

Features

- Fast Switching
- Low On-Resistance
- Low Gate Charge
- Low Reverse transfer capacitances
- High avalanche ruggedness
- RoHS product

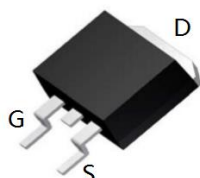
Application

- Switching applications
- Motor drivers

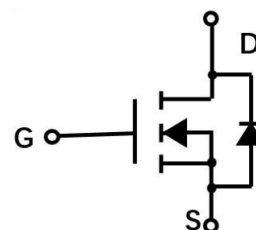
Product Summary



V_{DS}	100	V
$R_{DS(on), Typ @ V_{GS}=10V}$	3.2	mΩ
I_D	170	A



TO-263



ABSOLUTE RATINGS at $T_C=25^{\circ}\text{C}$, unless otherwise specified

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	100	V
I_D	Continuous Drain Current, Silicon Limited	170	A
	Continuous Drain Current @ $T_C=100^{\circ}\text{C}$, Silicon Limited	109	A
I_{DM} ^{Note1}	Pulsed Drain Current	480	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS} ^{Note2}	Avalanche Energy	625	mJ
P_D	Power Dissipation	227.2	W
	Derating Factor above 25°C	1.82	W/ $^{\circ}\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^{\circ}\text{C}$
T_L	Maximum Temperature for Soldering	260	$^{\circ}\text{C}$

Note1: Repetitive Rating: Pulse width limited by maximum junction temperature

Note2: $L=0.5\text{mH}$, $I_{as}=50\text{A}$, Start $T_J=25^{\circ}\text{C}$

Thermal characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	thermal resistance, Junction-Case	0.55	$^{\circ}\text{C/W}$
$R_{\theta JA}$	thermal resistance, Junction-Ambient	62.5	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_C=25^{\circ}\text{C}$, unless otherwise specified

OFF Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
V_{DS}	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	100	--	--	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$	--	--	1	μA
		$V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$ @ $T_C=125^{\circ}\text{C}$	--	--	100	μA
$I_{GSS(F)}$	Gate-Source Forward Leakage	$V_{GS}=+20\text{V}$	--	--	100	nA
$I_{GSS(R)}$	Gate-Source Reverse Leakage	$V_{GS}=-20\text{V}$	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Values			Unit
			Min	Typ	Max	
$R_{DS(on)}$	Drain-Source On-Resistance	$V_{GS}=10\text{V}$, $I_D=50\text{A}$	--	3.2	4.0	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0	3.1	4.0	V
Pulse width $t_p \leq 300\mu\text{s}$, $\delta \leq 2\%$						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
C_{iss}	Input Capacitance	$V_{DS}=50\text{V}$, $V_{GS}=0$, $f=1\text{MHz}$	--	6907	--	pF
C_{oss}	Output Capacitance		--	956	--	
C_{rss}	Reverse Transfer Capacitance		--	114	--	
Q_g	Total Gate Charge	$V_{DD}=50\text{V}$, $I_D=50\text{A}$, $V_{GS}=10\text{V}$	--	102	--	nC
Q_{gs}	Gate-Source charge		--	30	--	
Q_{gd}	Gate-Drain charge		--	19.6	--	

Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
$t_{d(on)}$	Turn-On Delay Time	$V_{DD}=50\text{V}$, $I_D=50\text{A}$, $V_{GS}=10\text{V}$, $R_G=3\Omega$, Resistive Load	--	29	--	ns
t_r	Rise Time		--	33	--	
$t_{d(off)}$	Turn-Off Delay Time		--	48	--	
t_f	Fall Time		--	26	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
I_S	Continuous Source Current		--	--	120	A
I_{SM}	Maximum Pulsed Current		--	--	480	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0\text{V}$, $I_S=50\text{A}$	--	--	1.2	V
T_{rr}	Reverse Recovery Time	$I_S=50\text{A}$, $di/dt=100\text{A}/\mu\text{s}$	--	80	--	ns
Q_{rr}	Reverse Recovery Charge		--	189	--	μC

