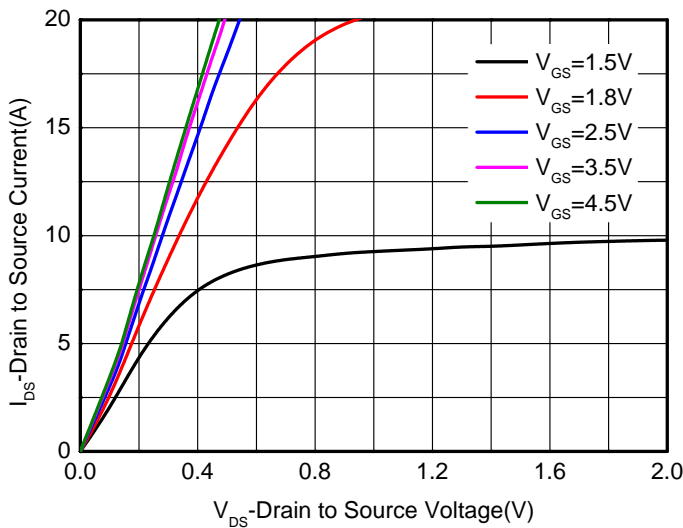
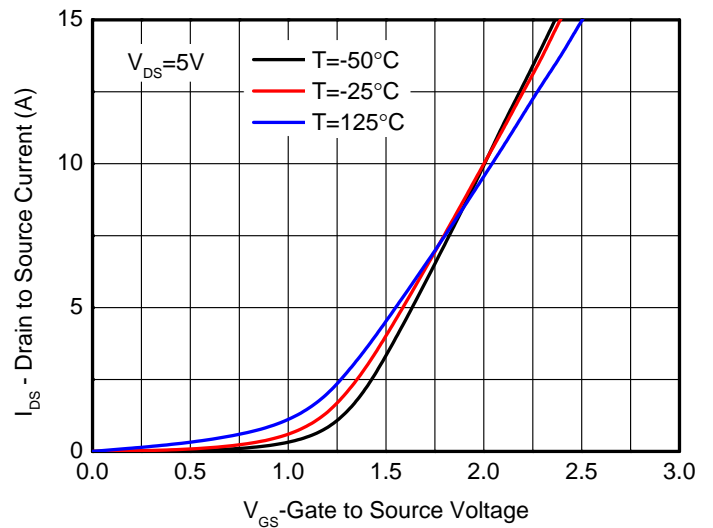
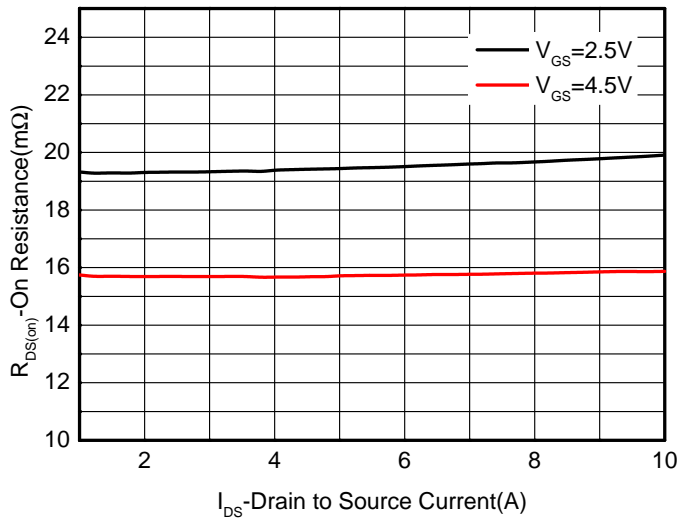
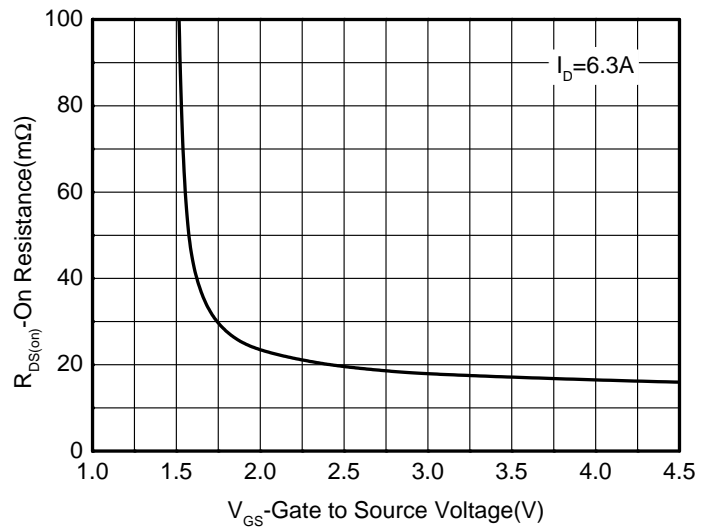
