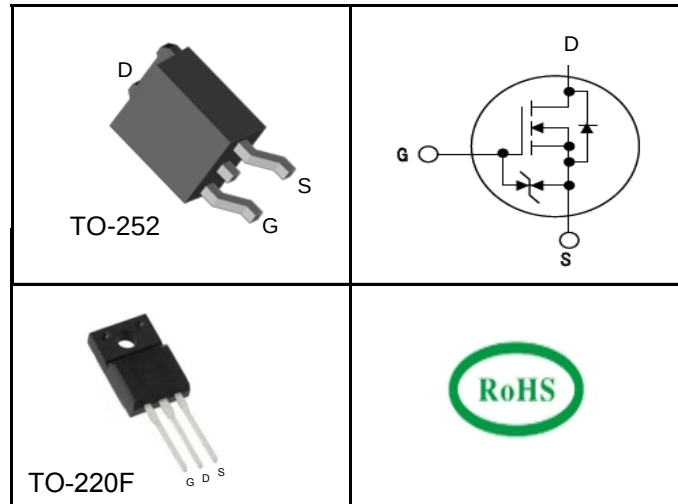


General Description

This Power MOSFET is produced using WPMtek's Advanced Super-Junction technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for AC/DC power conversion in switching mode operation for higher efficiency.

Features

- 8A, 650V, $R_{DS(on)typ} = 0.52\Omega @ V_{GS} = 10V$
- Low gate charge (typical 18nC)
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Absolute Maximum Ratings

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	WTM08N65AD	WTM08N65AF	Units
V_{DSS}	Drain-Source Voltage	650		V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$)	8		A
	- Continuous ($T_C = 100^\circ\text{C}$)	4.4		A
I_{DM}	Drain Current - Pulsed (Note 1)	28		A
V_{GSS}	Gate-Source Voltage	± 30		V
EAS	Single Pulsed Avalanche Energy (Note 2)	400		mJ
I_{AR}	Avalanche Current (Note 1)	11		A
dv/dt	Peak Diode Recovery dv/dt (Note 3)	15		V/ns
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	125	35	W
	- Derate above 25°C	1.0	0.28	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300		$^\circ\text{C}$

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	WTM08N65AD	WTM08N65AF	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.0	3.57	$^\circ\text{C/W}$
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	--	--	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	62.5	$^\circ\text{C/W}$

Electrical Characteristics

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	650	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, Referenced to 25°C	--	0.6	--	V/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 560\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 3.5\text{ A}$	--	0.52	0.6	Ω
R_g	Gate resistance	$F=1\text{MHz}$	--	4.9	--	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	494	--	pF
C_{oss}	Output Capacitance		--	27	--	pF
C_{rss}	Reverse Transfer Capacitance		--	1.7	--	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 350\text{ V}, I_D = 8.0\text{ A},$ $R_G = 24\text{ }\Omega$ (Note 4, 5)	--	10	--	ns
t_r	Turn-On Rise Time		--	28	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	53	--	ns
t_f	Turn-Off Fall Time		--	26	--	ns
Q_g	Total Gate Charge	$V_{DS} = 560\text{ V}, I_D = 8.0\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 4, 5)	--	18	--	nC
Q_{gs}	Gate-Source Charge		--	3.9	--	nC
Q_{gd}	Gate-Drain Charge		--	9.3	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	8.0	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	28	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 8.0A	--	--	1.4	V
t _{rr}	Reverse Recovery Time	V _{GS} = 0 V, I _S = 8.0A, dl _F / dt = 100 A/us (Note 4)	--	317	--	ns
Q _{rr}	Reverse Recovery Charge		--	2.8	--	uC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 79\text{ mH}, I_{AS} = 3.2\text{ A}, V_{DD} = 100\text{ V}, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 8.0\text{ A}, di/dt \leq 100\text{ A/us}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

