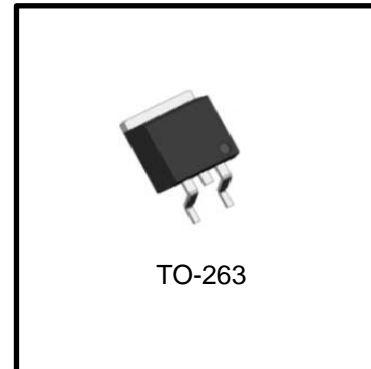


800V 0.3Ω Super Junction Power MOSFET

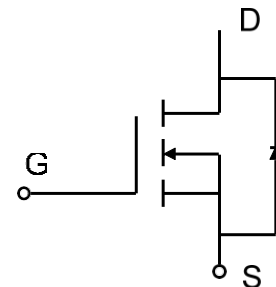
Description

WMOS™ M3 is Wayon's 3rd generation 800V super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS™ M3 is suitable for applications which require superior power density and outstanding efficiency.



Features

- $V_{DS} = 850V @ T_{j,max}$
- Typ. $R_{DS(on)} = 0.3\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free



Applications

LED Lighting, Charger, Adapter, PC, LCD TV, Server

Absolute Maximum Ratings

Parameter	Symbol	WMN/WMM/WMJ/WMK	WML	Unit
Drain-source voltage	V_{DSS}	800		V
Continuous drain current ¹⁾ ($T_C = 25^\circ C$) ($T_C = 100^\circ C$)	I_D	15		A
		8		A
Pulsed drain current ²⁾	I_{DM}	56		A
Gate-source voltage	V_{GS}	± 30		V
Avalanche energy, single pulse ³⁾	E_{AS}	350		mJ
Avalanche energy, repetitive ²⁾	E_{AR}	0.25		mJ
Avalanche current, repetitive ²⁾	I_{AR}	3		A
Power dissipation ($T_C = 25^\circ C$) - Derate above $25^\circ C$	P_D	150	35	W
		1.2	0.28	W/ $^\circ C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150		$^\circ C$
Continuous diode forward current ¹⁾	I_S	15		A
Diode pulse current ²⁾	$I_{S,pulse}$	56		A

Thermal Characteristics

Parameter	Symbol	WMN/WMM/WMJ/WMK	WML	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	0.85	3.7	$^\circ C/W$
Thermal resistance, junction-to-ambient	$R_{\theta A}$	62	80	$^\circ C/W$



WMM15N80M3

Electrical Characteristics T_c = 25°C, unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0 V, I _D =0.25 mA	800	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =0.25mA	2.5	3.5	4.5	V
Drain cut-off current	I _{DSS}	V _{DS} =800 V, V _{GS} =0 V, T _j = 25°C T _j = 125°C	- -	- 10	1 -	μA
Gate leakage current, forward	I _{GSSF}	V _{GS} =30 V, V _{DS} =0 V	-	-	100	nA
Gate leakage current, reverse	I _{GSSR}	V _{GS} =-30 V, V _{DS} =0 V	-	-	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =4A T _j = 25°C	- -	- 0.3	- 0.36	Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz	-	1700	-	pF
Output capacitance	C _{oss}		-	63	-	
Reverse transfer capacitance	C _{rss}		-	2.6	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 300V, I _D = 10A R _G = 25Ω, V _{GS} =10V	-	35	-	ns
Rise time	t _r		-	38	-	
Turn-off delay time	t _{d(off)}		-	125	-	
Fall time	t _f		-	24	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =480 V, I _D =10A, V _{GS} =0 to 10 V	-	7.8	-	nC
Gate to drain charge	Q _{gd}		-	15	-	
Gate charge total	Q _g		-	34	-	
Gate plateau voltage	V _{plateau}		-	5.7	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0 V, I _F =4A	-	-	1.2	V
Reverse recovery time	t _{rr}	V _R =50 V, I _F =10A, dI _F /dt=100 A/μs	-	260	-	ns
Reverse recovery charge	Q _{rr}		-	3.1	-	μC
Peak reverse recovery current	I _{rrm}		-	26	-	A