Characteristics Curves

Figure 1. Safe Operating Area

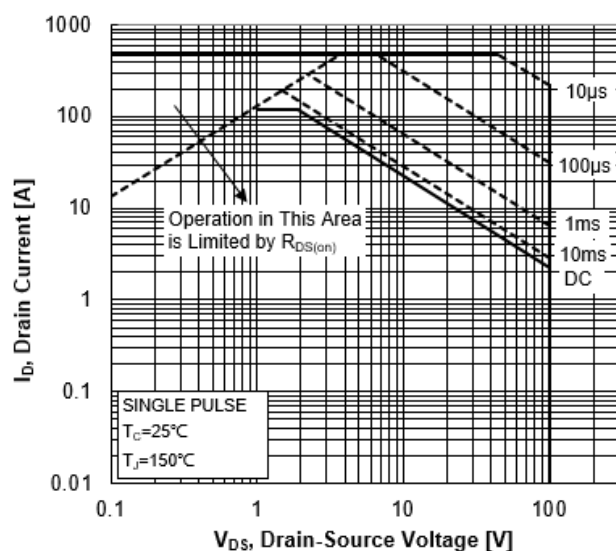


Figure 2. Maximum Power Dissipation vs Case Temperature

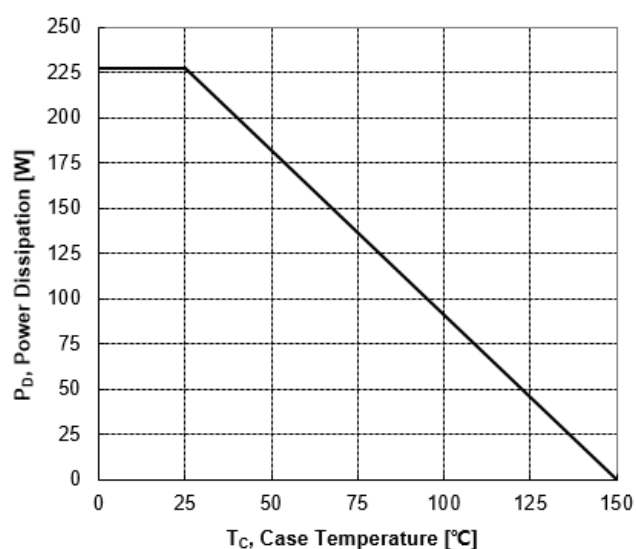


Figure 3. Maximum Continuous Drain Current vs Case Temperature