Typical Characteristics

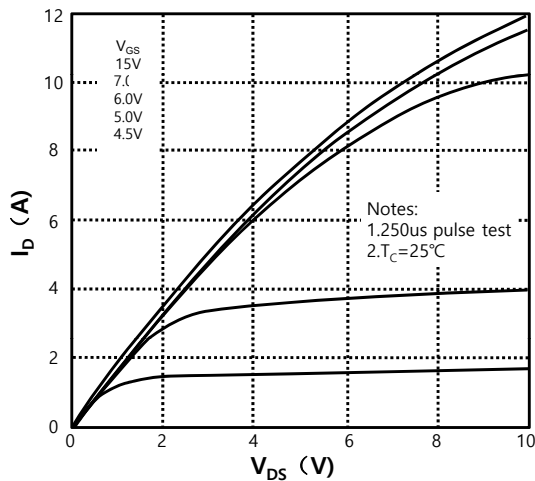


Figure 1. On-Region Characteristics

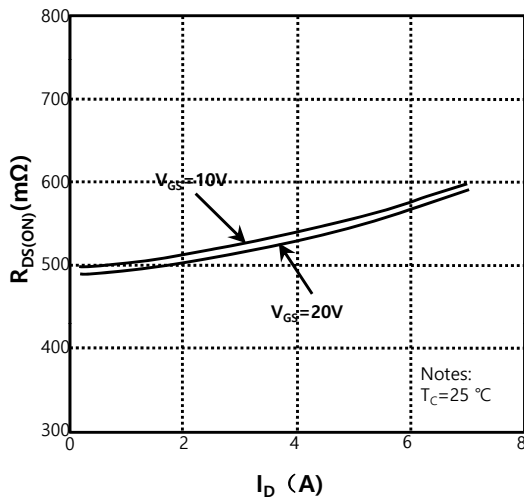


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

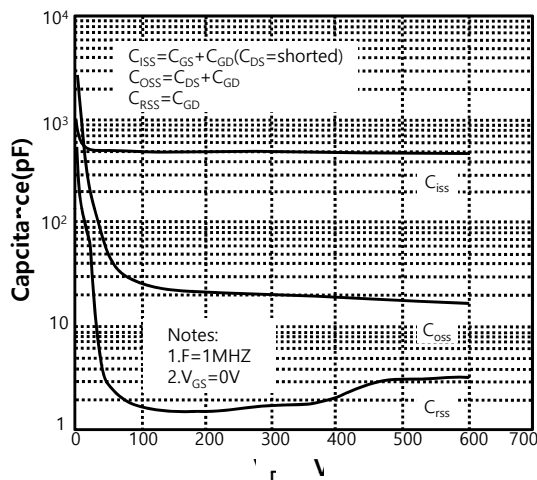


Figure 5. Capacitance Characteristics

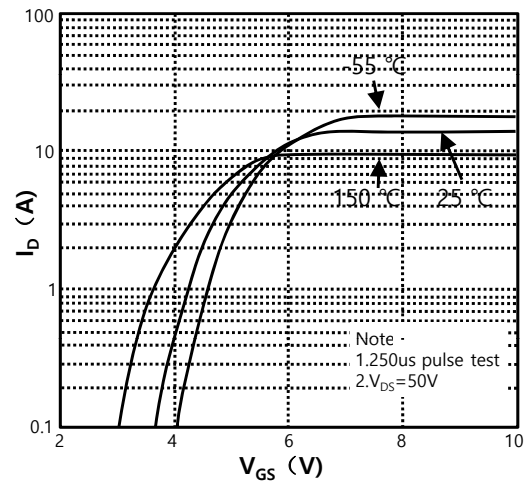


Figure 2. Transfer Characteristics

