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RFG40N10, RFP40N10, RF1S40N10SM

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

	RFG40N10, RFP40N10, RF1S40N10SM	UNITS
Drain to Source Breakdown Voltage (Note 1)	100	V
Drain to Gate Voltage ($R_{GS} = 1\text{M}\Omega$) (Note 1)	100	V
Gate to Source Voltage	± 20	V
Drain Current		
Continuous (Figure 2)	40	A
Pulsed Drain Current (Note 2)	100	A
Pulsed Avalanche Rating	Figures 4, 12, 13	
Power Dissipation	160	W
Derate Above 25°C	1.07	W/ $^\circ\text{C}$
Operating and Storage Temperature	-55 to 175	$^\circ\text{C}$
Maximum Temperature for Soldering		
Leads at 0.063in (1.6mm) from case for 10s	300	$^\circ\text{C}$
Package Body for 10s, see Techbrief 334	260	$^\circ\text{C}$

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTES:

1. $T_J = 25^\circ\text{C}$ to 150°C .
2. Repetitive Rating: pulse width limited by maximum junction temperature.

Electrical Specifications $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Drain to Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$ (Figure 9)	100	-	-	V
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}$, $I_D = 250\mu\text{A}$ (Figure 8)	2	-	4	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80\text{V}$, $V_{GS} = 0\text{V}$	$T_C = 25^\circ\text{C}$	-	1	μA
			$T_C = 150^\circ\text{C}$	-	50	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}$	-	-	± 100	nA
Drain to Source On Resistance	$r_{DS(ON)}$	$I_D = 40\text{A}$, $V_{GS} = 10\text{V}$ (Figure 7)	-	-	0.040	Ω
Turn-On Time	t_{ON}	$V_{DD} = 50\text{V}$, $I_D = 20\text{A}$, $R_L = 2.5\Omega$, $V_{GS} = 10\text{V}$, $R_{GS} = 4.2\Omega$ (Figure 11)	-	-	80	ns
Turn-On Delay Time	$t_{d(ON)}$		-	17	-	ns
Rise Time	t_r		-	30	-	ns
Turn-Off Delay Time	$t_{d(OFF)}$		-	42	-	ns
Fall Time	t_f		-	20	-	ns
Turn-Off Time	t_{OFF}		-	-	100	ns
Total Gate Charge	$Q_{g(TOT)}$		$V_{GS} = 0\text{V}$ to 20V	-	-	300
Gate Charge at 10V	$Q_{g(10)}$	$V_{GS} = 0\text{V}$ to 10V	-	-	150	nC
Threshold Gate Charge	$Q_{g(TH)}$	$V_{GS} = 0\text{V}$ to 2V	-	-	7.5	nC
Thermal Resistance Junction to Case	$R_{\theta JC}$		-	-	0.94	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	TO-247	-	-	30	$^\circ\text{C}/\text{W}$
		TO-220AB and TO-263AB	-	-	62	$^\circ\text{C}/\text{W}$

Source to Drain Diode Specifications

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Source to Drain Diode Voltage	V_{SD}	$I_{SD} = 40\text{A}$	-	-	1.5	V
Reverse Recovery Time	t_{rr}	$I_{SD} = 40\text{A}$, $dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	200	ns