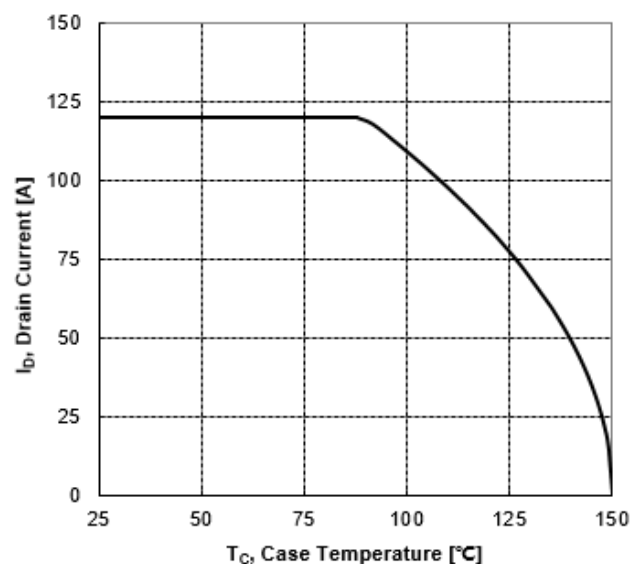


Figure 4. Typical Output Characteristics

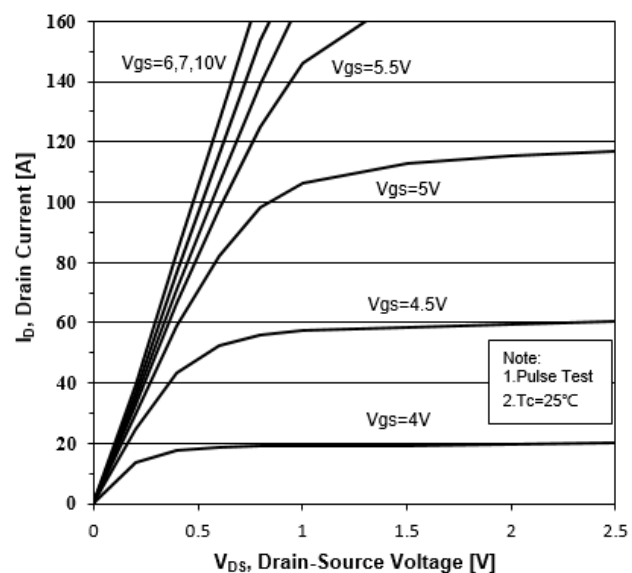


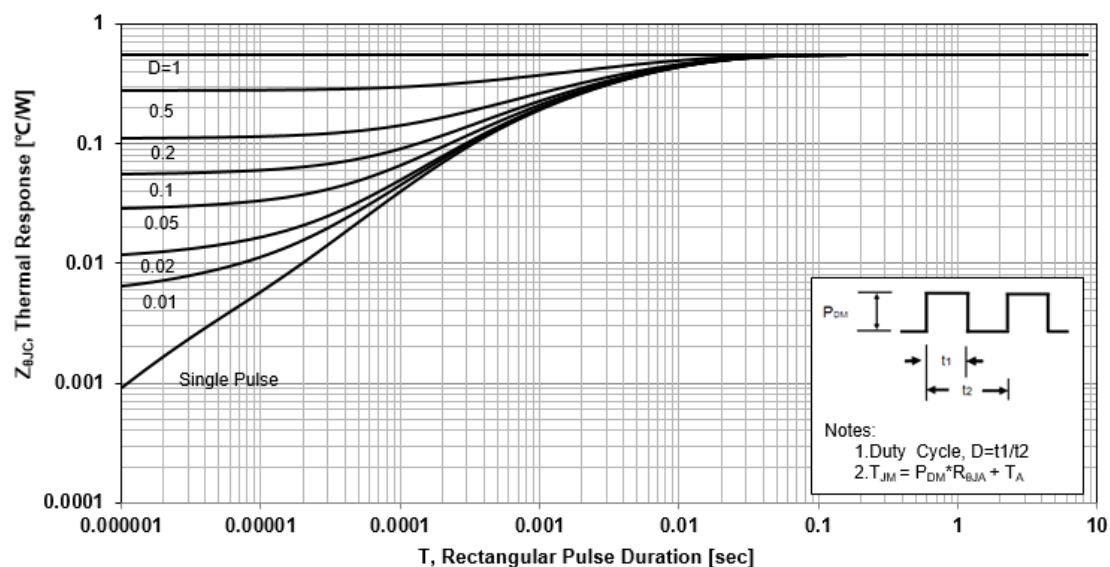
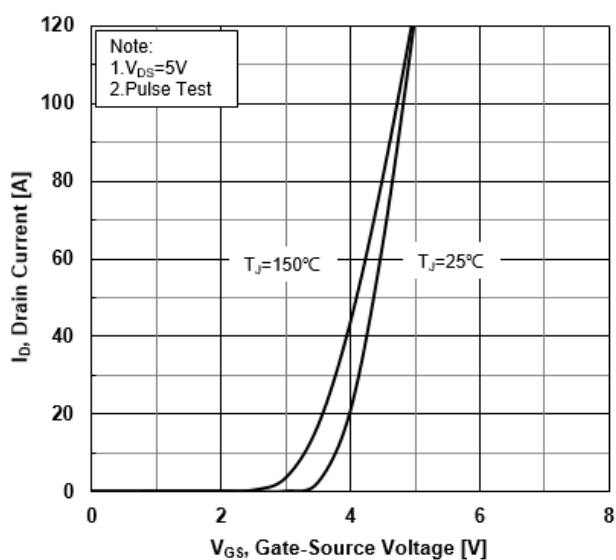
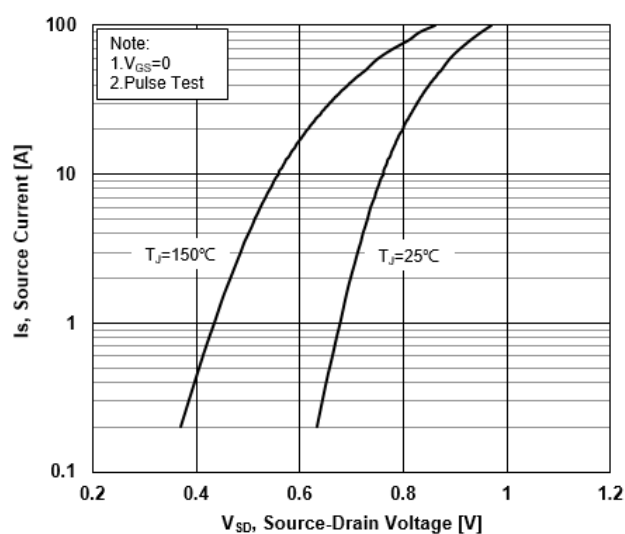
Figure 5. Transient Thermal Impedance