Notes:

- Limited by T_{j max}. Maximum duty cycle D=0.5.
- Repetitive rating: pulse width limited by maximum junction temperature
- I_{AS} = 3A, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C

Typical Performance Characteristics

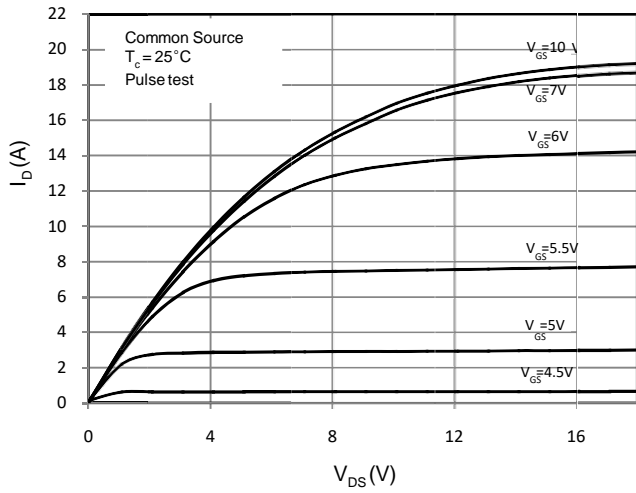


Figure 1. On-Region Characteristics

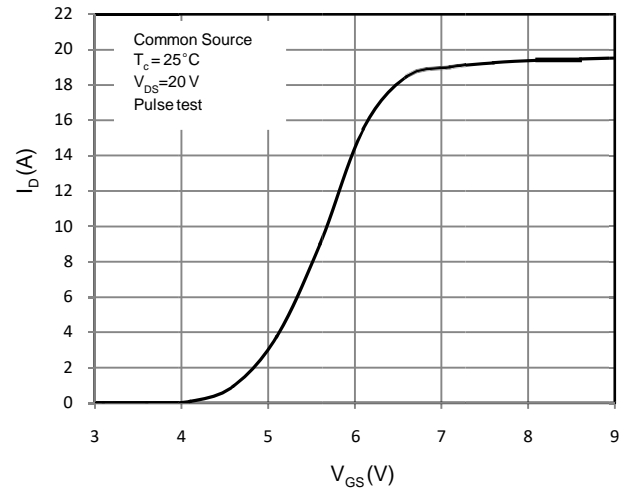


Figure 2. Transfer Characteristics