Typical Performance Curves Unless Otherwise Specified

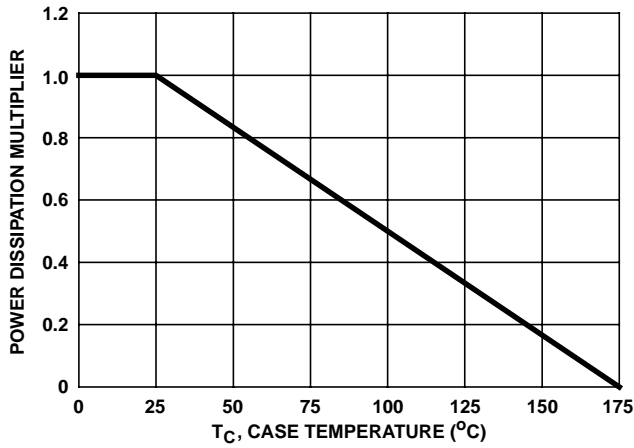


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

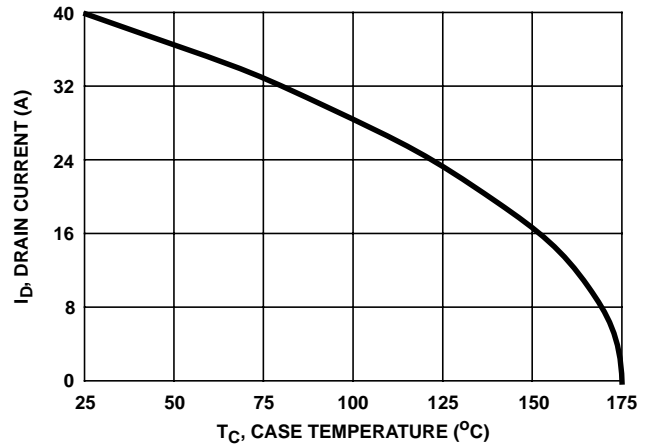


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

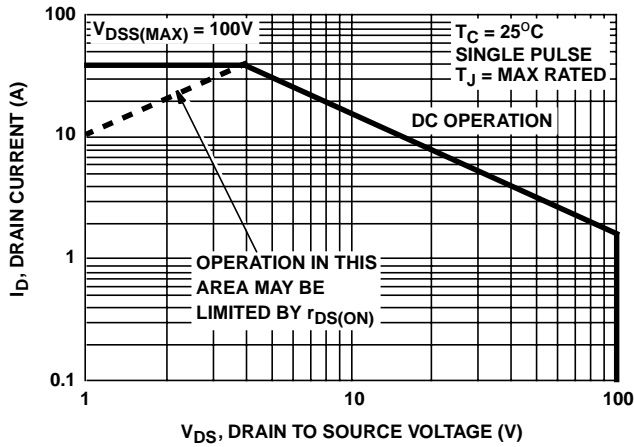
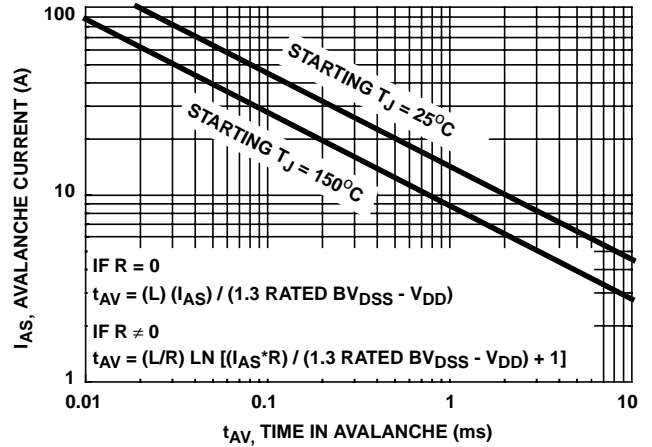


FIGURE 3. FORWARD BIAS SAFE OPERATING AREA



NOTE: Refer to Intersil application notes AN9321 and AN9322.