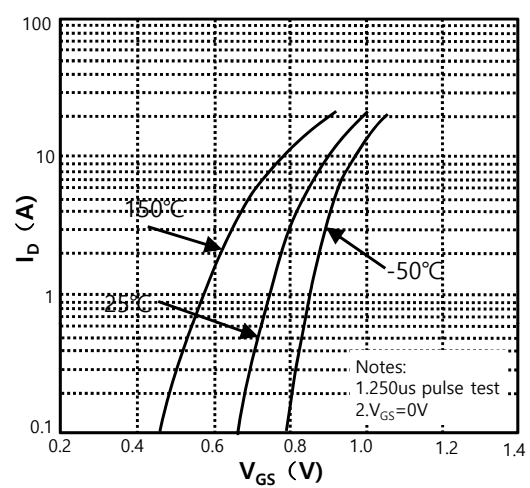


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

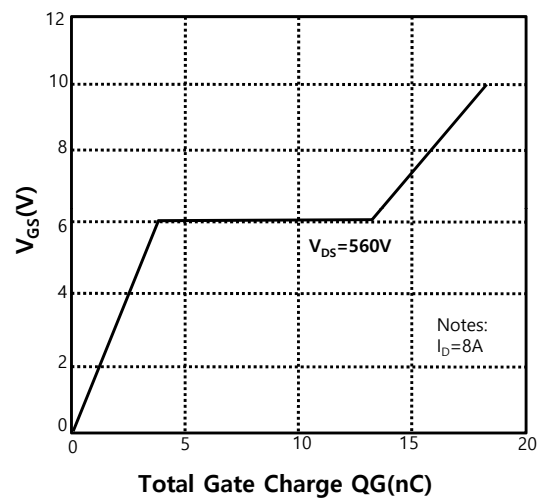


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

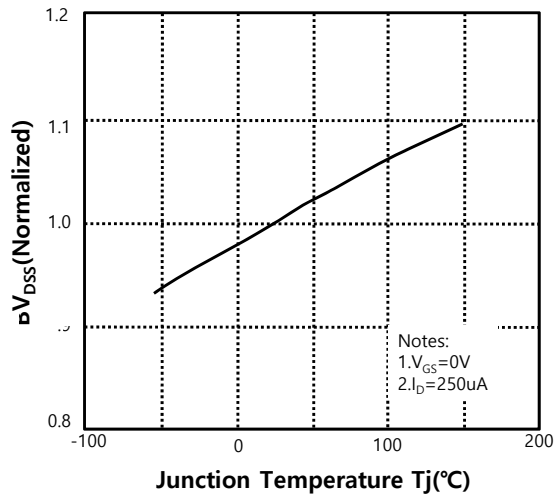


Figure 7. Breakdown Voltage Variation vs Temperature

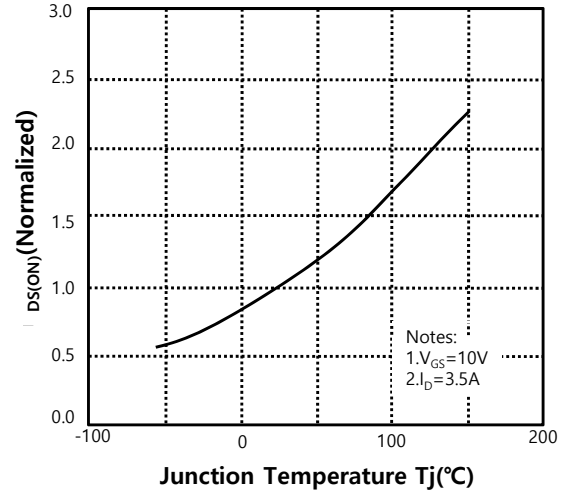


Figure 8. On-Resistance Variation vs Temperature

