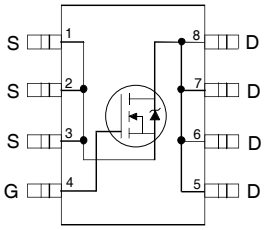
IRF8736

30V N-Channel MOSFET

Applications

- Synchronous MOSFET for Notebook Processor Power
- Synchronous Rectifier MOSFET for Isolated DC-DC Converters in Networking Systems



Top View

Benefits

- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Low Gate Charge
- Fully Characterized Avalanche Voltage and Current
  100% Tested for R_G
- Lead -Free
- $V_{DS\,(V)}$ = 30V
- I_D = -18A (V_{GS} = 10V)
- $R_{DS(ON)}$ ＜4.8mΩ (V_{GS}=10V)
- $R_{DS(ON)}$ ＜6.8mΩ (V_{GS}=4.5V)

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	18	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	14.4	
I_{DM}	Pulsed Drain Current ①	144	
P_D @T_A = 25°C	Power Dissipation ④	2.5	W
P_D @T_A = 70°C	Power Dissipation ④	1.6	
	Linear Derating Factor	0.02	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤		20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④⑤		50	

Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	30			V	V_{GS} = 0V, I_D = 250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.022		V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		3.9	4.8	mΩ	V_{GS} = 10V, I_D = 18A ③
			5.5	6.8		V_{GS} = 4.5V, I_D = 14.4A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	1.8	2.35	V	V_{DS} = V_{GS}, I_D = 50μA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient		-6.1		mV/°C	
I_{DSS}	Drain-to-Source Leakage Current			1.0	μA	V_{DS} = 24V, V_{GS} = 0V
				150		V_{DS} = 24V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage			100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage			-100		V_{GS} = -20V
gfs	Forward Transconductance	52			S	V_{DS} = 15V, I_D = 14.4A
Q_g	Total Gate Charge		17	26		
Q_{gs1}	Pre-Vth Gate-to-Source Charge		4.4			V_{DS} = 15V
Q_{gs2}	Post-Vth Gate-to-Source Charge		1.9		nC	V_{GS} = 4.5V
Q_{gd}	Gate-to-Drain Charge		5.8			I_D = 14.4A
Q_{godr}	Gate Charge Overdrive		4.9			See Fig. 16
Q_{sw}	Switch Charge (Q_{gs2} + Q_{gd})		7.7			
Q_{oss}	Output Charge		7.1		nC	V_{DS} = 10V, V_{GS} = 0V
R_G	Gate Resistance		1.3	2.2	Ω	
$t_{d(on)}$	Turn-On Delay Time		12			V_{DD} = 15V, V_{GS} = 4.5V ③
t_r	Rise Time		15			I_D = 14.4A
$t_{d(off)}$	Turn-Off Delay Time		13		ns	R_G = 1.8Ω
t_f	Fall Time		7.5			See Fig. 14
C_{iss}	Input Capacitance		2315			V_{GS} = 0V
C_{oss}	Output Capacitance		449		pF	V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance		219			f = 1.0MHz
I_S	Continuous Source Current (Body Diode)			3.1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①			144		
V_{SD}	Diode Forward Voltage			1.0	V	T_J = 25°C, I_S = 14.4A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time		16	24	ns	T_J = 25°C, I_F = 14.4A, V_{DD} = 10V
Q_{rr}	Reverse Recovery Charge		19	29	nC	di/dt = 300A/μs ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②		126	mJ
I_{AR}	Avalanche Current ①		14.4	A

