650V, 25A, 98mΩ N-channel Power Super Junction MOSFET

JMH65R110PEFD

Features

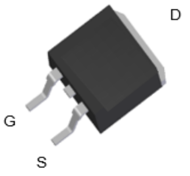
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% ΔVds Tested
- Halogen-free; RoHS-compliant

Applications

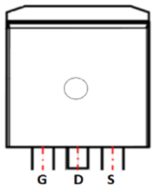
- SMPS with PFC
- Flyback and LLC topologies
- Silver ATX,adapter,TV,lighting,Telecom

Product Summary

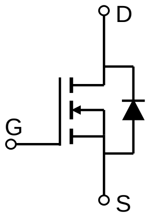
Parameters	Value	Unit
V_{DSS}	650	V
$V_{GS(th)\_Typ}$	3.3	V
I_D(@V_{GS}=10V)	25	A
$R_{DS(ON)\_Typ}$(@V_{GS}=10V	98	mΩ



TO-263 -3L Top View



Pin Assignment



Schematic Diagram

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMH65R110PEFD-13	H65R110PF	3	Tape&Reel	TO-263-3L	800	4000

Absolute Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{DS}	Drain-to-Source Voltage		650	V
V_{GS}	Gate-to-Source Voltage		±30	V
I_D	Continuous Drain Current	T_C = 25°C	25	A
		T_C = 100°C	16	
I_{DM}	Pulsed Drain Current (1)		Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy (2)		259	mJ
P_D	Power Dissipation	T_C = 25°C	179	W
		T_C = 100°C	71	
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient(3)	33	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.7	

Electrical Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu A$, $V_{GS} = 0V$	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650V$, $V_{GS} = 0V$	-	-	10.0	µA
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0V$, $V_{GS} = \pm 30V$	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	2.3	3.3	4.3	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	$V_{GS} = 10V$, $I_D = 15A$	-	98	110	mΩ
Dynamic Characteristics						
R_g	Gate Resistance	f = 1MHz	-	4.8	-	Ω
C_{iss}	Input Capacitance	$V_{GS} = 0V$, $V_{DS} = 325V$, f = 1MHz	1552	2173	2934	pF
C_{oss}	Output Capacitance		36	51	69	pF
C_{rss}	Reverse Transfer Capacitance		-	6.3	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V $V_{DS} = 325V$, $I_D = 10A$	33	47	63	nC
Q_{gs}	Gate Source Charge		10	14	19	nC
Q_{gd}	Gate Drain("Miller") Charge		12	16	22	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	$V_{GS} = 10V$, $V_{DD} = 325V$ $I_D = 10A$, $R_{GEN} = 24\Omega$	-	46	-	ns
t_r	Turn-On Rise Time		-	38	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	157	-	ns
t_f	Turn-Off Fall Time		-	34	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	25	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	99	A
V_{SD}	Body Diode Forward Voltage	$V_{GS} = 0V$, $I_S = 10A$	-		1.2	V
trr	Body Diode Reverse Recovery Time	$I_F = 10A$, di/dt = 100A/us	100	141	190	ns
Qrr	Body Diode Reverse Recovery Charge		-	1.0	-	uC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=75V, V_{GS}=10V, R_G=25ohm, L=10mH, I_{AS}=7.2A, V_{DD}=0V during time in avalanche.
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
4. Pulse Test: Pulse Width⩽300µs, Duty Cycle⩽0.5%.