Figure 6. Typical Transfer Characteristics

Figure 7. Source-Drain Diode Forward Characteristics


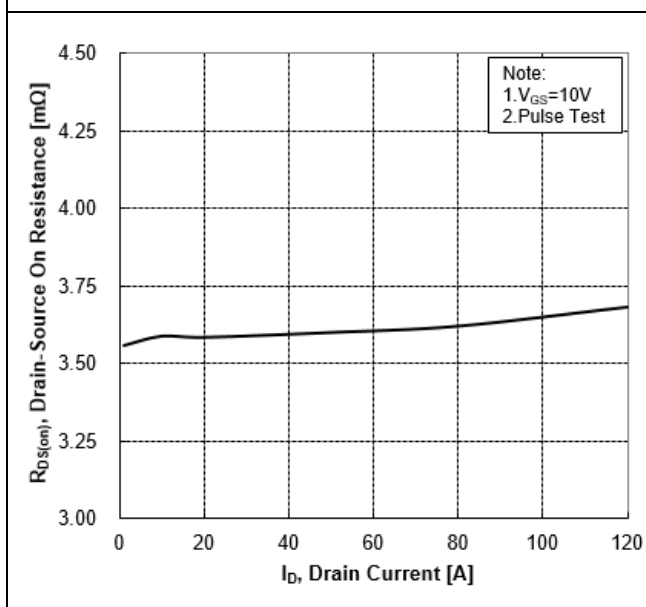
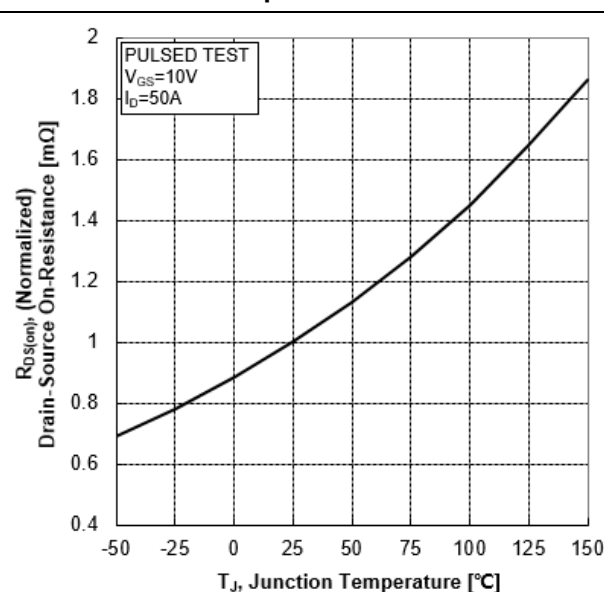
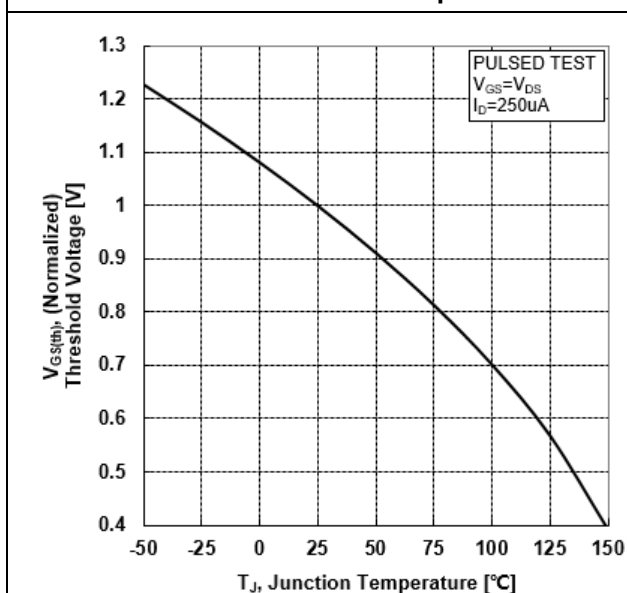
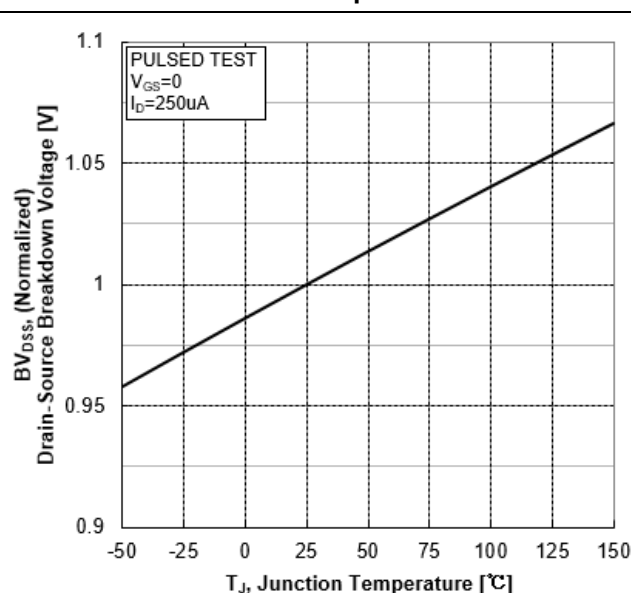
Figure 8. Drain-Source On-Resistance vs Drain Current