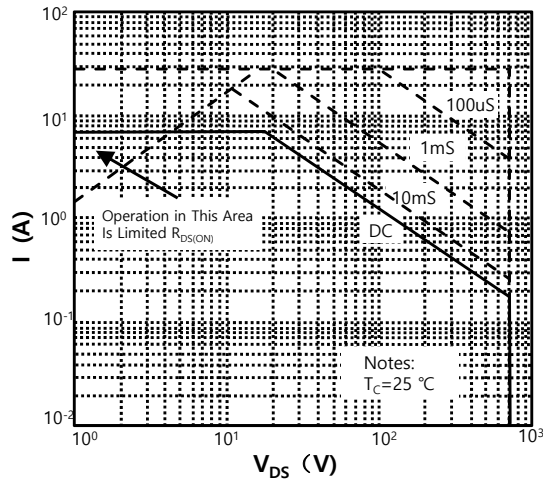


Figure 9-1. Maximum Safe Operating Area W TM08N65AD

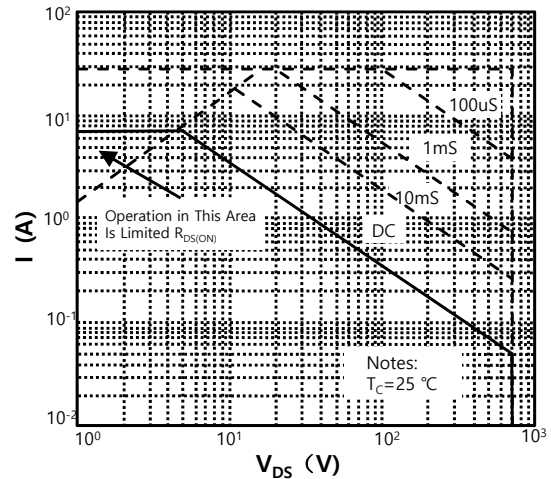


Figure 9-2. Maximum Safe Operating Area W TM08N65AF

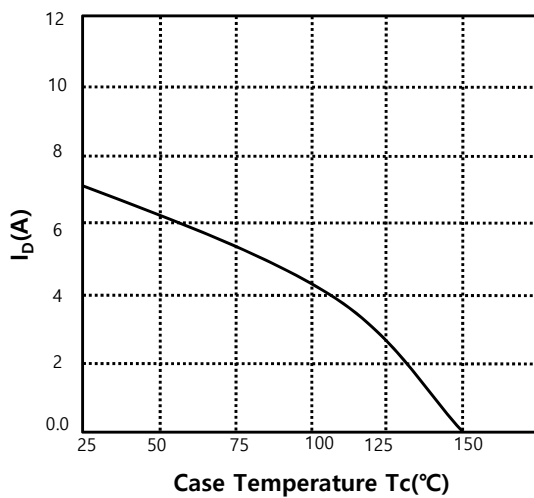
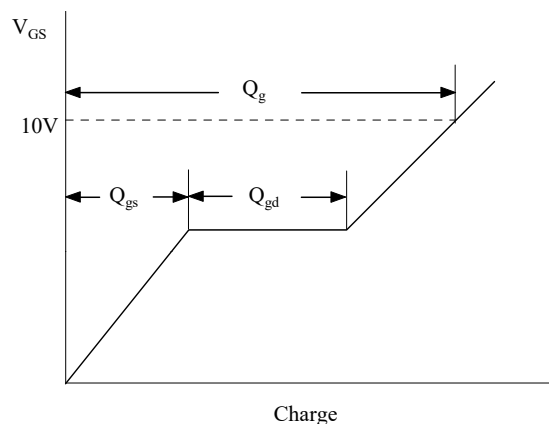
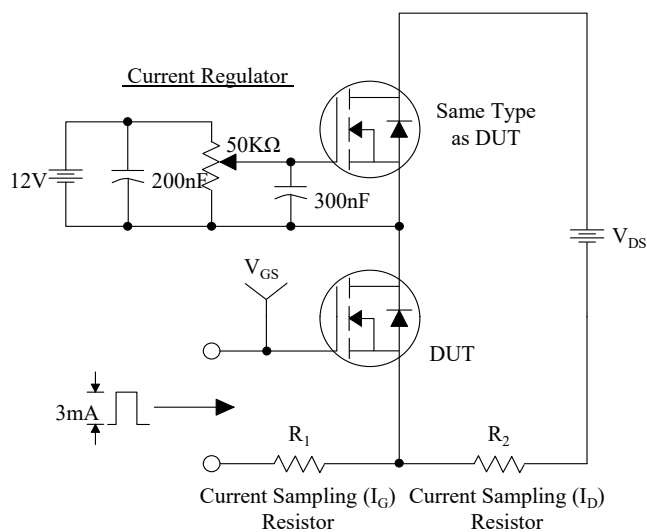
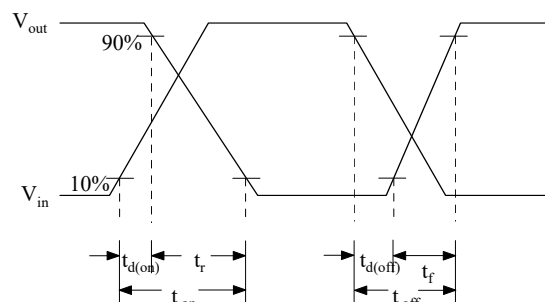
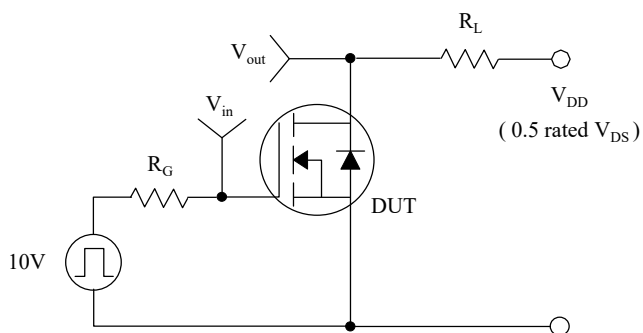