Typical Performance Characteristics

Figure 1: Power De-rating

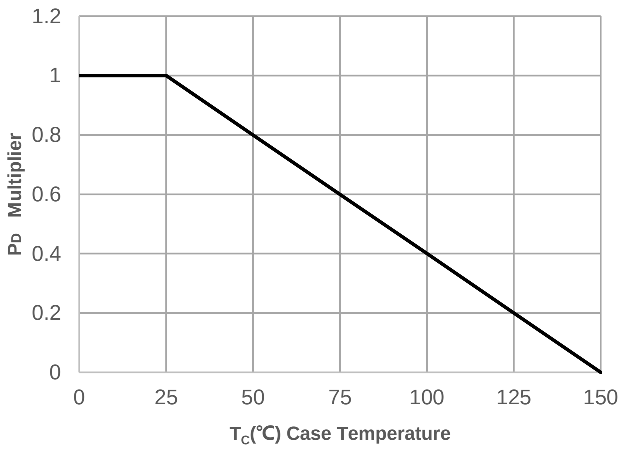


Figure 2: Current De-rating

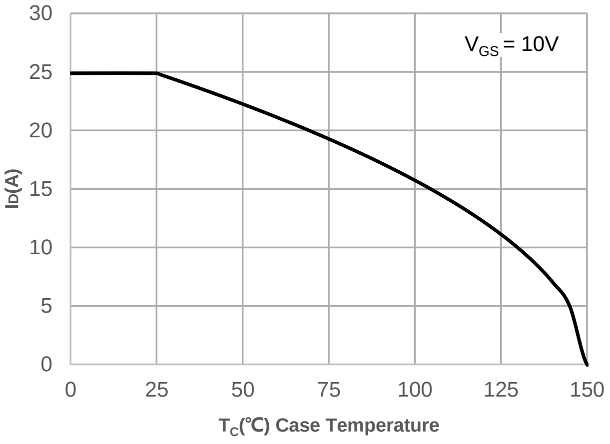


Figure 3: Normalized Maximum Transient Thermal Impedance

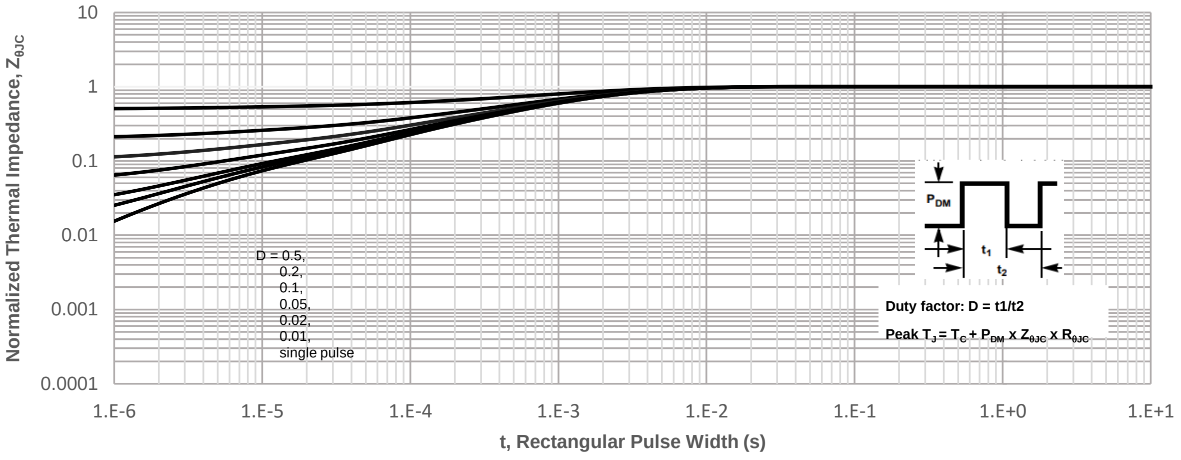
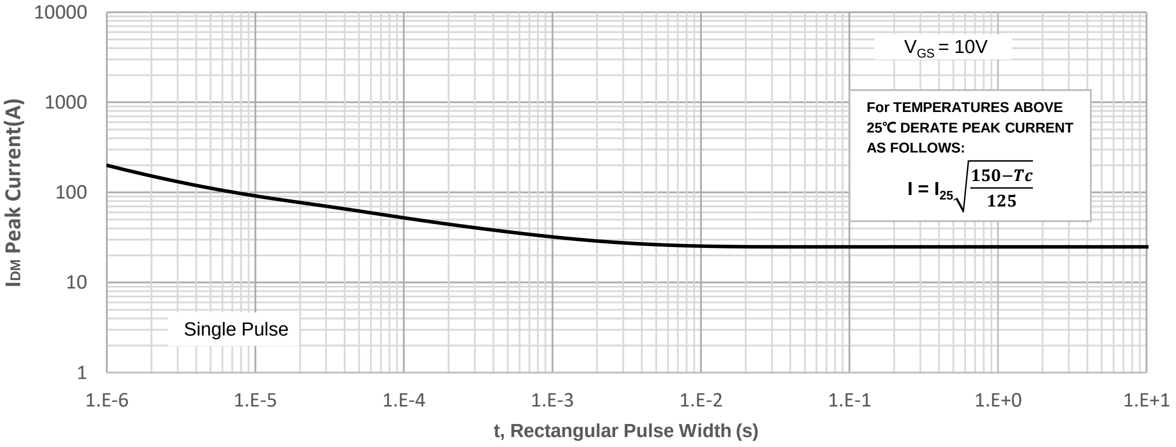