Figure 9. Normalized On-Resistance vs Junction Temperature

Figure 10. Normalized Threshold Voltage vs Junction Temperature

Figure 11. Normalized Breakdown Voltage vs Junction Temperature


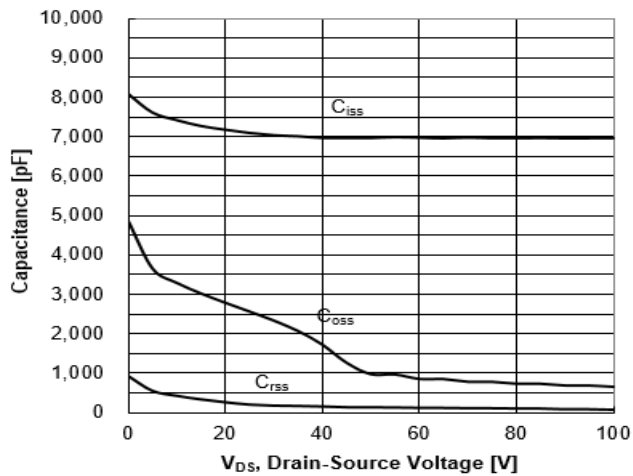
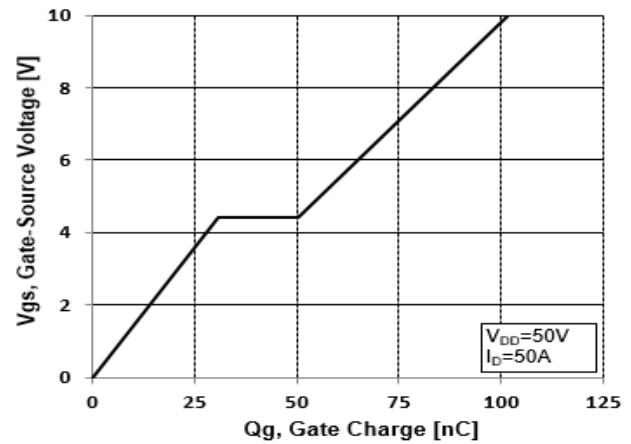
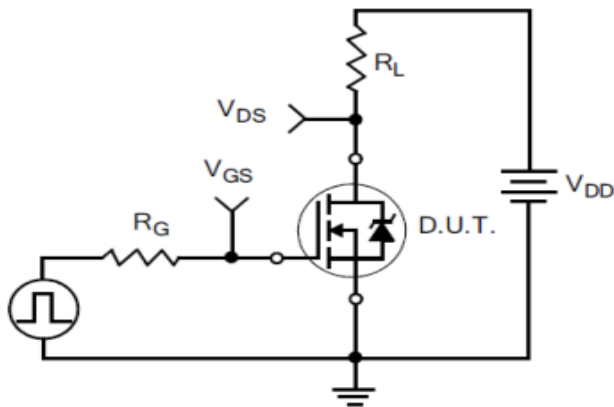
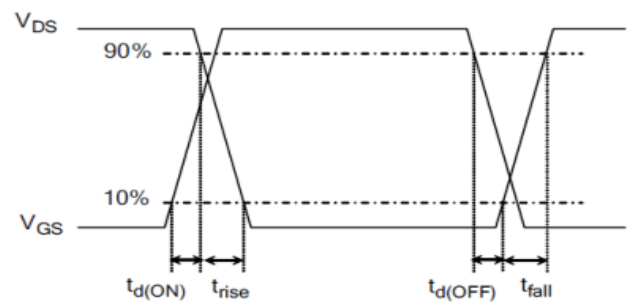
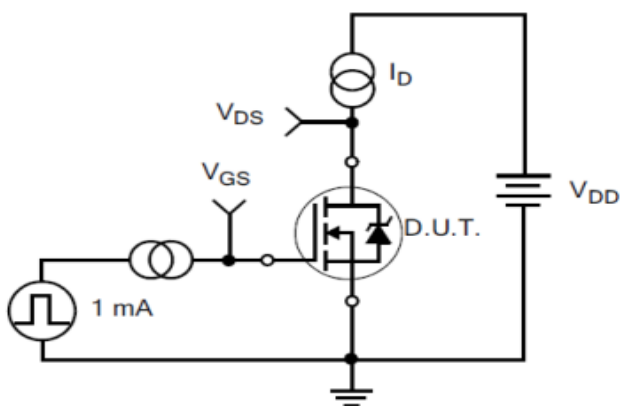
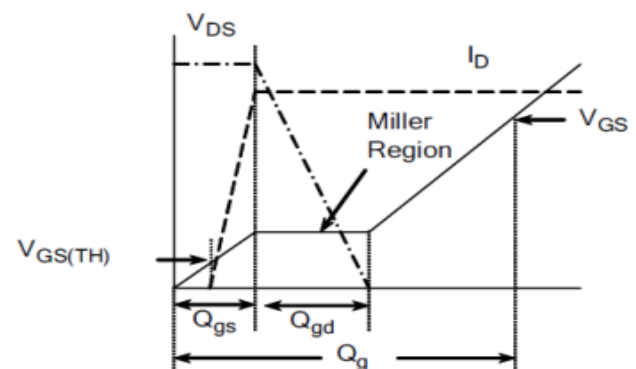
Figure 12. Capacitance Characteristics