FIGURE 4. UNCLAMPED INDUCTIVE SWITCHING CAPABILITY

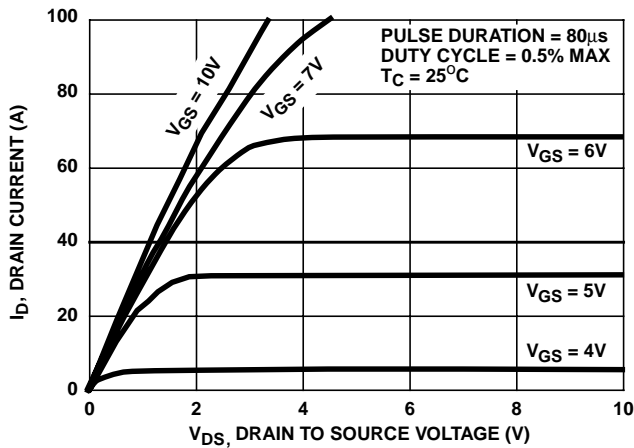


FIGURE 5. SATURATION CHARACTERISTICS

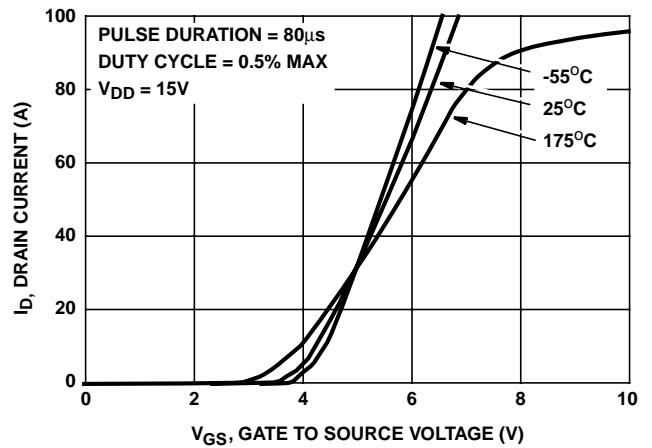