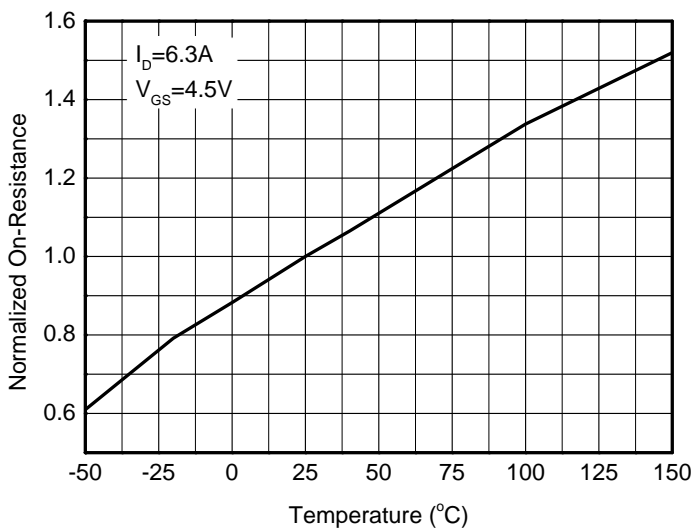
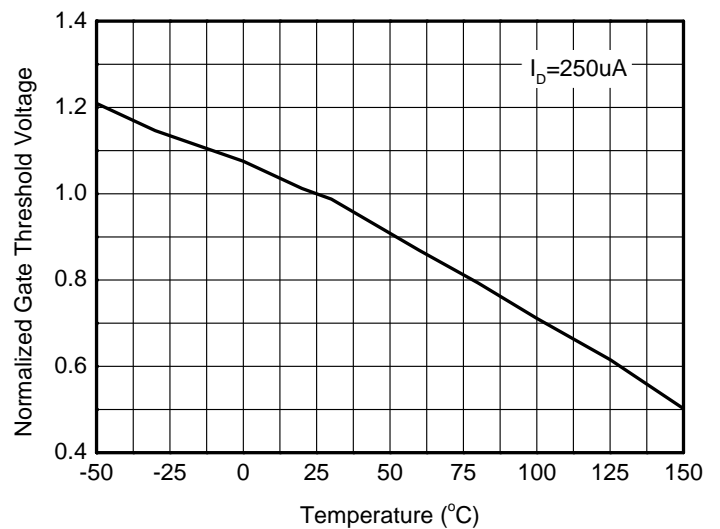
b Surface mounted on FR-4 board using minimum pad size, 1oz copper