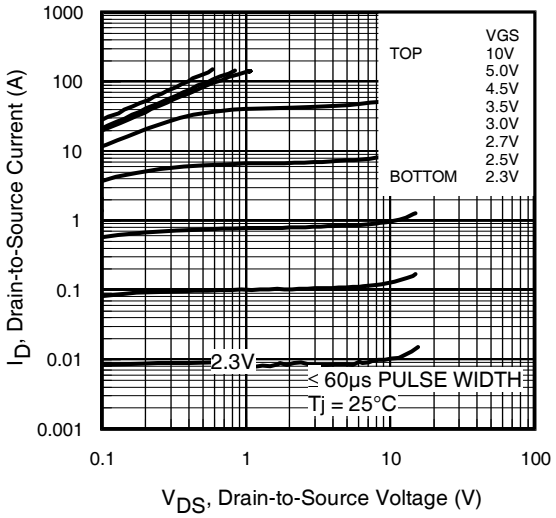


Fig 1. Typical Output Characteristics

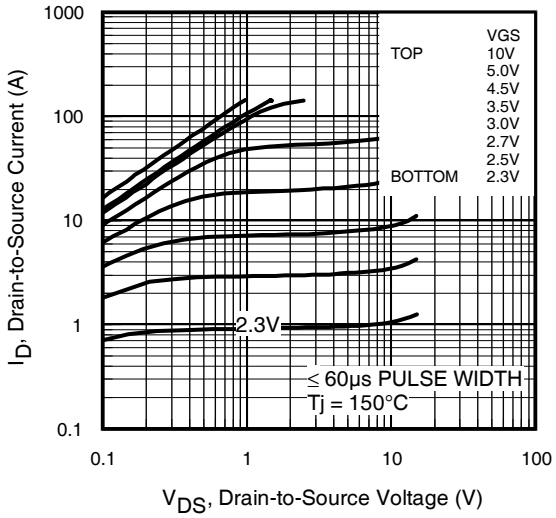


Fig 2. Typical Output Characteristics

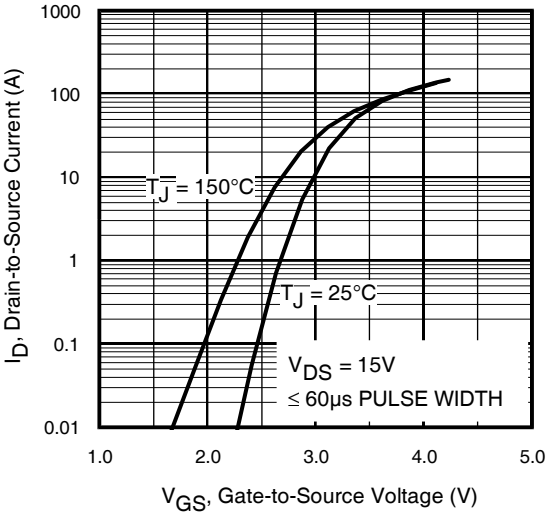


Fig 3. Typical Transfer Characteristics

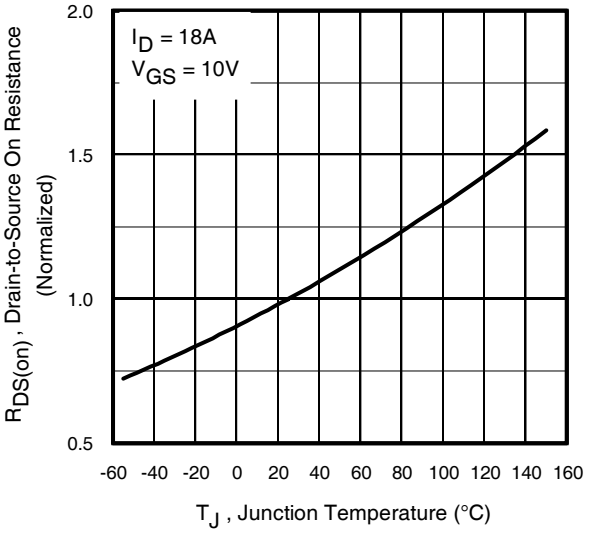


Fig 4. Normalized On-Resistance Vs. Temperature

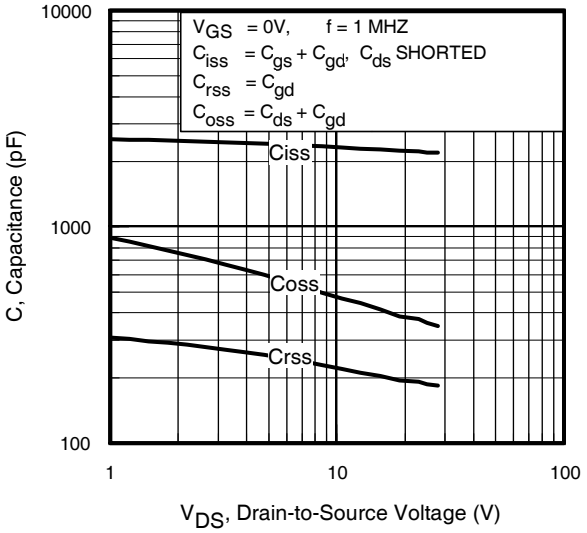


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