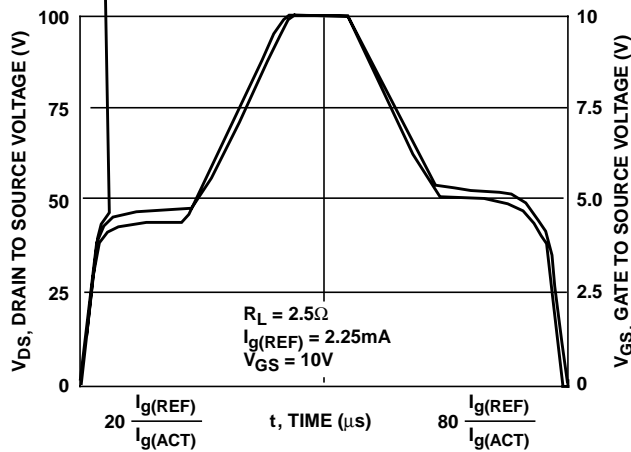
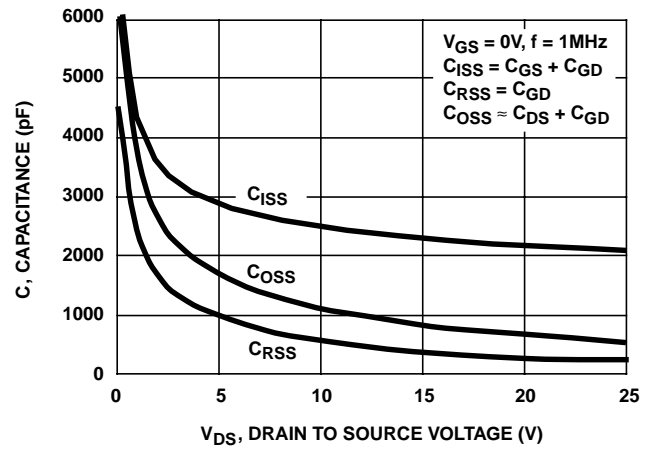
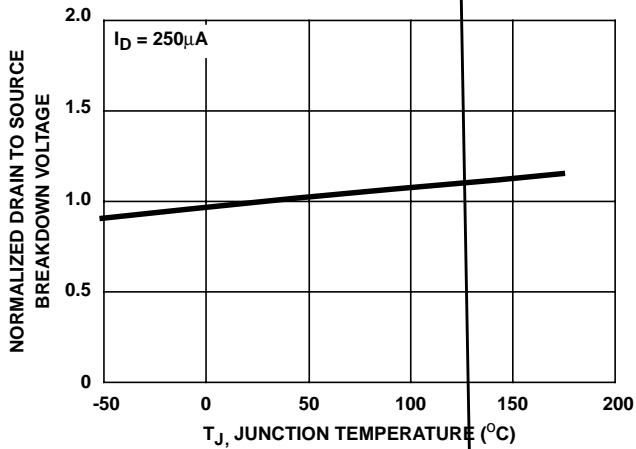
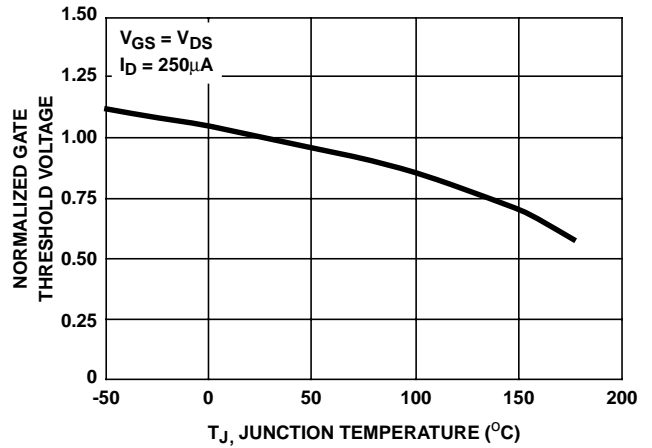
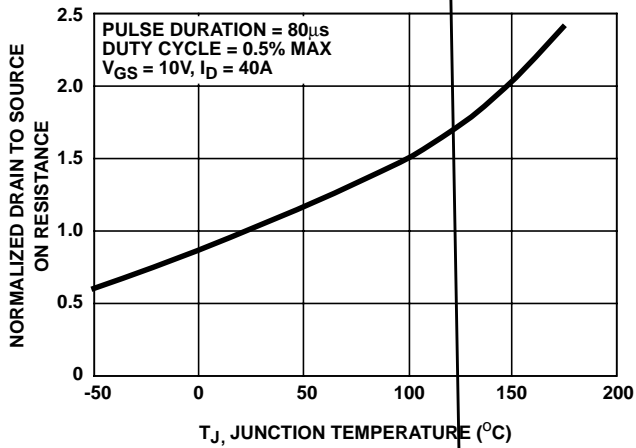