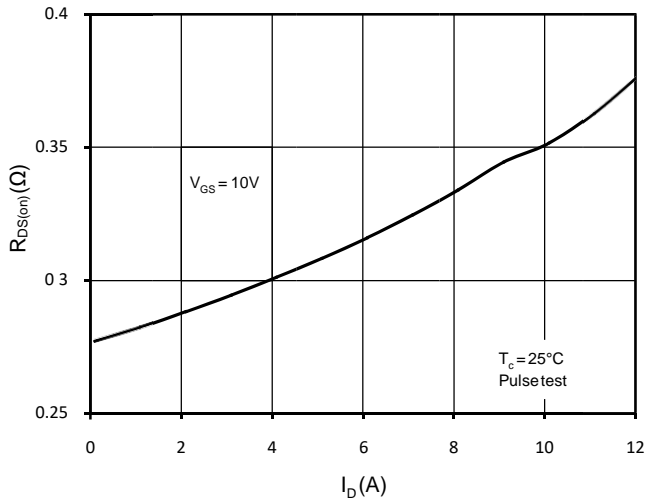


Figure 3. Static Drain-Source On Resistance

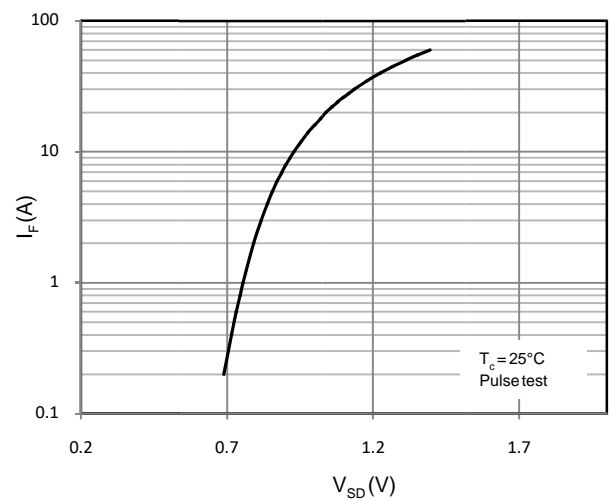


Figure 4. Body-Diode Forward Characteristics

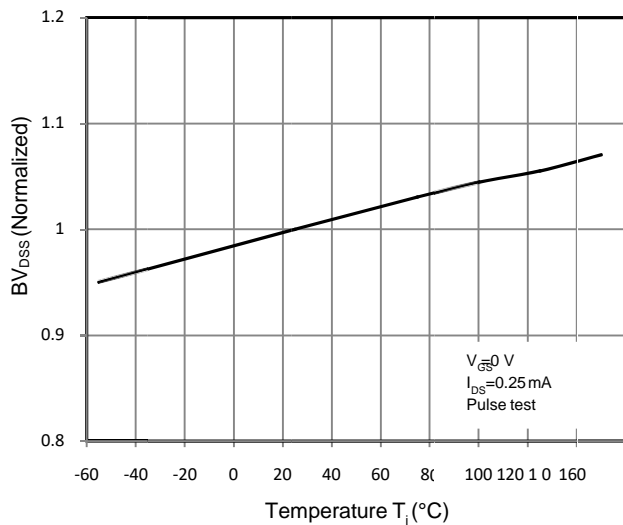


Figure 5. Normalized BV_{DS} vs. Temperature

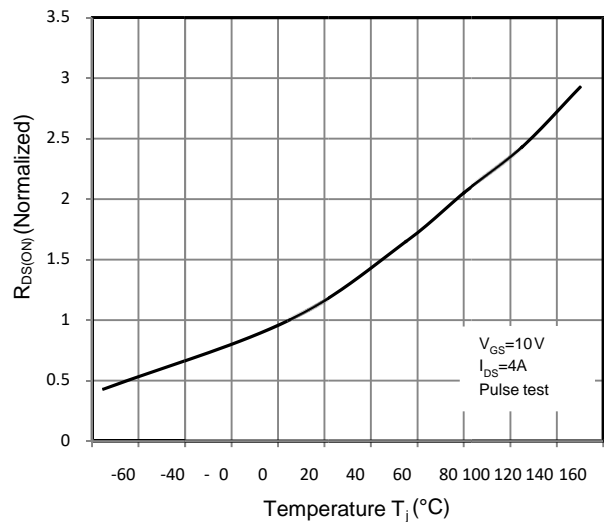


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

Typical Performance Characteristics(Con.)