Figure 4: Peak Current Capacity



Typical Performance Characteristics

Figure 5: Output Characteristics

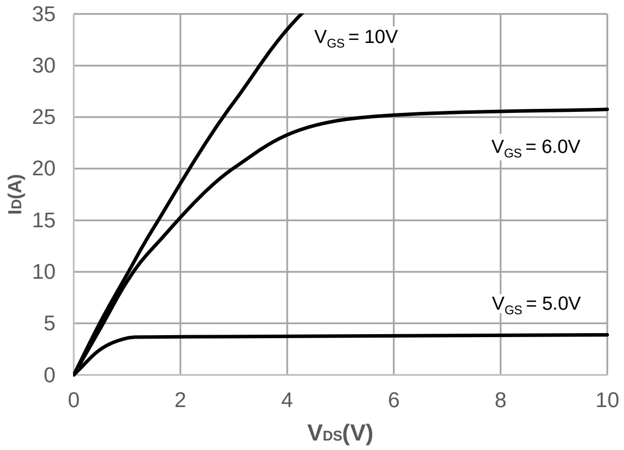


Figure 6: Typical Transfer Characteristics

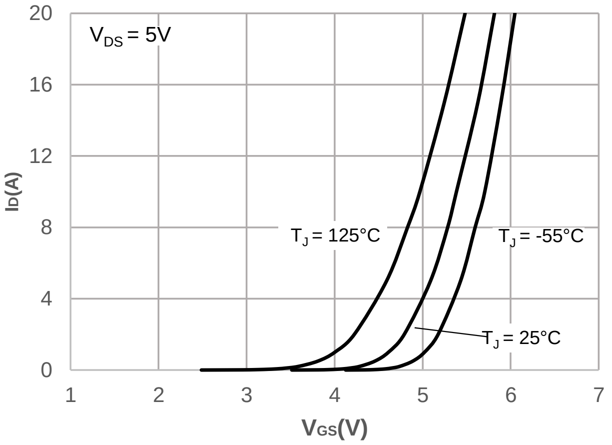


Figure 7: On-resistance vs. Drain Current