Figure 10. Maximum Drain Current vs Case Temperature

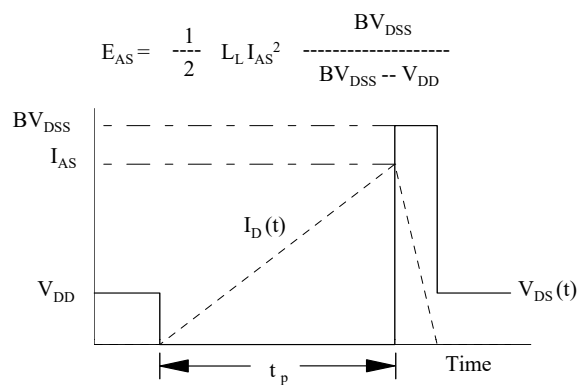
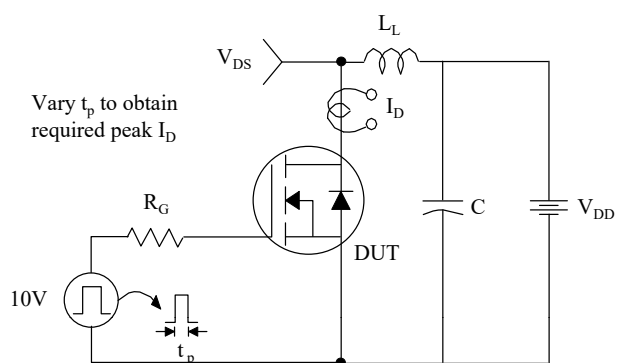
Gate Charge Test Circuit & Waveform



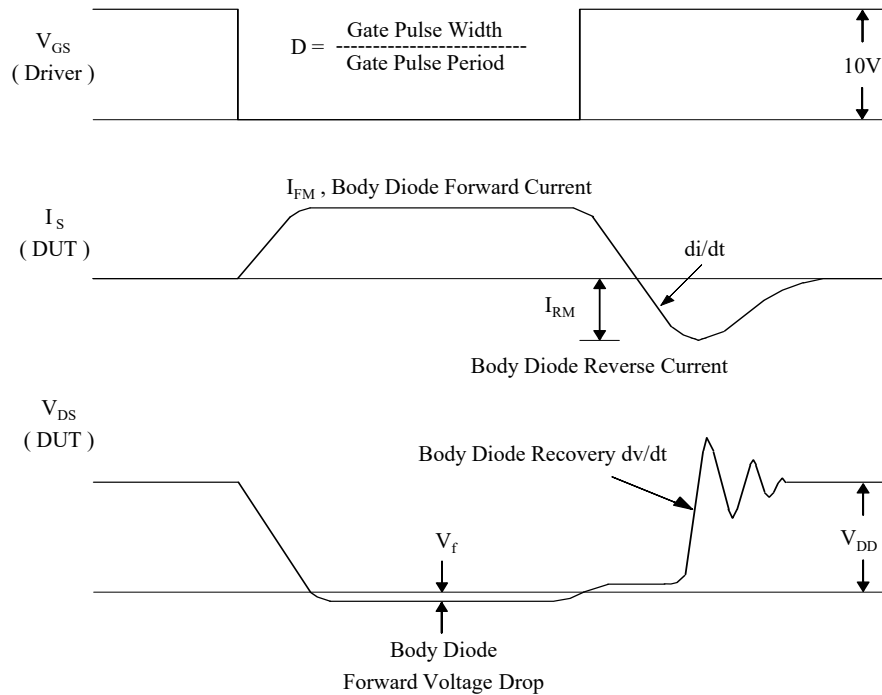
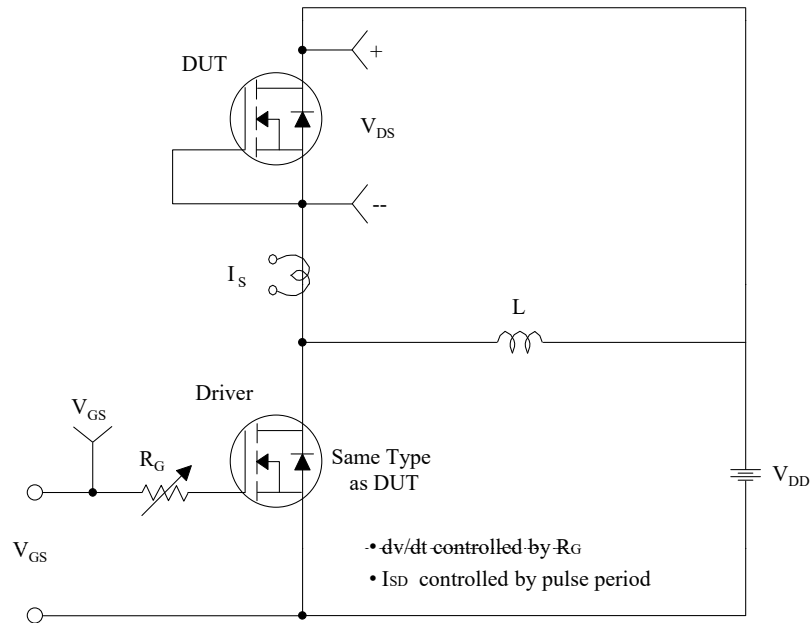
Resistive Switching Test Circuit & Waveforms