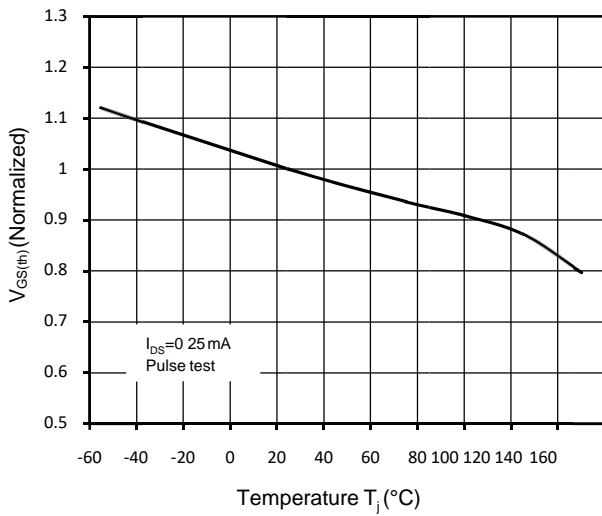


Figure 7. Threshold Voltage vs. Temperature

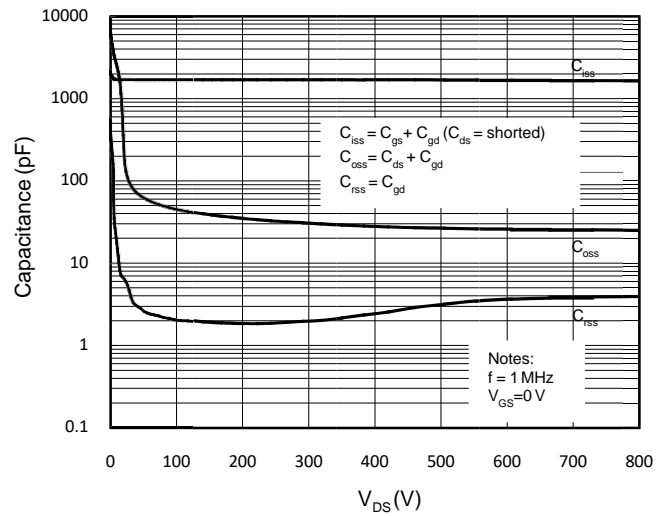


Figure 8. Capacitance Characteristics

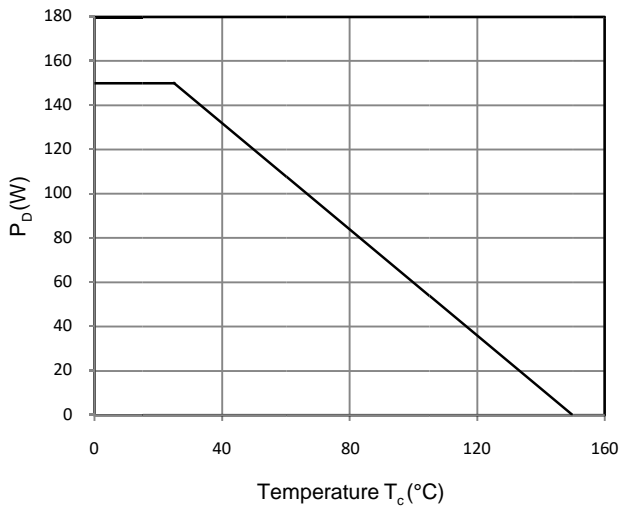


Figure 9. Power Dissipation

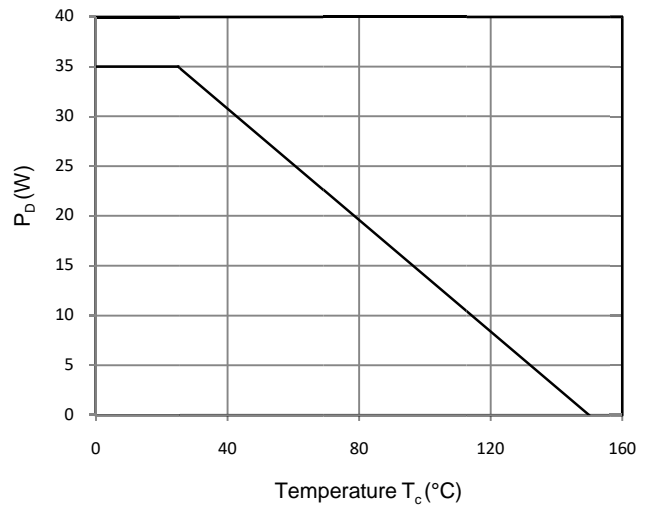


Figure 10. Power Dissipation (TO-220F)