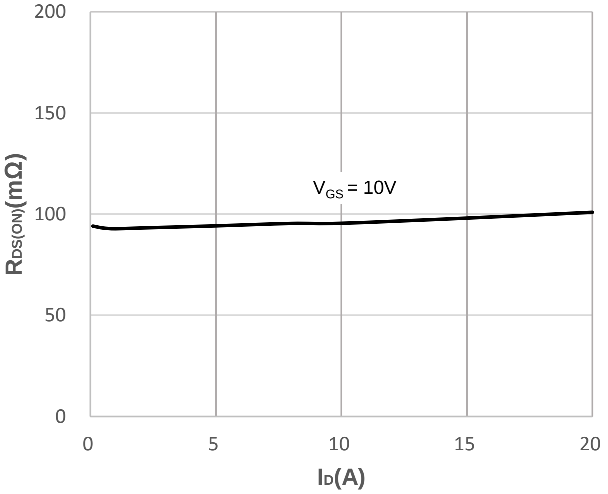


Figure 8: Body Diode Characteristics

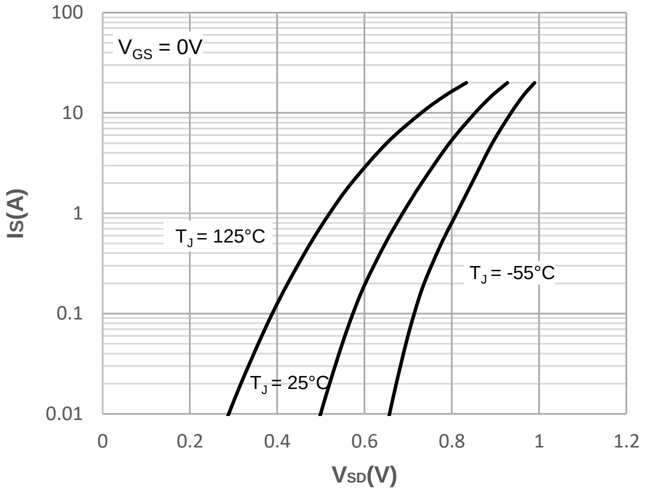


Figure 9: Gate Charge Characteristics

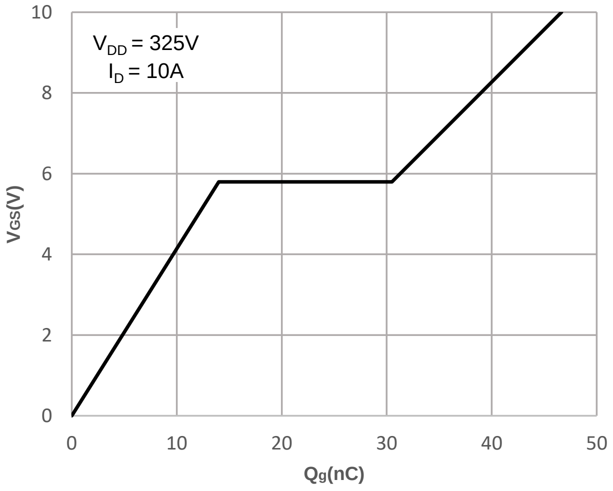
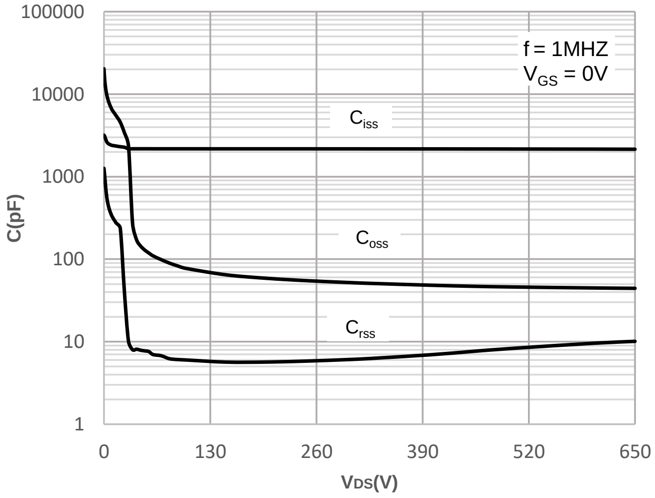