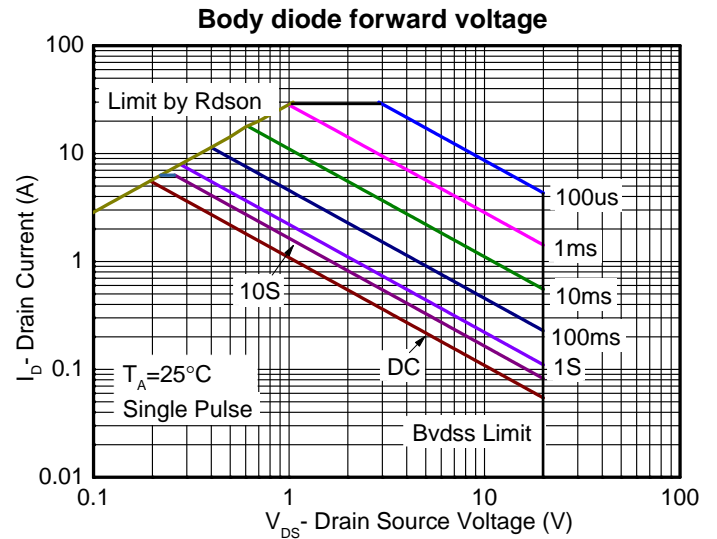
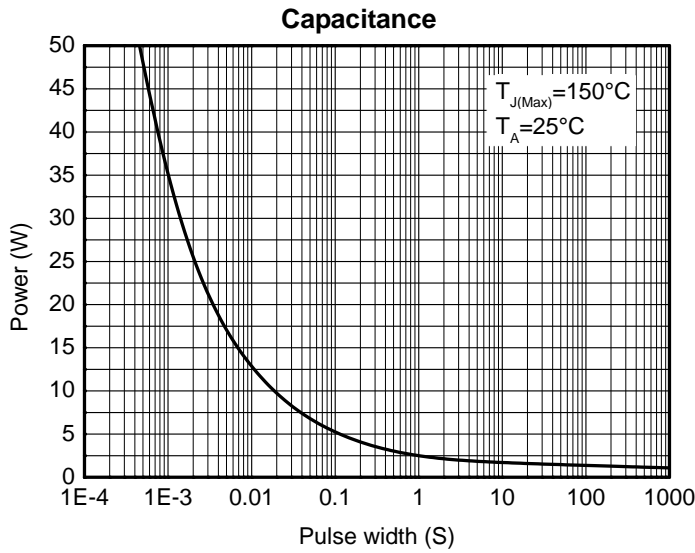
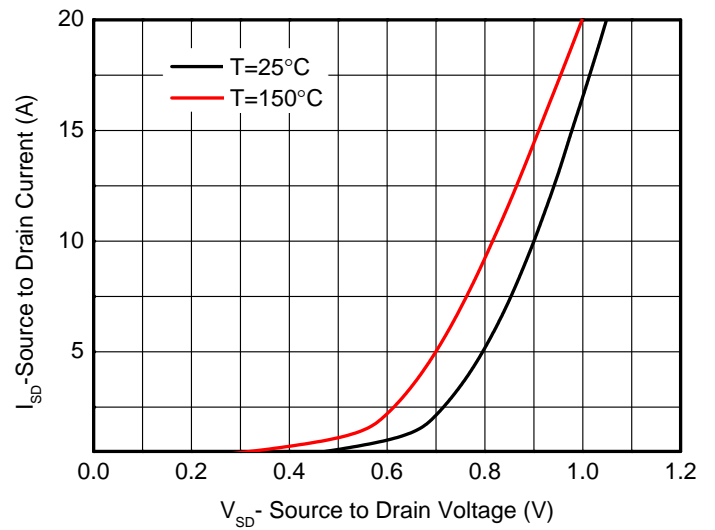
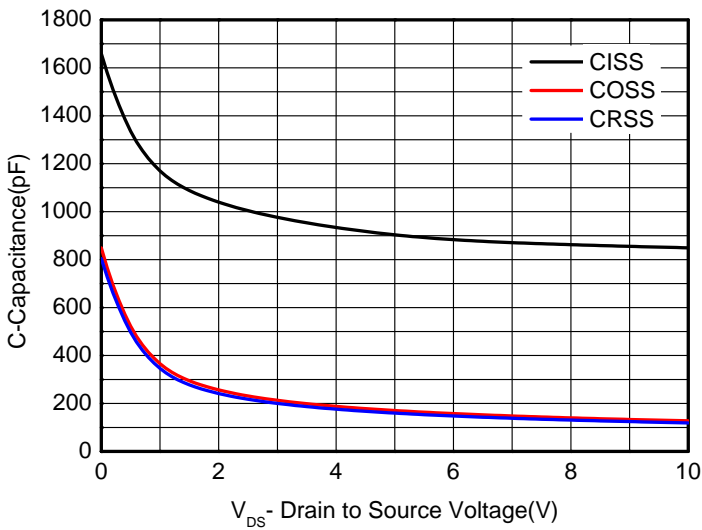
c Pulse width < 380 μ s, Duty Cycle < 2%