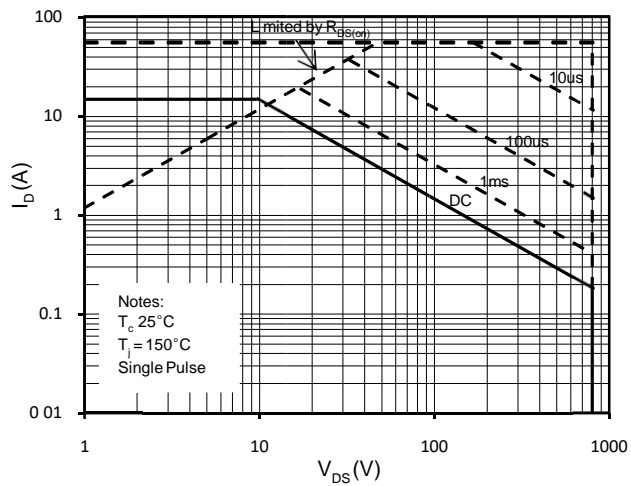


Figure 11. Maximum Safe Operating Area

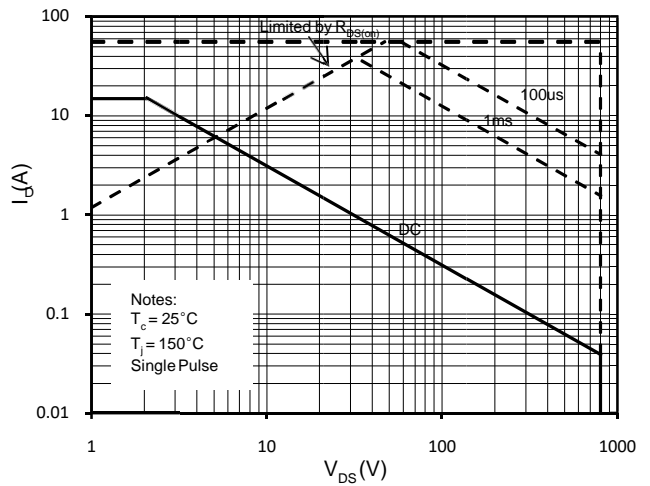


Figure 12. Maximum Safe Operating Area (TO-220F)

Typical Performance Characteristics(Con.)

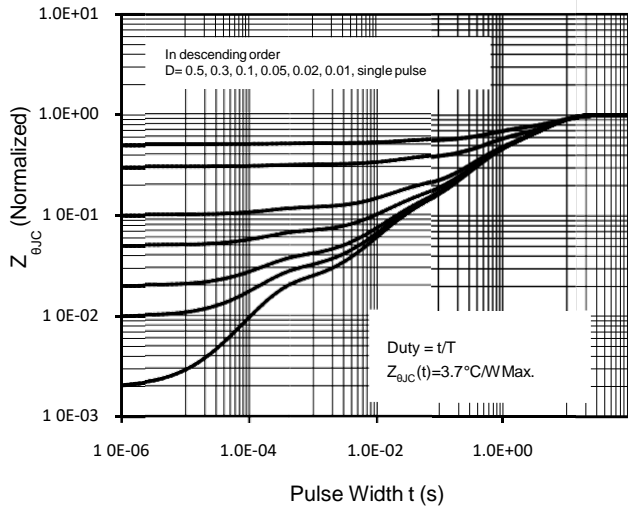


Figure 13. Transient Thermal Response Curve (TO-220F)