Figure 13. Typical Gate Charge vs Gate-Source Voltage

Figure 14. Resistive Switching Test Circuit

Figure 15. Resistive Switching Waveforms

Figure 16. Gate Charge Test Circuit

Figure 17. Gate Charge Waveforms


Figure 18. Diode Reverse Recovery Test Circuit

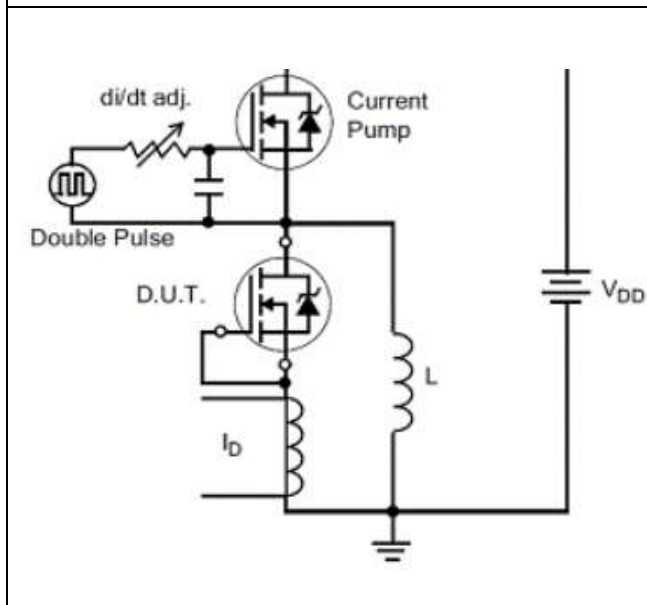


Figure 19. Diode Reverse Recovery Waveform

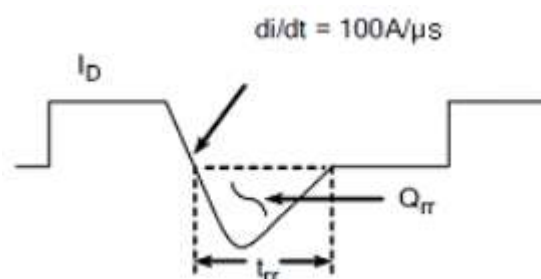


Figure 20. Unclamped Inductive Switching Test Circuit

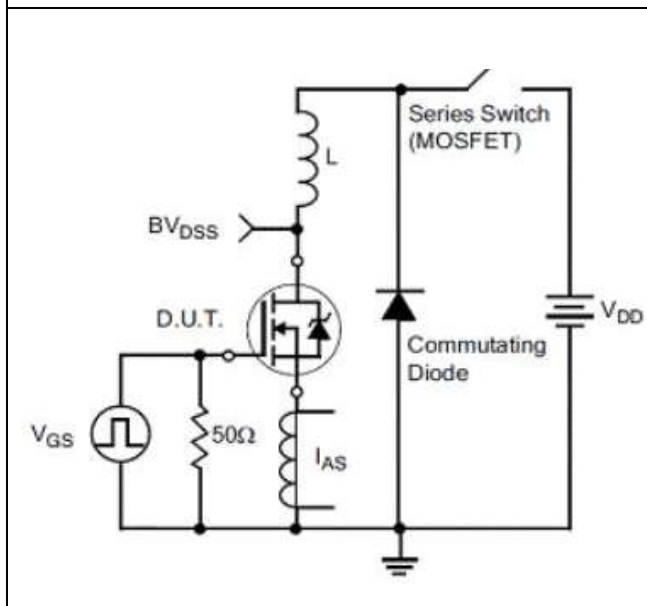
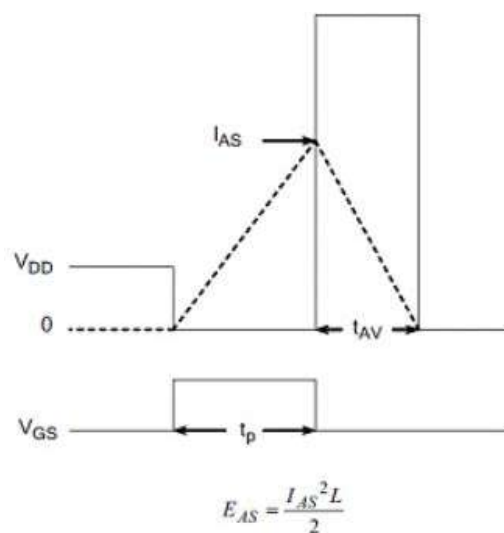
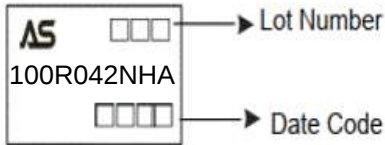