d Maximum junction temperature $T_J=150^{\circ}C$.

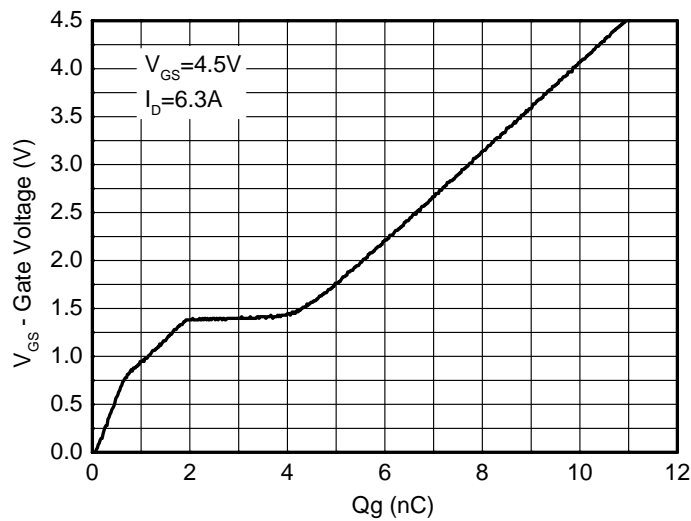
Electronics Characteristics (Ta=25°C, unless otherwise noted)

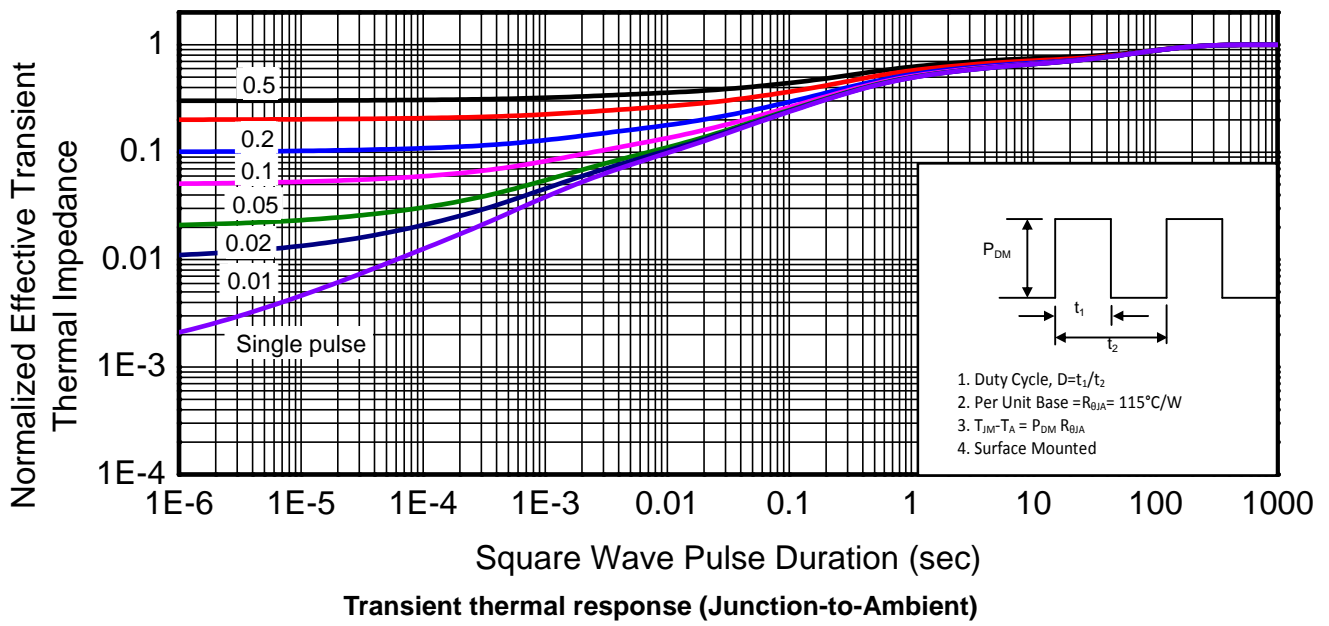
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\mu\text{A}$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$			1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			± 1	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	0.5	0.7	1.0	V
Drain-to-source On-resistance ^{b, c}	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 6.3\text{ A}$	12	16	21	m
		$V_{GS} = 3.1\text{ V}, I_D = 6.0\text{ A}$	14	18	23	
		$V_{GS} = 2.5\text{ V}, I_D = 5.5\text{ A}$	15	20	26	
Forward Transconductance	g_{FS}	$V_{DS} = 5.0\text{ V}, I_D = 6.3\text{ A}$		16		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, f = 1\text{ MHz},$ $V_{DS} = 10\text{ V}$		850		pF
Output Capacitance	C_{OSS}			127		
Reverse Transfer Capacitance	C_{RSS}			115		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 4.5\text{ V}, V_{DD} = 10\text{ V},$ $I_D = 6.3\text{ A}$		10.9		nC
Threshold Gate Charge	$Q_{G(TH)}$			0.62		
Gate-to-Source Charge	Q_{GS}			1.92		
Gate-to-Drain Charge	Q_{GD}			2.0		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_d(ON)$	$V_{GS} = 4.5\text{ V}, V_{DD} = 10\text{ V},$ $R_L = 2\ \Omega, R_G = 6\ \Omega$		22		ns
Rise Time	t_r			18		
Turn-Off Delay Time	$t_d(OFF)$			62		
Fall Time	t_f			28		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 1.0\text{ A}$		0.65	1.5	V