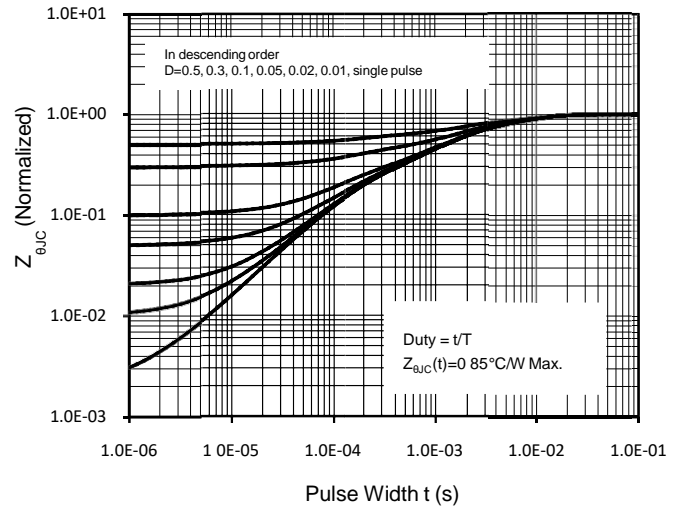


Figure 14. Transient Thermal Response Curve

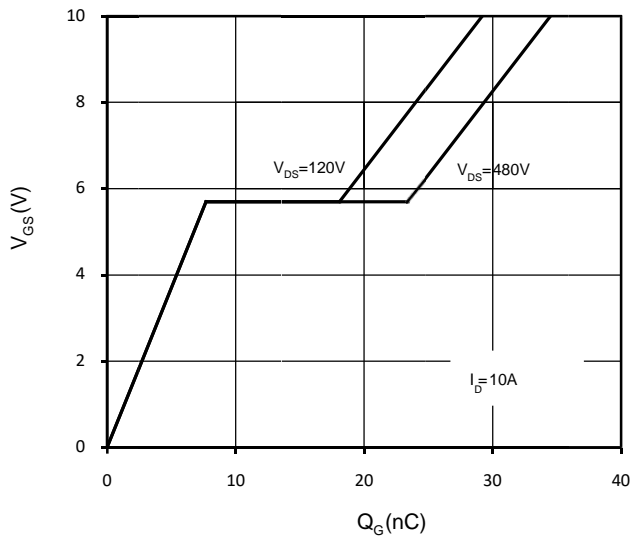
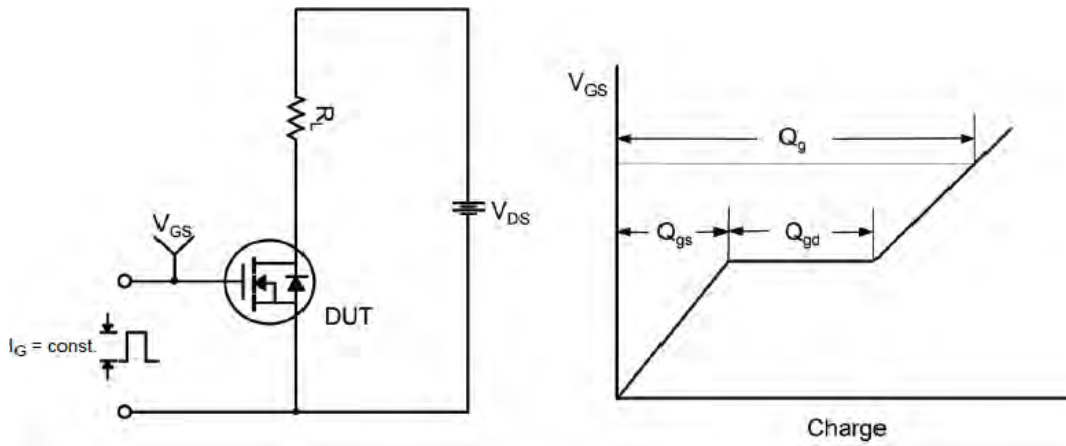
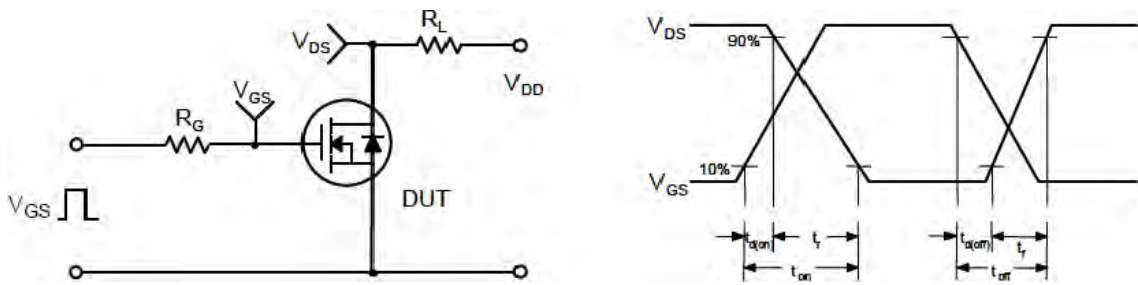