Figure 21. Unclamped Inductive Switching Waveform

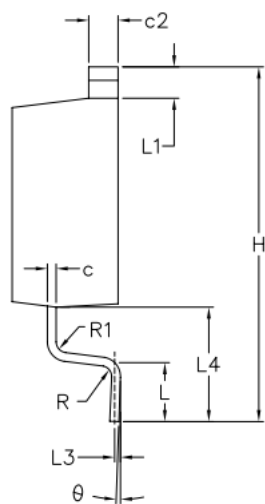
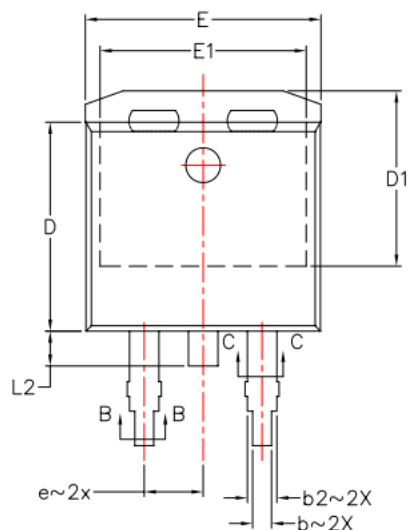


Ordering and Marking Information

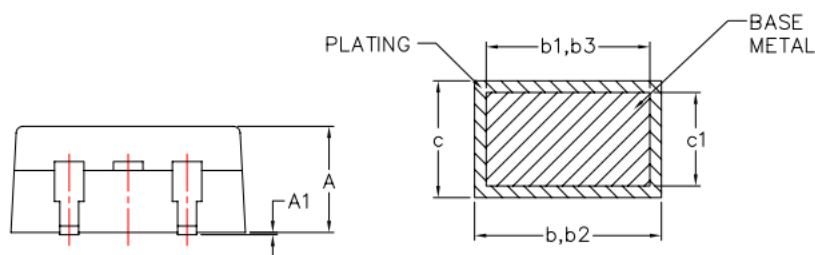
Ordering Device No.	Marking	Package	Packing	Quantity
ASDM100R042NHAG-R	100R042NHA	TO-263	Tape&Reel	800/Reel

PACKAGE	MARKING
TO-263	 The diagram shows a rectangular marking area on a TO-263 package. It contains the ASDsemi logo (AS), the part number 100R042NHA, and two sets of four empty boxes. Arrows point from these boxes to the labels 'Lot Number' and 'Date Code' respectively.

TO-263



DIMENSIONS	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	4.064	4.826	0.160	0.190
A1	0.000	0.254	0.000	0.010
b	0.508	0.991	0.020	0.039
b1	0.508	0.889	0.020	0.035
b2	1.143	1.778	0.045	0.070
b3	1.143	1.727	0.045	0.068
c	0.381	0.737	0.015	0.029
c1	0.381	0.584	0.015	0.023
c2	1.143	1.651	0.045	0.065
D	8.382	9.652	0.330	0.380
D1	6.858	—	0.270	—
E	9.652	10.668	0.380	0.420
E1	6.223	—	0.245	—
e	2.540 BSC.		0.100 BSC.	
H	14.605	15.875	0.575	0.625
L	1.778	2.794	0.070	0.110
L1	—	1.676	—	0.066
L2	—	1.778	—	0.070
L3	0.254 BSC		0.010 BSC	
L4	4.780	5.280	0.188	0.208
R	0.460 TYP		0.018 TYP	
R1	0.460 TYP		0.018 TYP	
θ	0°	8°	0°	8°



NOTES:
 1.Dimension D & E Does Not Include Mold Flash
 2.Dimension b2 Does Not Include Protrusions

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