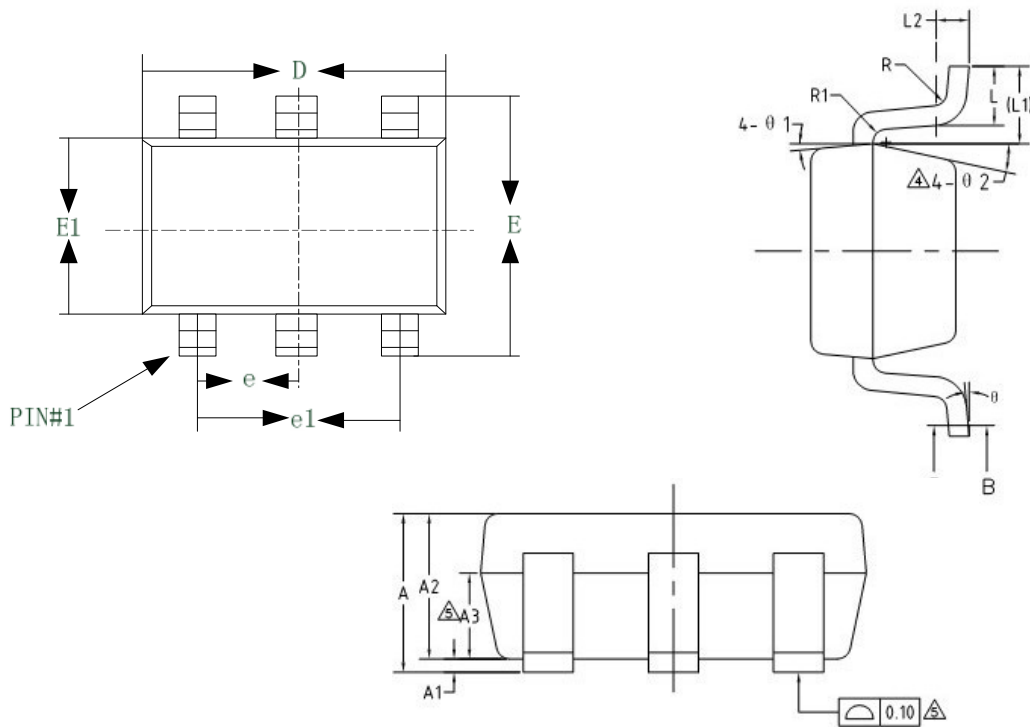
Typical Characteristics (Ta=25°C, unless otherwise noted)

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


Single pulse power

* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe operating power

Gate Charge Characteristics



Package outline dimensions
SOT-23-6


Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	-	-	1.25
A1	0	-	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	-	0.50
b1	0.36	0.38	0.45
c	0.14	-	0.20
c1	0.14	0.15	0.16
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.10	-	-
R1	0.10	-	0.20
θ	0°	-	8°
$\theta 1$	3°	5°	7°
$\theta 2$	6°	-	14°