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

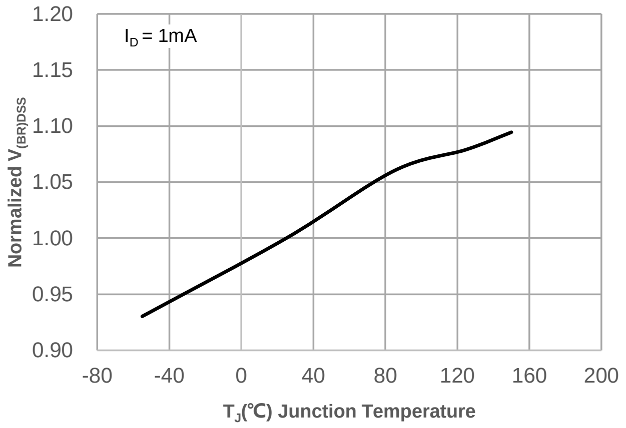


Figure 12: Normalized on Resistance vs. Junction Temperature

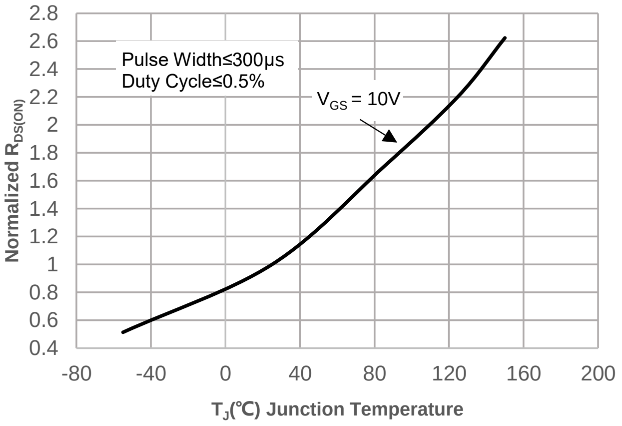


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

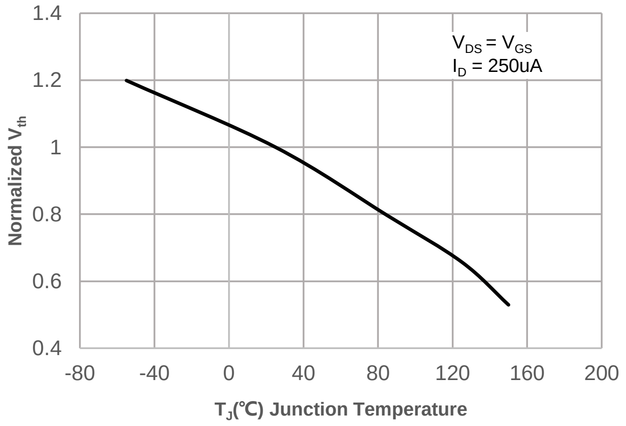


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

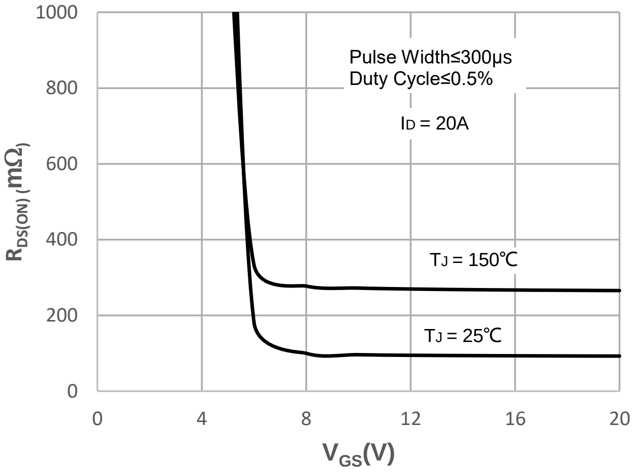
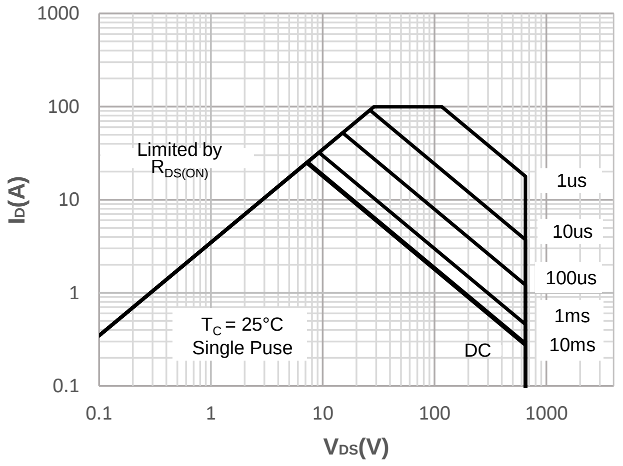