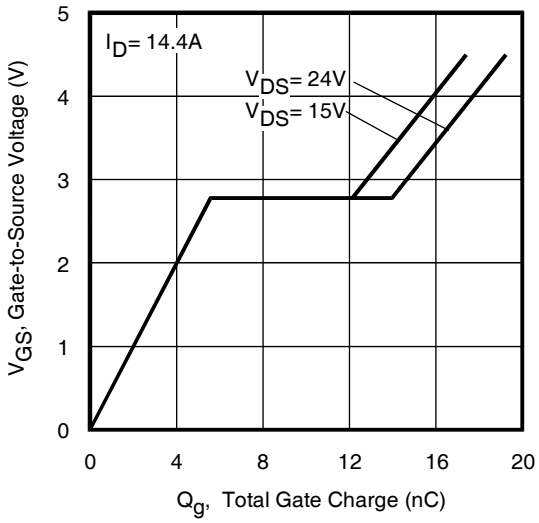


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

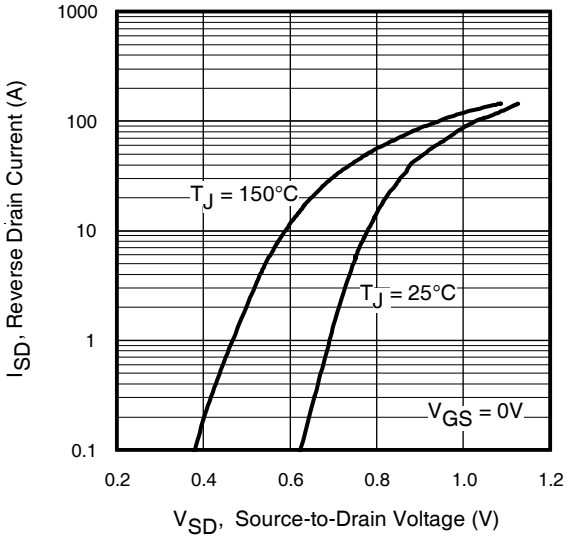


Fig 7. Typical Source-Drain Diode Forward Voltage

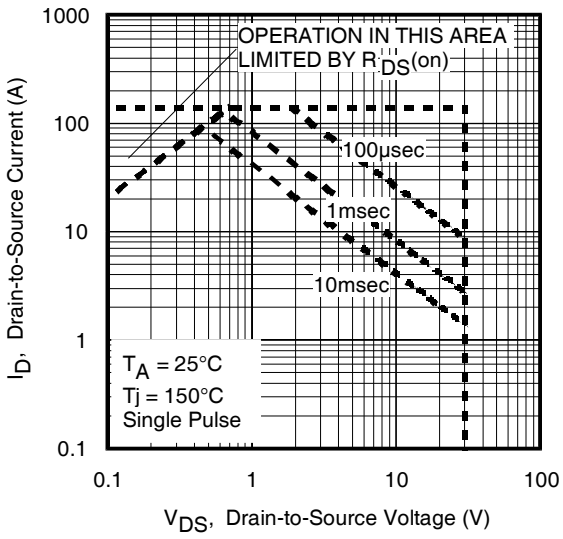


Fig 8. Maximum Safe Operating Area

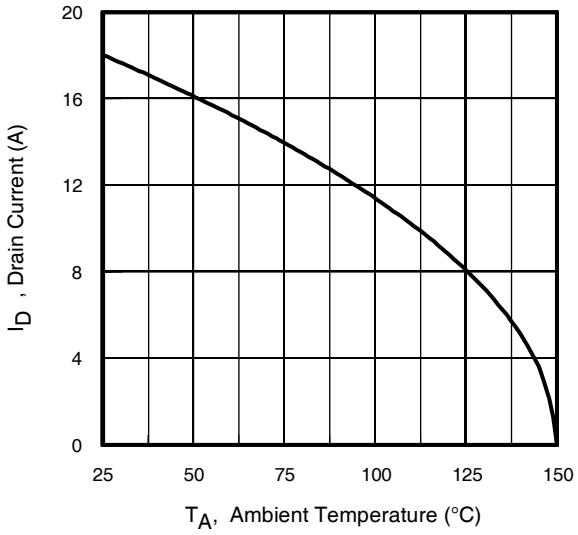


Fig 9. Maximum Drain Current Vs. Ambient Temperature

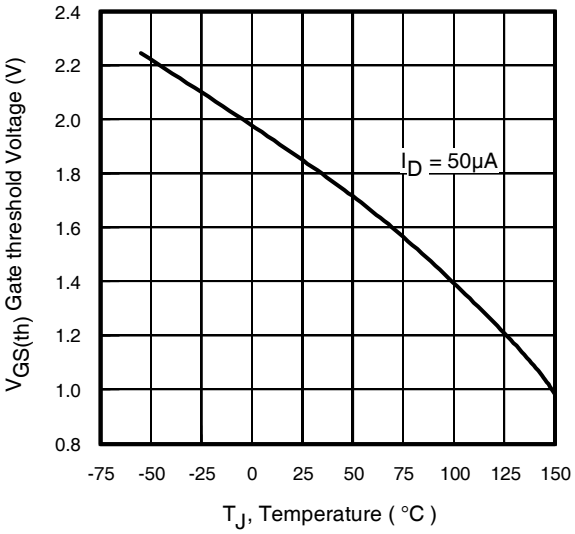