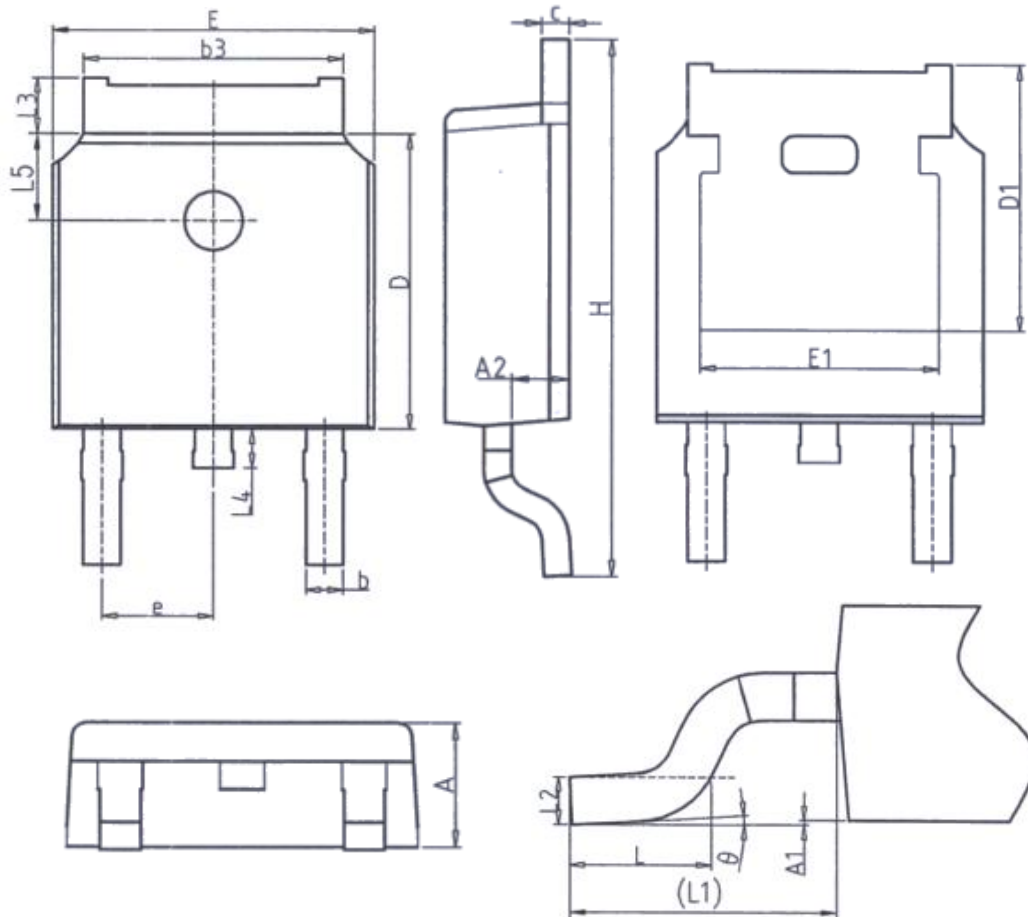
Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Test Circuit & Waveforms