Figure 15: Maximum Safe Operating Area



Test Circuit

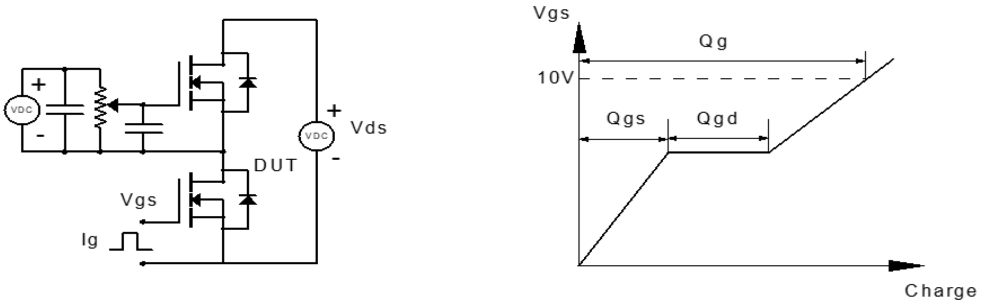


Figure 1: Gate Charge Test Circuit & Waveform

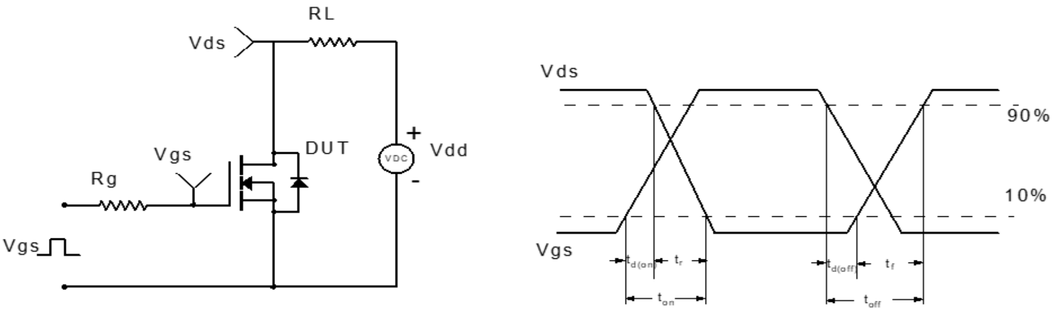


Figure 2: Resistive Switching Test Circuit & Waveform

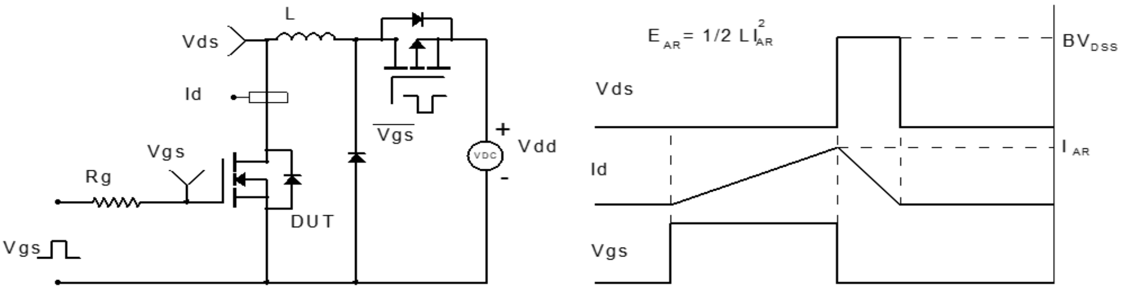


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

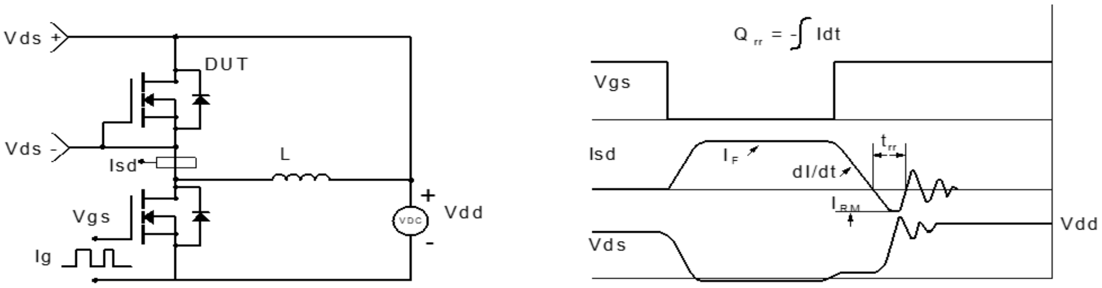
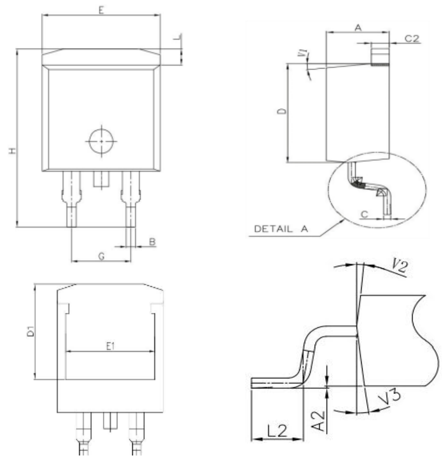


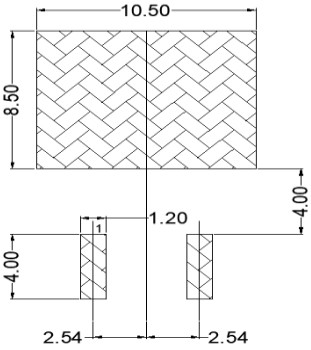
Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(TO-263-3L)

Package Outline



Land Pattern
(Only for Reference)



SYMBOL	DIMENSIONS		
	MIN	NOM	MAX
A	4.3	4.55	4.7
A2	0		0.15
B	0.75	0.8	0.85
C	0.38	0.46	0.55
C2	1.25	1.3	1.35
D	8.9	9.3	9.6
D1	7.4	7.65	7.9
E	9.9	10.05	10.21
E1	8.3	8.6	8.9
G	5.03	5.08	5.13
H	14.7	15	15.8
L2	2.2	2.35	2.5
L	1.16	1.36	1.61