Fig 10. Threshold Voltage Vs. Temperature

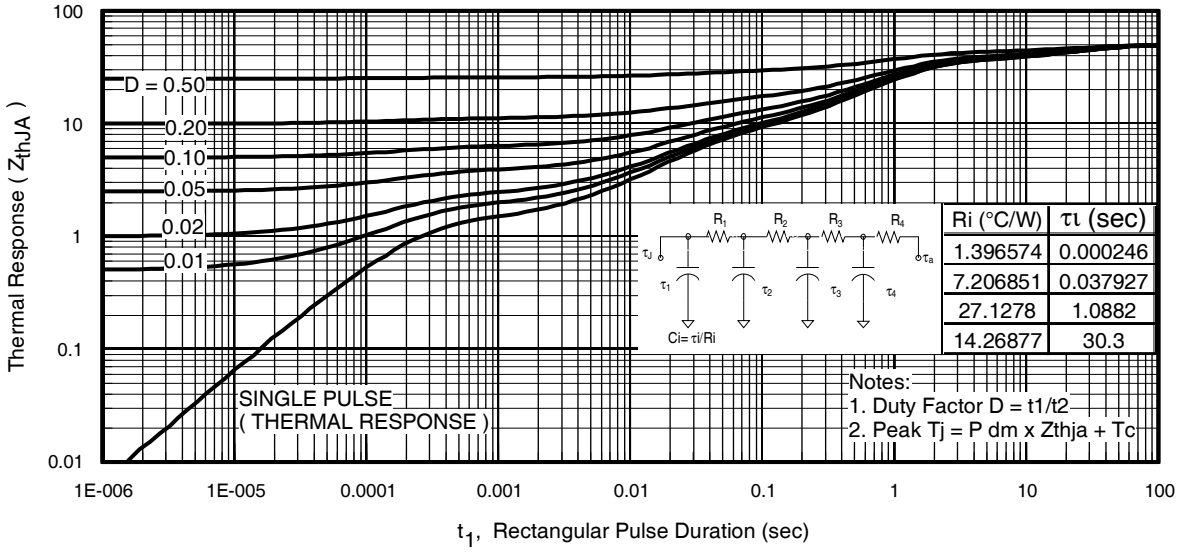


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

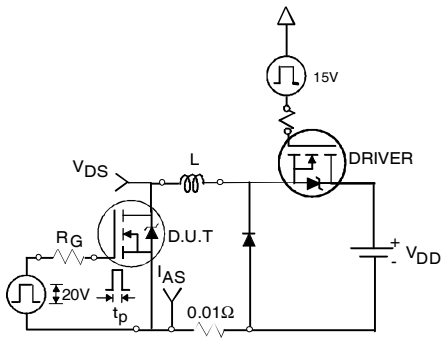


Fig 12a. Unclamped Inductive Test Circuit

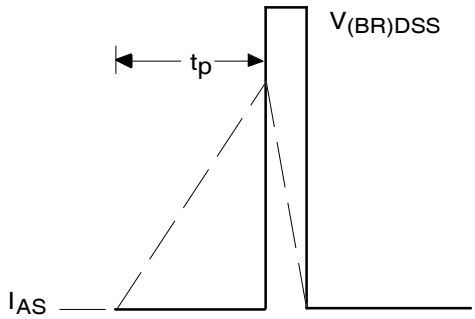


Fig 12b. Unclamped Inductive Waveforms

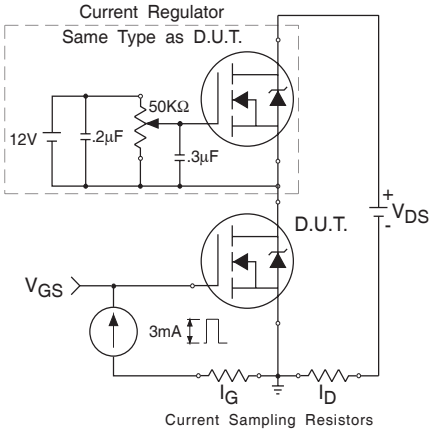


Fig 13. Gate Charge Test Circuit

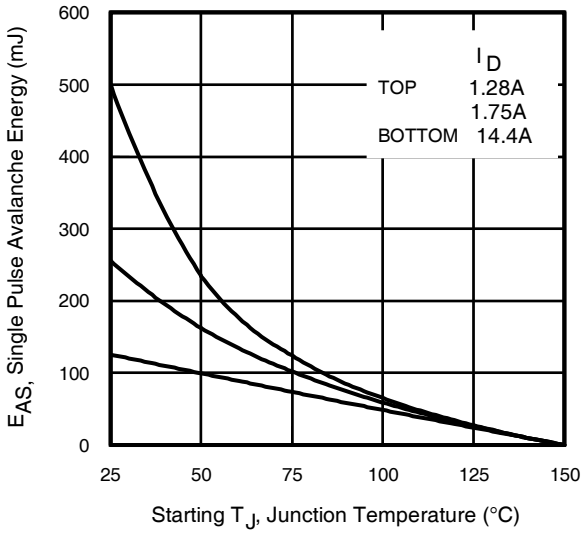