Figure 15. Gate Charge Characteristics

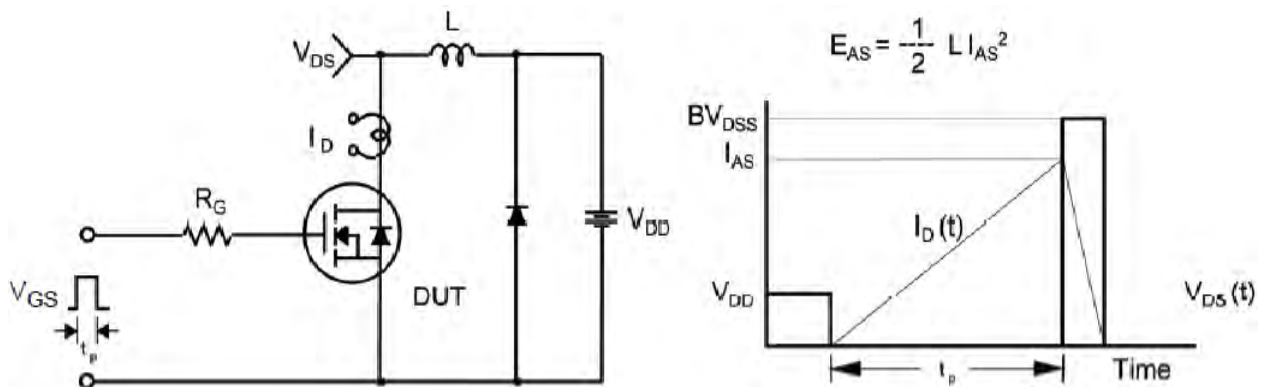
Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveforms

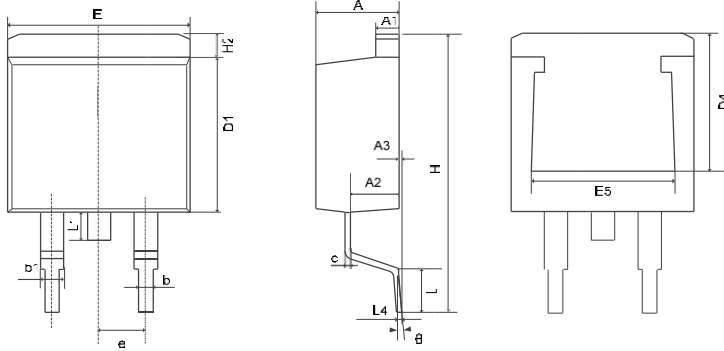


Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for TO-263

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.49	2.89
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.45	8.90
D4	6.60	—
E	9.86	10.40
E5	7.06	—
e	2.54BSC	
H	14.70	15.50
H2	1.07	1.47
L	2.00	2.70
L1	1.40	1.70
L4	0.25BSC	
θ	0°	9°