TO-252

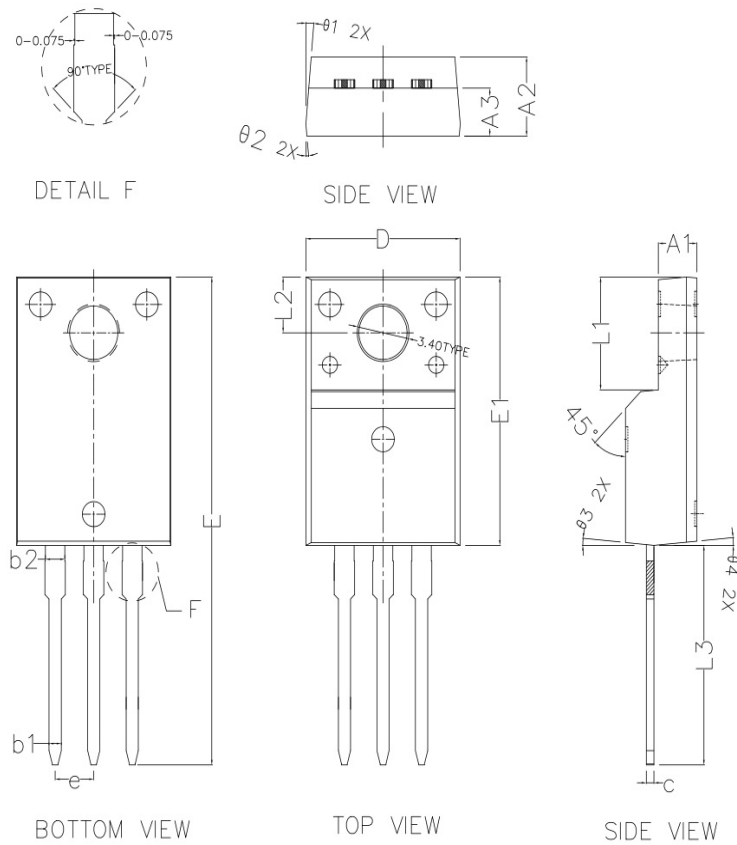


Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	-	1.00
L5	1.65	1.95
θ	0°	8°

Package Outline

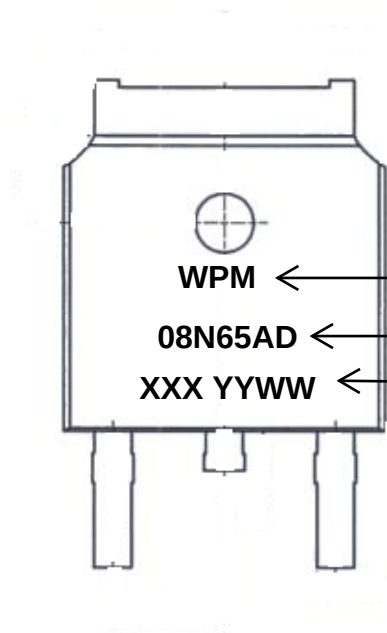
TO-220F Outline



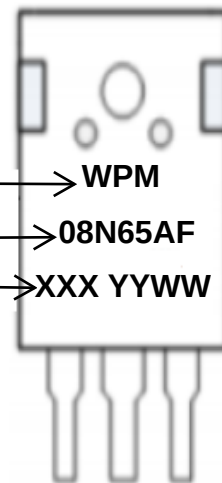
COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	2.440	2.540	2.640
A2	4.600	4.700	4.800
A3	2.730	2.830	2.930
b1	0.750	0.800	0.850
b2	1.230	1.280	1.330
c	0.450	0.500	0.550
D	10.060	10.160	10.260
E	28.650	28.850	29.050
E1	15.770	15.870	15.970
e	2.54TYPE		
L1	6.68REF		
L2	3.30REF		
L3	12.830	12.980	13.130
$\theta 1$	5° TYPE		
$\theta 2$	5° TYPE		
$\theta 3$	5° TYPE		
$\theta 4$	5° TYPE		

Marking Information

TO-252



TO-220F



WPM	←	WPM Logo	→	WPM
08N65AD	←	Marking	→	08N65AF
XXX YYWW	←	Date Code	→	XXX YYWW

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