FIGURE 6. TRANSFER CHARACTERISTICS

Typical Performance Curves Unless Otherwise Specified (Continued)



NOTE: Refer to Intersil Application Notes AN7254 and AN7260.

FIGURE 11. NORMALIZED SWITCHING WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

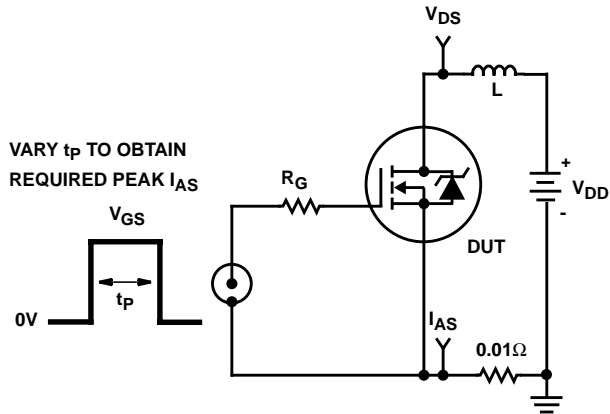


FIGURE 12. UNCLAMPED ENERGY TEST CIRCUIT

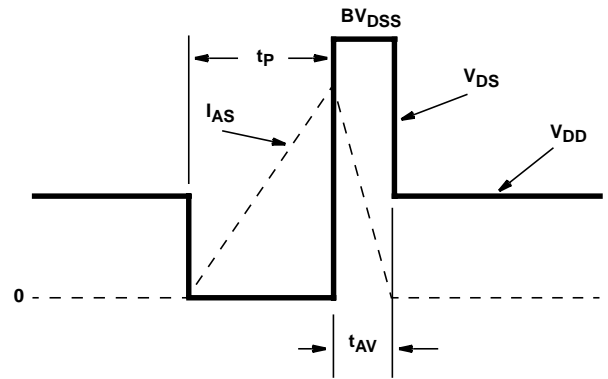


FIGURE 13. UNCLAMPED ENERGY WAVEFORMS

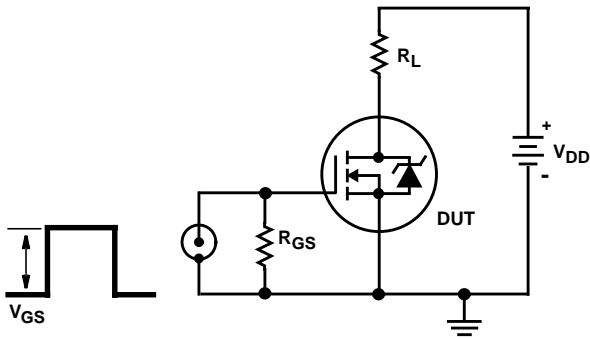


FIGURE 14. SWITCHING TIME TEST CIRCUIT

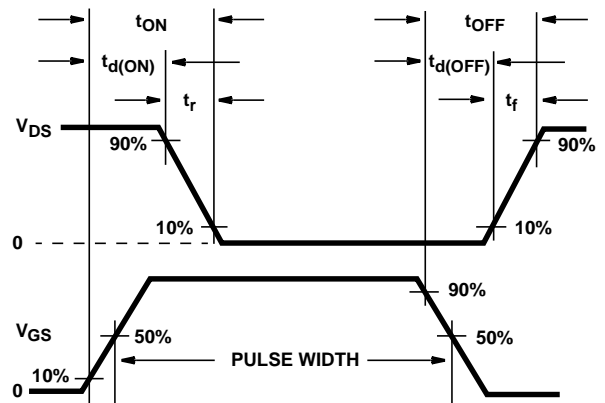


FIGURE 15. RESISTIVE SWITCHING WAVEFORMS

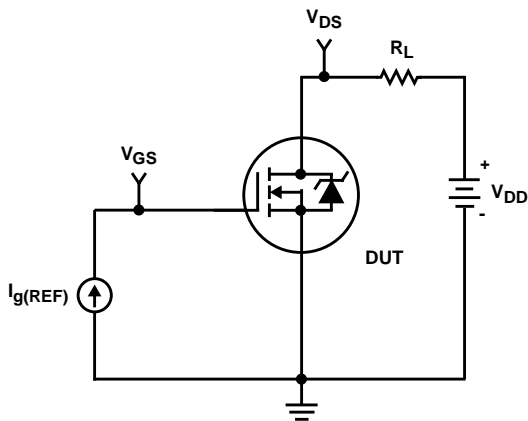


FIGURE 16. GATE CHARGE TEST CIRCUIT

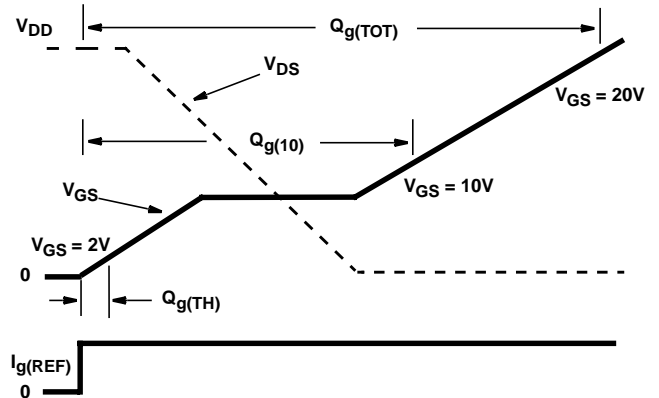


FIGURE 17. GATE CHARGE WAVEFORMS

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