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

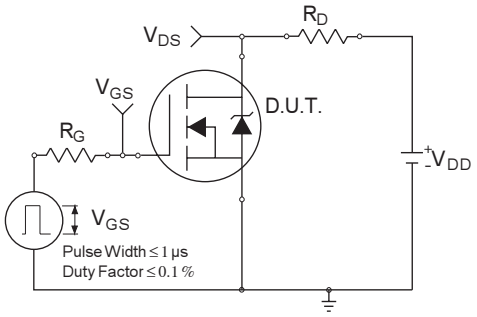


Fig 14a. Switching Time Test Circuit

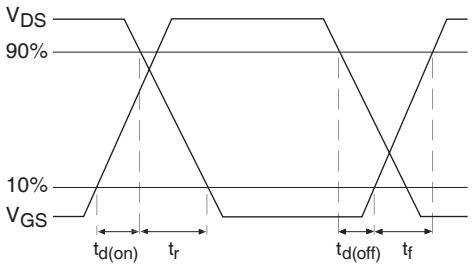
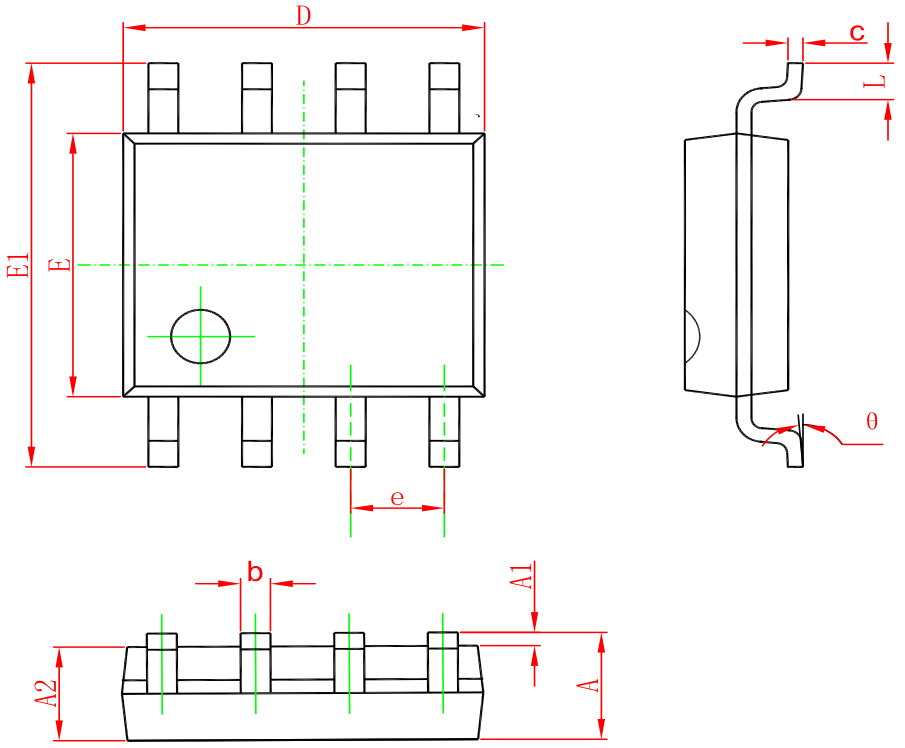


Fig 14b. Switching Time Waveforms

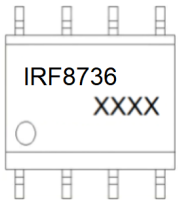
PACKAGE OUTLINE DIMENSIONS

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
IRF8736	SOP-8	3000	Tape and reel